Journal of Circuits, Systems, and Computers
Vol. 29, No. 2 (2020) 2050019 (21 pages)
© World Scientific Publishing Company
DOI: 10.1142/S021812662050019X

World Scientific
www.worldscientific.com

J CIRCUIT SYST COMP 2020.29. Downloaded from www.worldscientific.com
by UNIVERSITY OF BIRMINGHAM on 04/14/20. Re-use and distribution is strictly not permitted, except for Open Access articles

Normally Bypassed Cascaded Sources Multilevel Inverter with RGA Optimization for Reduced Output Distortion and Formulaic Passive Filter Design*

G. Chitrakala†
Department of Electrical and Electronics Engineering,
E. G. S. Pillay Engineering College,
Nagapattinam, Tamil Nadu 611002, India
mohan.chitrakala@yahoo.com

N. Stalin
Department of Petrochemical Technology,
Anna University BIT Campus,
Tiruchirappalli, Tamil Nadu 620024, India

V. Mohan
Department of Electrical and Electronics Engineering,
E. G. S. Pillay Engineering College,
Nagapattinam, Tamil Nadu 611002, India

Received 21 December 2018
Accepted 23 February 2019
Published 3 April 2019

The distributed generation involving multiple photovoltaic sources and synthesizing high-quality ac voltage from those multiple dc sources are nascent research ambits. A host of multilevel inverters (MLIs) has been ascertained for performing above errand diligently, where the component count is obnoxious. The single phase seven-level inverter is an acquiescent compromise between the circuit complexity and the quality of the output. Further enhancement on the performance can be succored through optimizing dc link voltages and switching angles. This paper proposes a component count pruned MLI structure and also a refined genetic algorithm (RGA)-based optimization scheme for the computation of both dc link voltages and switching angles. Previous attempts for this problem have solved the switching angles with the objective of resulting minimum harmonic content in the staircase-shaped output voltage. The dc link voltage of each level is however assumed to be the same and constant. As an extension, RGA-based optimization of both dc link voltages and switching angles is triumphed. The harmonic profile of the proposed switching strategy is simulated and also corroborated by a hardware prototype. In practice, the proposed fundamental switched strategy is apposite, in which each

*This paper was recommended by Regional Editor Piero Malcovati.
†Corresponding author.

ATTESTED
Dr. S. RAMABALAN, M.E., PH.D.,
PRINCIPAL
E.G.S. pillay Engineering College,
Nagapattinam - 611 002.

ISSN NO : 1869-9391

CASCADED MULTILEVEL INVERTER WITH MPPT FOR PV SYSTEM

R. Anandaraj[1] | R.Natarajan [2] | M.Vijayakumar[3] | T. Suresh Padmanabhan[4] | V. Mohan [5]

[1] Associate Professor, Department of EEE, EGS Pillay Engineering College, Nagapattinam, India.

[2] PG Scholar, Department of PED, EGS Pillay Engineering College, Nagapattinam, India.

[3] Associate Professor, Department of EEE, EGS Pillay Engineering College, Nagapattinam, India.

[4] Professor, Department of EEE, EGS Pillay Engineering College, Nagapattinam, India.

[5] Professor & Head, Department of EEE, EGS Pillay Engineering College, Nagapattinam, India

TRACT: The multilevel inverters (MLI) have been d since mid-1970. The term multilevel originated three-level inverter. Subsequently, several ... inverter topologies continue to emerge, especially in the last two decades. They are power-conversion systems composed by an array of power semiconductors and DC voltage sources that, when appropriately connected and controlled, can generate a multiple-step voltage waveform with variable and controllable frequency, phase and amplitude. This paper presents a new E-type multilevel module for asymmetrical multilevel inverter with reduced components. Each module produce 13 levels with five unequal DC source and 10 switches. The design of the proposed module makes some preferable features with a better quality than similar modules such as the low number of semiconductor and DC sources and low switching frequency. Also this module is able to create a negative level without any additional circuit such as an H-Bridge which causes reduction of voltage stress on switches. MATLAB simulation and practical results are presented to validate the proposed module good performance.

Index Terms – Asymmetric, components, E-Type multilevel inverter, H-Bridge, selective harmonic elimination

1. INTRODUCTION

Power electronic inverters are widely used in industrial power conversion systems both for utility and drives applications (Tolbert and Peng 1998, 1999, 2002) [6]. As the power level increases, the voltage level also increases accordingly to obtain satisfactory efficiency. The word "inverter" in the context of power electronics denotes a class of power conversion circuits that operates from a dc voltage source or a dc current source and converts it into ac voltage or current[11]-[12].Thus, for example, the primary source of input power may be utility ac voltage supply that is "converted", to dc by an ac to dc converter and then "inverted" back to ac using an inverter. Here, the final output may be of a different frequency and magnitude than the input ac of the utility supply. Typical Applications such as Un-interruptible Power Supply (UPS), Industrial (induction motor) drives, Traction, HVDC [4]-[5]. The different types of multilevel inerter available .A continuous development of multilevel inverter to drive the to drive the high voltage and high current industrial application [5]-[7].Nowadays multilevel inverter are good solution for power application due to the fact that they can achieve high power using advanced power semiconductor.

MULTI LEVEL INVERTERS (MLI)

Two level inverters have some limitations in operating at high frequency mainly due to switching losses and constraints of device ratings These limitations can be overcome using multilevel inverters in highpower and high voltage applications. Multilevel inverters not only can generate the output voltages with very low distortion, but also can reduce the dv/dt stresses. Therefore electromagnetic compatibility problems can be reduced.. Multilevel inverters used to draw input current with low distortion.

There are 3 types of multilevel inverters named as diode clamped multilevel inverter, flying capacitor multilevel inverter and cascaded multilevel inverter .These three types of multilevel inverters require more no. of components such as switches, clamping diodes and capacitors. The concept of multilevel inverters has been introduced since 1975. The elementary

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nag...attinam (Dt) Tamil Nadu

19-20

International Journal of Advanced Science and Technology
Vol. 29, No. 4s, (2020), pp. 357-362

A Study on Employee Motivation and Engagement with special reference to Ancillary Industries of BHEL, Tiruchirapalli

B.Asha Daisy, *Research Scholar, A.V.V.M Sri Pushpam College, (Affiliated to Bharathidasan University), Poondi- Thanjavur.*
Dr. C. Suresh, *Associate Professor & Research Advisor, Department of Management Studies, AVVM Sri Pushpam College (Autonomous) (Affiliated to Bharathidasan University), Poondi, Thanjavur – 613503.*

Abstract

The main aim of the study is to find out the employee motivation and engagement in the Ancillary Industries of BHEL at Tiruchirapalli. The main relationship between the motivation and engagement is bind with that naturally, engaged employees are inherently motivated. These kinds of employees are always doing what they love. They also were applying their talents in an enthusiastic manner. Engaged employees encompass a wish or desire to help the company, and that is what motivates them. The study has been carried out on employees of Ancillary Industry of BHEL. In this study descriptive design and simple random sampling was used. The primary data was taken with the help of questionnaire for the study.

Key Words: *inherently, encompass, applying, enthusiastic, desire*

INTRODUCTION

Employee motivation and engagement is a significant subject in management theory and practice. Motivated employees help to success the business, but if they engaged in the work, the motivation is intrinsic. Engagement is a dynamic harmony to do something for someone. Motivation is the determination to do something. Both the things are significantly to creating high performing teams, but employee motivation and engagement are two various things and both are significant in building a great team. Teams are always highly engaged to increase the productivity of the organization as well as achieving their team goals. Engagement implies the emotional commitment of the employees in their work. Likewise motivation implies the employees feel that their work is meaningful. Engagement induces the employees to keep continuously seek and learn knowledge and motivation induces the employees to take the initiation of tasks and new projects.

OBJECTIVES

1. To understand the perception of employees on motivational factors at the ancillary units of BHEL, Trichy
2. To understand the drivers of Employee Engagement in BHEL Ancillaries, Trichy.
3. To study the impact of motivation on employee performance and productivity
4. To study the impact of employee engagement on job satisfaction.
5. To know the relationship between motivation and employee engagement at Ancillary industry of BHEL.

REVIEW OF LITERATURE

According to D Mehta NK Mehta (2013), "Motivated and engaged employees tend to contribute more in terms of organizational productivity and support in maintaining a higher commitment level leading to the higher customer satisfaction".

According to C Sekhar (2013), "In a complex and dynamic environment, leader of the organization used to create the environment in which employee feel trusted and are empowered to take decisions in the organization which leads to enhance motivation level of employee and ultimately organizational performance are enhanced".

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu

ISSN: 2005-4238 IJAST
Copyright ⓒ 2020 SERSC

Studies in Indian Place Names
(UGC Care Journal)

ISSN: 2394-3114
Vol-40-Issue-50-March -2020

19-20

A Study on Employee Engagement in the Ancillary Industries of BHEL at Tiruchirappalli

B.Asha Daisy
Research Scholar, A.V.V.M Sri Pushpam College,
Affiliated to Bharathidasan University
Poondi- Thanjavur.

Dr. C. Suresh
Associate Professor & Research Advisor,
Department of Management Studies,
AVVM Sri Pushpam College (Autonomous)
Affiliated to Bharathidasan University
Poondi, Thanjavur – 613503.

ABSTRACT

The main aim of the study is to find out the employee engagement in the Ancillary Industry of BHEL at Tiruchirapalli. The study has been carried out on employees of Ancillary Industry of BHEL. In this study descriptive design and simple random sampling was used. The population size was 250. The sample size was 120. The primary data was taken with the help of questionnaire for the study. It is found out the most of the respondents are agree that they are happy to work in the organization. Statistical analysis of chi – square and correlation analysis was used. It is found that there is no relationship between age of the respondents and the team share office information with colleagues.

Key Words:*employee engagement, team, office information and colleagues.*

INTRODUCTION

Employee engagement is the expressive dedication the employee has to the organization and its objectives. Employee engagement is actually the part of employee retention in the organization. It also shows abruptly the level of eagerness and devotion an employee feels toward his or her job.Employees are the major assets of an organization. It is essential that the employees perform together as a collective unit and contribute equally towards the realization of a common goal. It has been observed that targets are achieved at a much faster rate if the employees work together and share a warm relationship with each other. Employees must be comfortable with each other to deliver their best and enjoy their work. Employee engagement

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College
Thethi, Nagore - 611 002
Nagapattinam (Dt) Tamil Nadu

Copyright © 2020Author

The Arithmetical Edifices of Strength of Connectedness in Intuitionistic Fuzzy Soft Graphs

Dr.N.Sarala R.Deepa R.Deepa

Abstract : Fuzzy graphs and soft graphs are two different mathematical frameworks for modeling ambiguous and imprecise data in real-time applications. The concept of a fuzzy soft graph is more generalized as compared with fuzzy graphs and soft graphs. Hence, the fuzzification of soft graph theory has attracted the interest of several researchers, and investigations in this domain have exaggerated over the last few years. The analysis of links (i.e., edges) plays a significant role in Intuitionistic fuzzy soft graphs (IFSG) to understand the nature of the entire real-world problems. In this paper, we present various arithmetical edifices related to types of links such as sturdy, feeble and δ^* a weak edge to analyze the strength of connectedness of IFSG. Also, we implement these concepts to solve a real-time decision-making problem.

Keywords: decision making; edges; intuitionistic fuzzy soft graphs; strength of connectedness;

1 INTRODUCTION

Imprecision, uncertainty, and fuzziness are ubiquitous in current real-time applications, and these issues cannot be resolved successfully by conventional mathematical frameworks. Some of the innovative concepts exploited to handle these restrictions include fuzzy set theory [1], soft set theory [2] and intuitionistic fuzzy set theory [3]. Over the past fifty years, the concept of fuzzy set proposed by Zadeh, have paved the way to handle vagueness, ambiguous, and fuzziness of information in real-life problems. Based on the fundamental description of the fuzzy set theory introduced by Zadeh, Kauffman developed the preliminary concept of fuzzy graphs [4]. Fuzzy graphs are now used as an innovative technique for handling perceptions related to an imprecise and uncertain situation. They are hastily entering into the mainstream of science and technology fields including computer science, electrical and electronics engineering, data mining approaches, communication system, information coding, and image processing where the rate of required data of the system changes with multiple levels of precision. Consequently, Bhattacharya [5] proposed some essential insights into fuzzy graphs. Mordeson and Nair performed some basic operations on fuzzy graphs [6].

- *Dr.N.Sarala1 Research Supervisor, Associate Professor, Department of Mathematics, A.D.M College for Women (Autonomous), Nagapattinam, Affiliated to Bharathidasan University, Thiruchirupalli, Tamilnadu, India Saralaadmc68@gmail.com*
- *R.Deepa Associate Professor,*
- *Department of Mathematics, E.G.S Pillay Engineering College (Autonomous), Nagapattinam,*
- *Tamilnadu, India R.Deepa Research Scholar (Part Time),*
- *Department of Mathematics, A.D.M College for Women (Autonomous), Nagapattinam, Affiliated to Bharathidasan University, Thiruchirupalli, Tamilnadu, IndiaSrideepamuruga13@gmail.com*

Recently, fuzzy graphs having gained more attention from several researchers. Akram et al. extended the notion of fuzzy graphs to the interval-valued fuzzy graph [7], intuitionistic fuzzy graphs [8], intuitionistic fuzzy hyper graphs structures [9], and bipolar fuzzy graphs [10]. Samanta et al. suggested some important concepts on irregular bipolar fuzzy graphs, fuzzy planar graphs, regularity and completeness of the generalized fuzzy graph, and vague graphs [11-13]. However, the main issue in implementing a fuzzy graph is that a membership degree in [0, 1] is fixed for each element in the set for a specific application. Then, it was ratified that a single membership function might not replicate the uncertainty of a real-time environment completely. To overcome this limitation, Molodtsov proposed soft sets as an effective mathematical tool for handling uncertainty problems. The concept of soft set delivers a parameterized view for handling and evaluating uncertainties [14]. The utilization of the soft set is rising rapidly and a number of researchers are aiming at real-world problems with imperfect and vague data. Molodtsov's approach revealed the applicability of soft sets in various domains and realized some noteworthy results continuously improved by other researchers like Maji et al. [15] and Aktas and Cagman [16], and others. Ali et al. discussed some interesting features of soft sets [17]. Sezgin and Atagun studied the theoretical characteristics of the soft sets by performing some elementary operations on soft sets [18]. At present, soft sets are finding several applications in several fields to handle data with uncertainties. In order to evade the uncertainty issues that are integral in each of these notions, some investigators have preferred to integrate the above-mentioned notions in order to implement novel fuzzy-based hybrid frameworks. The most popular among these include fuzzy soft sets [19], [20] interval-valued fuzzy soft sets [21], intuitionistic fuzzy set [22], vague soft sets [23]. But all of these notions have their intrinsic difficulties to assign the membership function in each case. This led to the evolution of the Intuitionistic fuzzy soft graphs model [20], and, successively, the progress and extension of this concept [24]. At present, the theory of IFSG is used to handle vague data in the domain of engineering, environmental science, social science, medical science, and economics. This article explores various kinds of links in IFSG and categorizes the links as sturdy, feeble and δ_a^* –weak. Furthermore, we also exploit the concept of IFSG to find appropriate solutions for a decision-making problem.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
Engineering College,
Nagore - 611 002.
(Dt) Tamil Nadu

International Journal of Grid and Distributed Computing
Vol. 12, No. 4, (2019), pp. 01 - 08

Fuzzy α Regular ω- Super Open Sets in Fuzzy Topological Spaces

[1]Dr. M.K. Mishra,[2]Dr. R.Deepa
[1]Prof, Asso.[2] Prof.
Edyathangudy G.S. Pillay Arts and Science College Nagapattinam(T.N.)

Abstract: This paper is study the fuzzy αrω- super open sets in fuzzy topological space and obtain some its properties and describes fuzzy super αrω-interior, fuzzy αrω- neighborhood, fuzzy αrω –limits points in fuzzy topological spaces., and find some of the properties of fuzzy αrω- super closed sets we introduce fuzzy αrω- super closure rties.

Keywords: fuzzy Topological spaces, fuzzy αrω- super closed sets, fuzzy αrω- super open sets.

1. Introduction:

After the introduction of fuzzy sets by Zadeh [17] in 1965 and fuzzy topology by Chang [3] in 1968, several researches were conducted on the generalizations of the notions of fuzzy sets and fuzzy topology. Thakur and Malviya [14] introduced the concepts of fuzzy g- closed sets , fuzzy g-continuity and fuzzy gc-irresolute mappings in fuzzy topological spaces.In this paper we study and describes fuzzy αrω- super open sets in fuzzy topological space and obtain some its properties. Also introduce fuzzy αrω-interior, fuzzy αrω- neighbourhood, fuzzy αrω –limits points in fuzzy topological spaces., Applying fuzzy αrω- super closed sets we introduce fuzzy αrω- super closure and discuss some basic properties.

2. Preliminaries:

Let X be a non empty set and I= [0,1]. A fuzzy set on X is a mapping from X in to I. The null fuzzy set 0 is the mapping from X in to I which assumes only the value is 0 and whole fuzzy sets 1 is a mapping from X on to I which takes the values 1 only. The union (resp. intersection) of a family $\{P\alpha: \in\alpha\Lambda\}$of fuzzy sets of X is defined by to be the mapping sup Pα (resp. inf Pα) . A fuzzy set P of X is contained in a fuzzy set Q of X if $P(x) \leq Q(x)$ for each $x\in X$. A fuzzy point xβ in X is a fuzzy set defined by $x\beta(y)=\beta$ for y = x and $x\beta(y) = 0$ for $y \neq x$,$\beta \in[0,1]$ and $y\in X$ .P fuzzy point xβ is said to be quasi-coincident with the fuzzy set A denoted by xβqP if and only if $\beta + P(x)>1$. A fuzzy set A is quasi–coincident with a fuzzy set B denoted by AqB if and only if there exists a point $x\in X$ such that $A(x) + B(x)>1$.For any two fuzzy sets P and Q of X, $P \leq Q$ if and only if ⌉(AqBc)[5].A family Γof fuzzy sets of X is called a fuzzy topology [1] on X if 0,1 belongs to Γand Γis closed with respect to arbitrary union and finite intersection .The members of Γ□are called fuzzy open sets and their complement are fuzzy closed sets. For any fuzzy set P of X the closure of P (denoted by cl(P)) is the intersection of all the fuzzy closed sets of P and the interior of P (denoted by int(P))is the union of all fuzzy open subsets of P.

ISSN: 2005-4262 IJGDC
Copyright © 2019 SERSC

ATTESTED
BALAN, M.E., Ph.D.,
PRINCIPAL
Engineering College,
Nagore - 611 002.
(Dt) Tamil Nadu.

Certain Investigations on Fuzzy Soft Graph

Dr.N.Sarala
Department of Mathematics
A.D.M College for Women (Autonomous)
Nagapattinam, Tamilnadu, India
saralaadmc68@gmail.com

R.Deepa
Department of Mathematics
E.G.S. Pillay Engineering College
Nagapattinam, Tamilnadu, India
srideepamuruga13@gmail.com

Abstract — Fuzzy soft graph theory is a very beneficial scientific tool to handle different real-time applications in the domain of applied mathematics, social science, engineering, medical science, economics, and environment. FSS offers a parameterized approach to analyze uncertainty and vagueness in graph theory. This research study relates the idea of FSSs to graphs. In this paper, we describe several basic notions regarding fuzzy soft graphs (FSG). We also investigate some of their remarkable properties. Moreover, we present some highly worthwhile operations on FSG namely union, intersection, join, complement function, etc., and elaborate them with appropriate i'' trations.

I. INTRODUCTION

Solving decision-making problems through mathematical modeling and calculating fuzziness associated with the real-world applications have attracted the interest of the investigators particularly in the field of applied mathematics, computational intelligence, and decision support system. For modeling real-time applications, there is an obligation to handle data comprise high levels of uncertainty and fuzziness. Uncertainties arise from a number of sources which are heterogeneous in nature and cannot be resolved by a single mathematical tool. Over the past forty years, Fuzzy sets, introduced by Zadeh, have paved the way towards the modeling of ambiguous, uncertain, and fuzziness of data in real-world applications [1]. According to the rudimentary explanation given by Zadeh, Kauffman established the initial notion of fuzzy graphs [2]. Fuzzy graphs are now recognized as an advanced tool for handling perceptions (e.g., perceptions of safety, comfort, health, and size) involving a vague and a iguous environment. It is a weighted graph which gives a normalized relational strength over a fuzzy subset [3]. It is rapidly arriving into the mainstream of engineering domains namely electrical and electronics engineering, communication system, image processing, computer science, information coding, and data mining where the rate of essential information of the system varies with several levels of exactness.

As a result, Bhattacharya [4] introduced some important perceptions of fuzzy graphs. Then, Mordeson and Nair investigated some operations on fuzzy graphs [5]. Of late, fuzzy graphs having gained more attention from numerous researchers. Akram et al. extended the concept of fuzzy graphs to the interval-valued fuzzy graph [6], intuitionistic fuzzy graphs [7], intuitionistic fuzzy hypergraphs structures [8], and bipolar fuzzy graphs [9]. Samanta et al. discussed some notions on fuzzy planar graphs, irregular bipolar fuzzy graphs, completeness and regularity of the generalized fuzzy graph, and vague graphs [10-12]. Nevertheless, the main issue in applying a fuzzy graph is that a membership degree in [0, 1] is assigned to each discrete element in the set for a particular problem. Later, it was approved that a single membership function might not imitate the uncertainty of a real-world situation and the difficulty of the data entirely. In order to devastate this shortcoming, Molodtsov introduced soft sets as a novel technology for solving uncertainty problems.

The soft set provides a parameterized perception for modeling and assessing uncertainties [13]. The exploitation of the soft set is growing rapidly and a number of researchers are aiming at real-world problems with imperfect and imprecise information. Molodtsov's approach revealed the applicability of soft sets to several fields and achieved some significant results continuously enhanced by other researchers like Maji et al. [14] and Aktas and Cagman [15], and others. Ali et al. presented some stimulating characteristics of soft sets [16]. Sezgin and Atagun studied the theoretical features of the soft sets by presenting some rudimentary operations on soft sets [17]. Currently, soft sets are finding several applications in various domains to handle data with uncertainties.

Lately, numerous motivating developments in soft sets have suggested along with the graph theory. Ali et al. introduced the neighborhoods and soft sets based depiction of graph theory [18]. Akram and Nawaz presented the concept of soft graphs [19, 20]. The concept of the FSS also provides a parameterized feature of soft computing and uncertainty modeling. Maji et al. introduced the concept of FSGs by assimilating the concepts of soft graphs and fuzzy graphs [21]. Actually, the idea of the FSG is more generalized than that of the fuzzy graph and the soft graph. In this paper, we elaborate on the concept of FSG and some operations such as union and intersections of two FSGs with suitable examples. Further, we study some notable characteristics of FSG.

II. PRELIMINARIES AND NOTATIONS

We start this section by reviewing some fundamental concepts related to FSG. In the year of 1965, Zadeh [1] introduced the concept of the fuzzy set. A fuzzy set X on A is pigeonholed by its degree of membership $U_X(a): A \longrightarrow [0,1]$, where $U_X(a)$ denotes the membership degree of element a in fuzzy set X, $\forall a \in A$. A fuzzy relation on E is a fuzzy subset of $E \times E$. A fuzzy relation r on E is a fuzzy relation on U if $r(p,q) \leq U(p) \wedge U(q)$, $\forall p,q \in E$. A fuzzy graph $G^* = (N,E)$ is defined as a pair $G = (U,r)$, where U and r are fuzzy sets on N and $E \times E$ correspondingly, such that $r(p,q) \leq min(U(p),U(q))$ for $\forall (p,q) \in E$.

ATTESTED
Dr.S.RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu

International Journal for Research in Engineering Application & Management (IJREAM)
ISSN : 2454-9150 Vol-05, Issue-06, Sep 2019

Application Of Complex Intuitionistic Fuzzy Soft Graph In Decision Support System For Mobile Commerce

[1]Dr. N. Sarala, Associate Professor, Department of Mathematics, A D M College for Women(Aoutonomous), Nagapattinam, Tamilnadu, India, saralaadmc68@gmail.com

[2]R. Deepa, Associate Professor, Department of Mathematics, E.G.S. Pillay Engineering College Nagapattinam, Tamilnadu, India. srideepamuruga13@gmail.com

Abstract : Solving, optimizing and analyzing imprecise problems involving vague and uncertain environment is one of the most interesting field in multidisciplinary research including computational intelligence, machine learning, applied mathematics, and decision analysis. It is worth mentioning that ambiguity and imprecise data arises from very different fields and cannot be modeled using conventional numerical and computational tools. Fuzzy soft graph theory enables a parameterized perspective for coping with uncertainty and vagueness. In this work, we describe a mathematical model for processing fuzzy soft information by integrating complex intuitionistic fuzzy soft sets with graph theory. This study presents some key ideas about Complex Intuitionistic Fuzzy Soft graphs (CIFS-graphs) and also explores some of their related properties. In order to demonstrate the effectiveness of CIFS-graphs, we apply this model to describe and solve a multi-criteria decision-making problem in a mobile communication network using CIFS-graphs.

Keywords — **fuzzy soft sets; complex intuitionistic fuzzy soft graphs; multi-criteria decision-making problems; uncertainty**

I. INTRODUCTION

Konigsberg bridge problem is the starting point of graph theory. The solution of this notable puzzle led directly to the idea of the Eulerian graph. Euler investigated the Konignberg bridge problem and developed an aptsolutionwhich is known as Eulerian graph. At present, graph theory is becoming mainstream of science and technology mainly because of its applications in different domains including networking and coding theory, data mining and image processing, optimization algorithms and computations, clustering and scheduling.

Ambiguity, fuzziness, and uncertainties are ubiquitous in real-time applications and these characteristics cannot be handled successfully by means of conventional numerical models. Recently, a number of innovative concepts including of set theory [1], fuzzy set theory [2], and intuitionistic fuzzy set theory [3] are proposed to solve these issues. In order to overcome the limitations that are intrinsic in each of these concepts, researchers have selected to integrate these concepts to design new fuzzy-based hybrid frameworks (e.g., fuzzy soft graphs [4],intuitionistic fuzzy soft graphs [4] vague soft sets [5], interval-valued fuzzy soft graphs [6], and interval-valued intuitionistic fuzzy soft graphs [7]).

The introduction of a fuzzy set by Zadeh in[2]really changed the face of engineering and science. Fuzzy sets laid the foundations for an innovative approach of philosophical thinking. "Fuzzy logic" which plays an important role in the domain of artificial intelligence. The best imperative property of a fuzzy logic is that it comprises of a class of objects that meet a definite constraint or many constraints .In 1999, Molodtsov presented the concept of soft set for dealing problems with uncertainties and vagueness in modelling real time applications in different fields such asocial and medical science, engineering, economics, and environmental science [1]. Molodtsov employed this concept in many applications like probability and measurement theory, smoothness of function, operation research, game theory, etc.

Off late, a number of research works contributed into fuzzification of soft set theory. Consequently, it captured the attention from many researchers globally. In 1975, Rosenfeld introduced the theory of fuzzy graph theory [8]. [illegible] developed fuzzy soft set-based model by integrating the notions of soft sets and fuzzy sets. Thenceforth, several stimulating applications of fuzzy soft

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

DOI : 10.35291/2454-[illegible]
© 2019, IJREAM All Rights Reserved.

International journal of basic and applied research
www.pragatipublication.com
ISSN 2249-3352 (P) 2278-0505 (E)
Cosmos Impact Factor-5.960

Application of intuitionistic fuzzy soft graph in medical diagnosis

[1]N. Sarala, Associate Professor, Department of Mathematics, ADM College for Women, Nagapattinam
[2]R. Deepa, Associate Professor, Department of Mathematics, EGS Pillay Engineering College , Nagapattinam,

Received: 10 June Revised: 18 June Accepted: 26 June

Abstract

In this paper, we define Intuitionistic fuzzy soft graph, Intuitionistic fuzzy soft graph gives more precision, flexibility to the system as compared to the fuzzy models. Also, we analyze the application of these graphs in decision making problem.

Keywords: complement of fuzzy soft graphs, , Fuzzy soft graph, Soft graph.

I. Introduction:

Mathematical modelling analysis and computing of problems with uncertainty is one of the heaviest areas in interdisciplinary research involving applied mathematics, computational intelligence and decision making problems. It is worth noting that uncertainty arises from various domains has very different nature and cannot be captured within a single mathematical framework. Molodtsov's soft sets [1] provide us a new way of coping with uncertainty from the viewpoint of parameterization. Akram.ct.al discussed some properties of the interval valued fuzzy graphs, Intuitionistic fuzzy hypergraphs, bipolar fuzzy graphs.

Thumbakara and george are discussed the concepts of soft graphs in the specific way. M. Akram and S. Nawaz [5] introduced fuzzy soft graph in 2015. Mohinta and samanta [6] also introduced the concept of fuzzy soft graph.

In this paper our aim is introduce the notion of Intuitionistic fuzzy soft graph in dicision making problem which will yield best result in this field.

II. Preliminaries

In this section, we recall some basic essential notion of fuzzy soft graph theory.

Definition: 2.1

Let a set.E be fixed. An Intuitionistic fuzzy set or IFS A in E is an object having the form $A = \{< x, \mu_A(x), V_A(x) > / x \in E\}$ where the functions $\mu_A: E \to [0,1] and\ V_A: E \to [0,1]$ define the degree of membership and degree of non-membership of the element $x \in E$ to the set A, which is a subset of E, and for every $x \in E, 0 \leq \mu_A(x) + V_A(x) \leq 1$. The value $A(x) = 1 - (\mu_A(x) + V_A(x))$ is called the hesitation part, which may cater to either membership value or non-membership value or both.

July 2019 Volume 9 Number 7
Index in Cosmos
Page-696-711

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

A detailed investigation and analysis of fuzzy soft graph in social safety network

Dr. N. Sarala[1], Associate Professor, Department of Mathematics A.D.M College for Women (Autonomous), Nagapattinam Tamilnadu, India.

R. Deepa[2] ,Associate Professor Department of Mathematics E.G.S Pillay Engineering College (Autonomous) Nagapattinam, Tamilnadu, India.Srideepamuruga13@gmail.com

Abstract:

Social safety networks are the areas in which a huge number of people are connected. In this paper, a new social safety network called fuzzy soft social safety network (FSSSN) has been introduced based on fuzzy soft graph. For this safety network , centrality, single and multi safety bridges and transfer value of the safety bridges are newly defined and illustrated by examples. In this safety network, the strength of relationship can be graded by different values between 0 and 1, and we have shown that this representation is more realistic. Also, we have introduced a new concept of registration for a new user. So that the chance of fake user may be reduced.

Keywords:

Bridges, centrality, Fuzzy soft graphs, social safety networks.

1. Introduction

- **Now a days social safety networks are new platforms for staying in touch with people in everywhere in the world. These are perfect places of exchanging information of various topics and issues. These help in marketing world, connecting public to clients. These are important tools for public awareness by spreading messages rapidly to a wide audience.**
- **Indeed, social networks are important for information diffusion, e- commerce and e-business, influential players like scientists, innovators, employees, customers, companies etc., effective social and political campaigns, future events, terrorist/criminal network, alumni, etc.,**
- **Facebook , Twitter, LinkedIn, orkut, Research Gate are some types of social networks. Face book was founded by mark zuckerberg in collaboration with his college roommates and fellow students to connect the whole world.**
- **Core Date points Review and updated Wednesday April 24,2019 based upon Face book's official investor relations information are**

  1. **Worldwide, there are over 2.38 billion monthly active users (MAU) as of March 31, 2019. This is an 8 percent increase in Face book MAUs year over year.**
  2. **1.56 billion people on average log onto Face book daily and are considered daily active users (Face book DAU) for March 2019.**

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D
PRINCIPAL
E.G.S. Pillay Engineering College
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

International journal of basic and applied research
www.pragatipublication.com
ISSN 2249-3352 (P) 2278-0505 (E)
Cosmos Impact Factor-5.960

Application of Fuzzy Soft Digraph in decision Making

Sarala N [1] Tharani S [2]
[1]Department of Mathematics, A.D.M.College for Women, Nagapattinam, Tamilnadu, India
[2] Department of Mathematics, E.G.S. Pillay Engineering College, Nagapattinam, Tamilnadu, India

Received: 10 June Revised: 18 June Accepted: 26 June

Abstract

The purpose of this study was to determine factors that influenced decisions of undergraduate students' choice of a university to study at. Studies show that universities are currently confronted with both the decrease in student enrolments and high competition for those students between institutions. As a result of these twin challenges, it is of critical importance that factors that influence students' choices of universities are investigated to enable effective planning of student admissions strategies. Fuzzy sets and soft sets are two different tools for representing uncertainty and vagueness. This paper presents an analysis of the results achieved using fuzzy soft digraph to find the influence factor of students to select the higher education institution in under graduate.

Keywords: fuzzy soft graph, fuzzy soft digraph, institutional characteristics, undergraduate students, influence factor. union of fuzzy soft digraph, intersection of fuzzy soft digraph.

I. Introduction

The factors that influence the decisions of students to choose institutions to pursue higher studies at vary student to student though there are some commonalities here and there (Yamamoto, 2006). These factors are grouped into two categories namely institutional characteristics and communication/marketing strategies (Ming & Kee, 2010). Institutional factors include reputation, location, study programmes, educational facilities, tuition fees, employment opportunities, and availability of scholarships at the institution (Ming & Kee, 2010). With regards to marketing or communication strategies, advertising, campus visits, institutional representatives visiting high schools, and career fairs, are some of the factors that influence students' decisions on which universities to study at (Ming & Kee, 2010; Domino et al, 2006). Napompech (2011) also mentions expertise of lecturers, variety of courses offered, and convenience of travel as some of the predictors of students' decisions to choose a particular university to study at.

The Concept of soft set theory was initiated by Molodtsov [18] for dealing uncertainties. A Rosenfeld [24] developed the theory of fuzzy graphs in 1975 by considering fuzzy relation on fuzzy set, which was developed by Zadeh [27] in the year 1965. Some operations on fuzzy graphs are studied by Mordeson and Peng [20] .Later, Ali et al. discussed about fuzzy sets and fuzzy soft sets induced by soft sets. Akram and Nawaz [2] introduced fuzzy soft graphs in the year 2015. Mohinta and samanta [17] also introduced fuzzy soft graphs independently. The notion of fuzzy soft graph and few properties related to it are presented in their paper. Using an introduction to fuzzy soft digraph (N.Sarala, S.Tharani) in 2017 in this paper, we apply the concept of fuzzy soft digraph to find the influence factor of students to select the higher education institution in under graduate level.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

Intuitionistic Fuzzy Soft Digraph

Sarala N Tharani S
[1](Department of Mathematics, A.D.M.College for Women(Autonomous)(Affiliated to Bharathidasan University), Nagapattinam, Tamilnadu, India)
[2](Department of Mathematics, E.G.S. Pillay Engineering College, Nagapattinam,Tamilnadu, India)

Abstract: *Fuzzy sets and soft sets are two different tools for representing uncertainty and vagueness. In this paper , we combine the concepts of Intuitionistic fuzzy soft sets and digraph theory and we introduce the notions of Intuitionistic fuzzy soft digraph and some operations in intuitionistic fuzzy soft digraphs.*
Keywords: *Intuitionistic fuzzy soft digraphs, Size and order of intuitionistic fuzzy soft digraph, Strong and Complete intuitionistic fuzzy soft digraph, Union of intuitionistic fuzzy soft digraph and Intersection of intuitionistic fuzzy soft digraph*

I. Introduction

The Concept of soft set theory was initiated by Molodtsov [1] for dealing uncertainties. A Rosenfeld [2] developed the theory of fuzzy graphs in 1975 by considering fuzzy relation on fuzzy set, which was developed by Zadeh [3] in the year 1965.Some operations on fuzzy graphs are studied by Mordeson a C.S. Peng [4] .Later Ali et al. discussed about fuzzy sets and fuzzy soft sets induced by soft sets. M.Akram and S Nawaz [5] introduced fuzzy soft graphs in the year 2015. Sumit mohinta and T K samanta [6] also introduced fuzzy soft graphs independently.

The theory of directed graphs has developed enormously within the last three decades. There is an extensive literature on digraphs (more than 3000 papers). Many of these papers contain, not only interesting theoretical results, but also important algorithms as well as applications. The applications for directed graphs are many and varied. They can be used to analyze electrical circuits, develop project schedules, find shortest routes, analyze social relationships, and construct models for the analysis and solution of many other problems.

Intuitionistic fuzzy set (IFS), developed by Atanassov is a powerful tool to deal with vagueness. A prominent characteristic of IFS is that it assigns to each element a membership degree and a non-membership degree, and thus, the IFS constitutes an extension of Zadeh's fuzzy set, which only assigns to each element a membership degree. In the last two decades, many authors have paid attention to the IFS theory has been successfully 18 applied in different areas such as; logic programming , decision making problems , medical diagnosis etc.

In this paper, we apply the concept of intuitionistic of fuzzy soft sets to digraph structure. We introduce notations of Intuitionistic fuzzy soft digraph, Strong and complete intuitionistic fuzzy sot digraph and investigate some properties of them.

II. Preliminaries

We now review some elementary concepts of digraph and fuzzy soft graph

Definition: 2.1

Let U be an initial universe set and E be the set of parameters. Let $A \subset E$, A pair (F,A) is called ***fuzzy soft set*** over U where F is a mapping given by $F : A \to I^U$, where I^U denotes the collection of all fuzzy subsets of U.

Definition: 2.2

Let V be a nonempty finite set and $\sigma : V \to [0,1]$. Again , let $\mu : V\,X\,V \to [0,1]$such that $\mu(x,y) \leq \sigma(x) \wedge \sigma(y)$ for all $(x,y) \in V\,X\,V$. Then the pair $G = (\sigma, \mu)$ is called ***a fuzzy graph over the set V***. Here σ *and* μ are respectively called *fuzzy vertex and fuzzy edge* of the fuzzy graph G = (σ, μ)

Definition: 2.3

A fuzzy digraph $G_D = (\sigma_D, \mu_D)$ is a pair of function $\sigma_D : V \to [0,1]$ and $\mu_D : V\,X\,V \to [0,1]$ Where $\mu_D(x,y) \leq \sigma_D(x) \wedge \sigma_D(y)$ for all $(x,y) \in V\,X\,V$ and μ_D is a set of fuzzy directed edges are called *fuzzy arcs.*

Definition: 2.4

The ***degree of any vertex*** $\sigma(x_i)$ of a fuzzy graph is sum of degree of membership of all those edges which are incident on a vertex $\sigma(x_i)$ and is denoted by $deg(\sigma(x_i))$.

Definition: 2.5

In a fuzzy digraph the number of arcs directed away from the vertex $\sigma(x)$is called the ***outdegree of vertex,*** it is denoted by $od(\sigma(x))$. The number of arcs directed to the vertex $\sigma(x)$ is called ***indegree of vertex,*** it is denoted by $id(\sigma(x))$.

ATTESTED
PRINCIPAL
Engineering College,
611 002.
Tamil Nadu.

REGULAR INTUITIONISTIC FUZZY SOFT DOMINATING DIGRAPH

Sarala N[1] and Tharani S[2]

[1]Department of Mathematics, A.D.M.College for Women (Autonomous), Affiliated to Bharathidasan University, Nagapattinam, Tamilnadu

[2]Department of Mathematics, E.G.S Pillay Engineering College (Autonomous), Nagapattinam, Tamilnadu

ABSTRACT

Fuzzy sets and soft sets are two individual tools for instead of improbability and vagueness. In this paper , we merge the concepts of Intuitionistic fuzzy soft sets , dominating set and digraph theory and we establish the ideas of regular intuitionistic fuzzy soft dominating set, Minimal and maximal intuitionistic fuzzy soft dominating set, regular independent intuitionistic fuzzy soft digraph..

Keywords: Edge dominating set, Strong edge neighbourhood , edge independent , isolated edges of intuitionistic fuzzy soft digraph and regular intuitionistic fuzzy soft dominating set, Minimal and maximal intuitionistic fuzzy soft dominating set, regular independent intuitionistic fuzzy soft digraph.

I. INTRODUCTION

The research of domination set in graphs begin by ore and Berge. The notion of domination in fuzzy graphs was introduce by A.Somasundaram and S Somasundaram. Sumit.Mohinta ans Samanta[12] have discuss the view of fuzzy soft graphs and Muhammed Akram and Saira Nawas[7] introduce poles apart type of fuzzy soft digraph.

The intuitionistic fuzzy set is introduce by Atanassov [3] as a generality of fuzzy set , which have both membership results and non-membership results. Moreover, he has also present and studied several types of operations, relations, and its properties, which were analogs to fuzzy sets. Sarala N, Tharani s have discuss the theory of fuzzy soft digraph and intuitionistic fuzzy soft digraph.

In this paper, we relate the concept of intuitionistic of fuzzy soft sets to edge dominating digraph composition. We initiate notations of intuitionistic fuzzy soft Edge domination and regular intuitionistic fuzzy soft dominating digraph, Minimal and maximal intuitionistic fuzzy soft dominating digraph , regular independent intuitionistic fuzzy soft digraph and prove various theorems to the concepts.

II. PRELIMINARIES

We now have another look at some basic concepts of digraph and fuzzy soft graph

Definition: 2.1

Let U be an initial universe set and E be the set of parameters. Let A $\subset E$, A pair (F,A) is called ***fuzzy soft set*** over U where F is a mapping given by F : A $\rightarrow I^U$, where I^U denotes the collection of all fuzzy subsets of U.

Definition: 2.2

Let V be a nonempty finite set and $\sigma : V \rightarrow [0,1]$. Again , let $\mu : V \times V \rightarrow [0,1]$such that

$\mu(x,y) \leq \sigma(x) \wedge \sigma(y)$ for all $(x,y) \in V \times V$. Then the pair $G = (\sigma, \mu)$ is called ***a fuzzy graph over the set V***. Here σ *and* μ are respectively called *fuzzy vertex and fuzzy edge* of the fuzzy graph G = (σ, μ)

Definition: 2.3

A fuzzy digraph $G_D = (\sigma_D, \mu_D)$ is a pair of function $\sigma_D : V \rightarrow [0,1]$ and $\mu_D : V \times V \rightarrow [0,1]$

Where $\mu_D(x,y) \leq \sigma_D(x) \wedge \sigma_D(y)$ for all $(x,y) \in V \times V$ and μ_D is a set of fuzzy directed edges are called *fuzzy arcs*.

Definition: 2.4

Let D = (V,E) be a simple digraph , V = $\{x_1, x_2, x_3, \ldots \ldots x_n\}$

(non empty set), E (parameters set) and $A \leq E$. Also let,

(i) $\tilde{\rho}_{\mu_D} : A \rightarrow IF(V)$(collection of all intuitionistic fuzzy subsets in V)

$e \rightarrow \tilde{\rho}_{\mu_D}^{(e)} = \tilde{\rho}_{\mu_D}^{e}$ *(say),* $e \in A$ and

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL,
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu

International Journal of Control and Automation
Vol. 13, No.1, (2020), pp. 199 – 207

Some Characterization of Fuzzy Strongly Super Closed Sets in Fuzzy Topological Space

Dr. R. Deepa ,Dr. M. K. Mishra,
[1] Asso. Prof . [1]Prof
Edyathangudy G.S. Pillay Arts and Science College Nagapattinam(T.N.)

Abstract:

In this paper we have introduced some characterization in terms of new class of Fuzzy sets called Fuzzy strongly (gsp)*-super closed sets, properties of this set and develop the relationship between fuzzy topological spaces described as fuzzy $T_{s(gsp)^*}$-space, fuzzy ${}_gT_{s(gsp)^*}$-space, fuzzy ${}_{g^*}T_{s(gsp)^*}$- space and fuzzy ${}_{g^{**}}T_{s(gsp)^*}$-space some characterization of fuzzy strongly super continuous mappings described in this paper.

Keywords: Fuzzy super closed set, fuzzy super open set ,fuzzy super continuity, Fuzzy Strongly (gsp)*-super closed sets, Fuzzy Strongly (gsp)*-super continuous mapping, Fuzzy $T_{s(gsp)^*}$-space, Fuzzy ${}_gT_{s(gsp)^*}$- space, Fuzzy ${}_{g^*}T_{s(gsp)^*}$-space and Fuzzy ${}_{g^{**}}T_{s(gsp)^*}$-space.

1.PRELIMINARIES:

Let X be a non empty set and I= [0,1]. A fuzzy set on X is a mapping from X in to I. The null fuzzy set 0 is the mapping from X in to I which assumes only the value is 0 and whole fuzzy sets 1 is a mapping from X on to I which takes the values 1 only. The union (resp. intersection) of a family {Pα: ∈αΛ}of fuzzy sets of X is defined by to be the mapping sup Pα (resp. inf Pα) . A fuzzy set P of X is contained in a fuzzy set Q of X if $P(x) \leq Q(x)$ for each x∈X. A fuzzy point xβ in X is a fuzzy set defined by xβ(y)=β for y = x and xβ(y) = 0 for y ≠x ,β ∈[0,1] and y∈X .P fuzzy point xβ is said to be quasi-coincident with the fuzzy set A denoted by xβqP if and only if β +P(x)>1. A fuzzy set P is quasi–coincident with a fuzzy set Q denoted by PqQ if and only if there exists a point x∈X such that P(x) + Q(x)>1.For any two fuzzy sets P and Q of X, $P \leq Q$ if and only if ⌉(AqBc).A family τof fuzzy sets of X is called a fuzzy topology on X if 0,1 belongs to τ and τ is closed with respect to arbitrary union and finite intersection .The members of τ are called fuzzy open sets and their complement are fuzzy closed sets. For any fuzzy set P of X the closure of P (denoted by cl(P)) is the intersection of all the fuzzy closed sets of P and the interior of P (denoted by int(P))is the union of all fuzzy open subsets of P. Throughout this paper (X,τ),(Y,σ) represent non-empty fuzzy topological spaces on which no separation axioms are assumed unless otherwise mentioned. For a subset A of a space (X,τ), cl(A) and int(A) denote the fuzzy closure and the fuzzy interior of A respectively.

Defination 1.1 : Let (X,τ) fuzzy topological space and P≤X then:

1. Fuzzy closure $scl(P)=\{x \in X: cl(U) \cap P \neq \phi\}$

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

ISSN: 2005-4297 IJCA
Copyright © 2020 SERSC

EFFECT OF ELEVATED TEMPERATURES ON THE PROPERTIES OF NANO ALUMINA MODIFIED CONCRETE CONTAINING ZIRCON SAND AS FINE AGGREGATE

SAKTHIESWARAN N.[1]*, JEYAMURUGAN A.[2], SOPHIA M.[2], SURESH P.[3]

[1, 2]*Department of Civil Engineering, Anna University Regional Campus – Tirunelveli, Tamilnadu-627007, India.*

[3]*Department of ECE, PSN College of Engineering and Technology, Tirunelveli,Tamilnadu, India.*

This paper reports the experimental investigations conducted to assess the behaviour of nano-alumina modified concrete containing zircon sand as fine aggregate at varying proportions of 5%, 10%, 15%, 20% and 25% by weight. To evaluate the combined effects of nano-alumina and zircon sand the mechanical and durability properties of concrete at ambient and at elevated temperatures the concrete mixes were tested after subjected to various temperatures of 200°C, 400°C, 600°C, and 800°C. The specimens after cooling were tested for compressive strength, flexural strength, ultrasonic pulse velocity, water absorption and porosity evaluation. The analysis of test results showed that the inclusion of nano-silica and zircon sand in concrete has increased the residual strength of the concrete at all heating regimes. Finally the SEM and XRD studies were conducted on the modified concrete to examine the micro-structural and chemical composition changes in the concrete due to temperature elevation.

Keywords: *nano alumina, temperature elevation, zircon sand, mechanical properties, microstructure*

1. Introduction

Concretes must sustain extreme conditions especially when used in public structure and buildings [1]. Fire is one of the serious threats to the buildings and may cause severe hazards to public safety and human life [2]. Fire resistance is one of the essential parameter that a concrete must contain in addition to strength and durability [3]. The change in the chemical and physical changes of concrete after exposure to temperature may weaken the chemical bond leading to structural collapse and undesirable failure of structures [4]. Therefore, choosing of appropriate materials is therefore necessary to eliminate the devastating effects caused in the concrete structures especially when they are exposable to high temperatures such in furnaces and reactors [5]. The concretes in the power reactors and furnaces may almost reach a temperature upto 1300°C which may lead to the loss of the bonding capacity [6] thus creating explosive spalling and explosive blasting [7]. Hence a concrete is said to be qualifying construction material only when they are able to sustain extreme weather conditions and high temperatures [8].

Several studies have investigated the temperature effects on the strength and durability of concrete [9-11]. The effects of additions of pozzolanic admixtures and supplementary cementitious materials on the temperature stability of concrete were also critically examined [12]. Some studies have also tried to analyse the effect of micro and nano materials on the properties of concrete after exposure to elevated temperatures [13]. Nano materials have been used to improve the specific properties of concrete at ambient and elevated temperatures and have yielded positive results due to emerging of nano-technology as a technological weapon [14]. The concrete structures when subjected to high temperatures may lead to the rise of internal pores (micro and meso) due to internal dehydration. Nano materials due to their high temperature stability and filling capacity may fill the pores thereby reducing the concrete disintegration and internal structure degeneration by delaying the failure occurrence. Studies relating the property evaluation of concretes by adding nano materials are numerous. Only a handful of studies have been done on the utilization of nano-alumina in concrete at normal and elevated temperatures. The nano alumina materials as additives have also increased the mechanical and physical properties of concrete after exposure to higher temperatures due to their pore shifting characteristics [15].

Earlier research works have reported that the use of nano particles in concrete restricts the pores in the interfacial transition zone of the aggregate and the cement paste. The degree of reduction of pores depends on the fraction of nano particle and the type of aggregate usage. The zircon sand is essentially a new concept to the world of concrete construction. However their thermal stability and fracture resistance is a well established concept. Insufficient studies to clearly demonstrate the effect of use of zircon sand in concrete forms the basis of

*Autor corespondent/*Corresponding author*,
E-mail: sakthis_nctrichy@gmail.com

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
Pillay Engineering College,
Vagore - 611 002.
Dt) Tamil Nadu.

COPPER SLAG -SILICA FUME BLENDED FIBRE CONCRETE – AN ECO-FRIENDLY HEALTHY ALTERNATIVE FOR CONVENTIONAL CEMENT CONCRETE

SAKTHIESWARAN N.[1*], DHANARAJ R.[1], SURESH P.[2]

[1]Department of Civil Engineering, Anna University Regional Campus Tirunelveli, Tamilnadu, India.

[2]Department of Electronics and Communication Engineering, PSN College of Engineering and Technology, Tirunelveli, Tamilnadu, India.

This study aims at utilizing industrial wastes and hybridized fibres to improve the strength and stability of concrete to obtain an eco-friendly healthy concrete. Steel, basalt and alkali reactive glass fibres were hybridized in various ratios to obtain modified concrete mixes containing 7% silica fume as cement replacement. This study also focuses on the effective ways of utilizing copper slag as fine aggregate replacement thereby reducing the pollution as well as meets the increasing demand of river sand for concrete. This experimental investigation includes the mechanical strength characterization such as compressive strength, flexural strength and split tensile strength at various ages and durability properties such as water absorption, porosity and resistance towards acid attack. The results obtained showed that the hybridization of fibres in combination with copper slag replacement can be incorporated in concrete to improve their mechanical strength and durability.The results also show that such fibre hybridization is indeed a promising concept that can significantly enhance the strength of the industrial waste incorporated concrete.

Keywords: silica fume, copper slag, fiber hybridization, mechanical strength, durability.

1. Introduction

Concrete, an indispensable construction material has occupied a predominant place in the construction of worldwide infrastructural facilities. No material has been proved to be an effective alternative to concrete and seems impossible even in the future. Substantial advancements taken in the recent decades have shown improved concrete with remarkable strength and sufficient stability to aggressive environments. Despite several advancements the construction industry still faces a major problem by posing a greater threat to the environmental sustainability due to greater demand of fine aggregates. The need to focus on the innovative materials as replacements for fine aggregates is increasing day by day due to the pressure of incorporating sustainable aspects in the construction industry. Moreover, the high amount of the energy associated with the production of cement demands the use of mineral or pozzolanic admixtures to solve the technical and environmental problems. Mineral admixtures mostly obtained from the industrial by-products are rich in alumina and silica and can function as effective cement replacements. Silica fume is a highly reactive mineral admixture that possesses high pozzolanic activity and can contribute significantly towards the strength improvement of concrete [1]. Several studies have seen significant enhancement in the properties of concrete due to the incorporation of silica fume both at the hardened and the fresh state. The inclusion of the silica fume has also been found to reduce the bleeding of concrete due to their comparatively high-water demand. The strength improvement in concrete due to silica fume addition may be attributed not only to their pozzolanic activities but also to their particle size which is finer when compared to the cement [2]. Similarly, copper slag also improved the strength of the concrete due to their filler effect and particle packing capacity [3-5]. The beneficial utilization of fibres and silica fume in concrete and their combined effects has been well documented by several researches [6-8]. Despite several studies have been reported on the utilization of copper slag and silica fume in concrete [9] no studies have attempted to replace binder and fine aggregate together as well as incorporating fiber hybridization. A comprehensive understanding is necessary when replacements to cement and fine aggregate is done at the same time and this study is an effort to glean the effect of replacement of fine aggregate by copper slag [10,11] and cement by silica fume together with fiber hybridization [12,13] on the strength and stability of cement concrete.

2.Research Objective

The primary objective of the research work is to investigate the effect of cement and fine aggregate replacements on the strength of concrete. Following are the specific objectives of the study:

*Autor corespondent/Corresponding author,
E-mail: sakthistructchy@gmail.com

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611002.
Tamil Nadu.

EXPERIMENTAL STUDY ON FIBRE AND FLY ASH BASED INTERLOCKING BRICKS

T. Adhavanathan[1] & R. Neelaveni[2]

Correspondence: adhavanathan@gmail.com

ABSTRACT

The use of interlocking bricks masonry has gained speedy quality in several foreign countries as an alternate to standard bricks for property housing. It is being always challenge for researchers to make interlocking brick light weight, low cost and improve the performance against aggressive environment. An experimental effort made in this concern. This paper offers the results of associate degree experimental investigation during which the compressive strength, water absorption and density were investigated by using varying percentage of fly ash, stone dust, and sand with different mix proportion. A manmade fibre, glass fibre reinforce polymer (GFRP) utilize as reinforcing material to produce the interlocking blocks which gives appreciable results discuss in detail. The experimental results compared thereupon normal force clay brick and interlocking brick found sturdy in aggressive environments and have decent strength for his or her use in property building construction.The utilization of interlocking blocks workmanship has increased fast prevalence in numerous remote nations as an option in contrast to customary blocks for reasonable lodging. It is as a rule consistently challenge for specialists to make interlocking block light weight, minimal effort and improve the exhibition against forceful condition. A trial exertion made in this worry. This paper gives the aftereffects of a test examination where the compressive quality, water retention and thickness were explored by utilizing fluctuating level of fly debris, stone residue, and sand with various blend extent. An artificial fiber, glass fiber fortify polymer (GFRP) use as strengthening material to deliver the interlocking squares which gives calculable outcomes examine in detail. The test results contrasted and that conventional burnt earth block and interlocking block found solid in forceful conditions and have adequate quality for their utilization in reasonable structure development.tool to evaluate the mechanical performance of the panels comparing to idealized design.

Keywords: fly ash, GFRP, compressive strength, water absorption, density

1. INTRODUCTION

A very high measure of waste is being delivered all around the globe. The most widely recognized strategy for overseeing waste is through its transfer in landfills making in that way colossal stores of waste. In this circumstance, squander reusing is increasing expanding significance [1]. At present in India, around 206 coals based warm power plants are delivering around 160 million tons of fly debris consistently; the evaluations arranged by Ministry of Power just as Planning Commissions up to the year 2031-32 show that age of fly debris during the year 2031-32 would be around 900 million tons for every year [2-3]. While the present yearly generation of fly debris worldwide is assessed around 600 million tones [4].The Government of India showed approaches drive for use and transfer of fly debris [5]. In a tropical nation like India the consumed mud block is the most fundamental structure material for development of houses. It is accounted for that the necessity of blocks for development movement sums to be in excess of 140 billion numbers every year [6]. For satisfy such request fly debris interlocking block might be one of option for maintainable development industry.

[1] Department of Civil Engineering, E.G.S Pillay Engineering College, Nagapattinam, Tamilnadu, India.
[2] Department of Civil Engineering, E.G.S Pillay Engineering College, Nagapattinam, Tamilnadu, India.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

2020 - 2021

ScienceDirect

Materials Today: Proceedings
Volume 37, Part 2, 2021, Pages 1062-1065

Improving the performance of mortar containing industrial wastes

N. Thamaraiselvi, N. Sakthieswaran, O. Ganesh Babu

Show more

Outline | Share | Cite

https://doi.org/10.1016/j.matpr.2020.06.294

Get rights and content

Abstract

Solid waste generated from manufacturing industries are consistently increasing. One such industrial solid waste is foundry sand. Foundry sand are partially replace the fine aggregate. The tests on the physical properties are specific gravity, dimension and mass were accepted out in according to obtain the mixture. The fine aggregate is partially replace with the foundry sand by different proportions 10%, 20%, 30% in normal mortar. The cement is replaced by GGBS and Silica fume (SF) in 5%, 10%, 15%. The ratio of mortar mix used here is 1:4. 53 grade ordinary portland cement is use in the project. The compressive strength, split tensile, flexural strength of specimen are found at 7 days and 28 days and compared with the normal mix to find the influence of foundry sand, GGBS and Silica fume in cement mortar.

Previous Next

Keywords

Cement mortar; Foundry sand; GGBS; Silica fume (SF)

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

ARTICLE IN PRESS

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Effect of steel fibre on fracture toughness of concrete

S. Sangeetha *, N. Sakthieswaran, O. Ganesh Babu

Department of Civil Engineering, Anna University Regional Campus-Tirunelveli, Tirunelveli 627007, Tamilnadu, India

ARTICLE INFO

Article history:
Received 17 May 2020
Received in revised form 28 May 2020
Accepted 13 June 2020
Available online xxxx

Keywords:
Fracture toughness
Notch depth ratio
Steel fibre
Three-point bending test
Foundry sand

ABSTRACT

The project focuses on fracture toughness of steel fibre reinforced concrete. M30 grade concrete is used in this project. 5%0.10%, 15%,20%, 25% and 30% of Ground Granulated Blast Furnace Slag (GGBFS) is replaced with cement. The hooked end steel fibre addition is kept constant as 3% by weight of binder content. 5% 10%, 15%, 20%, 25%, and 30% of foundry sand is replaced with fine aggregate. Specimens of size 500 × 50 × 50 mm are used with notch of constant width 3 mm with notch depth ratios of 0.1, 0.2, 0.3, and 0.4. The fracture toughness is determined by using three-point bending test. The results are compared with the results of ordinary concrete mix.
© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Concrete is the most versatile material used in the field of civil engineering. Concrete is used in large quantities almost everywhere mankind has a need for infrastructure. Loading effect, shrinkage, and various factor are formed cracks in the fibre-reinforced cementitious composite material. Fibres are very strong and stiff, and bond well with the cement matrix, limiting crack width and the FRC can carrying stress even after relatively large amount of deformations after cracking the specimens. Thus, fibres to have ductility of cementitious composites materials after cracking, improve the value of FRC toughness [1–6], According to EN 14651, flexural strength test was performed on notched beams 0.10, 30, 40, and 50 kg/m3 volume fractions of arched and hooked end type fibre were added. As results, all fracture parameter was increased with fibre volume fraction up to 40 kg/m3. values of ASFRC is higher than reinforced with hooked-end type steel fibre [7], notched prisms with a/D ratio equal to 0.4 was used. Three-point bending test is carried out. The values of ultimate load, fracture toughness, fracture energy, ductility and were measured conventional concrete (PCC) of same grade and the fibre content was varied from 0 to 0.75% with an increment of 0.25% [8]. An experimental study of the fracture energy of concrete reinforced with natural fibres of hemp, elephant grass, and wheat straw.0.19%of fibres are containing concrete specimen by the weight and of 40 mm of length were uniaxial tested with the wedge splitting test (WST) method is used. In the presence of fibres in concrete 4%, 7%, and 8% for hemp, straw and elephant grass reinforced specimen's tensile strength get decreased [9]. The experimental investigation of 1% and 2% of steel fibre or polypropylene fiber with plain concrete and fibre concrete cubes and notched prismatic specimens are tested [10].

2. Investigationmade

2.1. Material

Ordinary Portland cement of 53 grade was used confining to IS12269-1987. Specific gravity of cement was tested as per IS 2720-Part-3 and was found to be 3.15. The aggregate which passes through 4.75 mm sieve is used. Result of Specific gravity of fine aggregate is 2.85. The aggregate was taken as a combination of 20 mm as per IS code. Specific gravity of coarse aggregate test was conducted as per IS 2386 -Part-3 [12] and resulted as 2.87. Portable water is used for casting and curing work of beams, cylinder and cubes.

Foundry sand is used with specific gravity2.79 and GGBS is also used with fineness modulus 3.36, specific gravity 2.85. Hooked end Steel fibre has been used as reinforcing material and So, steel fibre concept is explained below, Steel Fibre: hooked end steel fibre is used in this experiment. Length and diameter of steel fibre is

* Corresponding author.
E-mail addresses: sangeethasubbiahngl@gmail.com (S. Sangeetha), sakthistructrichy@gmail.com (N. Sakthieswaran), oganeshbabu@gmail.com (O. Ganesh Babu).

https://doi.org/10.1016/j.matpr.2020.06.289
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
Principal
Please cite this article as: S. Sangeetha, N. Sakthieswaran and O. Ganesh Babu, Effect of steel fibre on fracture toughness of concrete, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.06.289
Tamil Nadu.

ARTICLE IN PRESS

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Experimental investigation of sustainable concrete by partial replacement of fine aggregate with treated waste tyre rubber by acidic nature

R. Gajendra Rajan*, N. Sakthieswaran, O. Ganesh Babu

Department of Civil Engineering, Anna University Regional Campus-Tirunelveli, Tirunelveli 627007, Tamilnadu, India

ARTICLE INFO

Article history:
Received 17 May 2020
Received in revised form 28 May 2020
Accepted 13 June 2020
Available online xxxx

Keywords:
Sustainable concrete
Waste tyre rubber
Surface modification method
Strong polarity groups
Strong chemical bond
Cement matrix

ABSTRACT

A sustainable concrete is one of the essential concretes for this current environment. Increasing of automobile industry leads to produce a huge amount of waste tyres in the entire world. The disposal of waste tires continues to pose a serious threat to environmental protection and health. The main aims of this study are the utilization of Waste tyre rubber material as partial replacement for fine aggregates in M30 grade of concrete mix at different percentages to produce a sustainable concrete. It has the additional advantage of saving in natural aggregates. In this paper, a surface modification method was proposed to introduce strong polarity groups to rubber surface to generate a strong chemical bond between the rubber and the cement matrix. It is an effective method to improve the mechanical properties of concrete.
© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Worldwide production of tyre increases due to increase of automobile industry, it is very difficult to dispose the waste tyre as the availability and capacity of landfill spaces decreases. Currently 75–80% of scrap tyres are buried in landfills. Disposal of whole tyre has been banned in the majority of landfill operations because of the bulkiness of the fires and their tendency to float to the surface with time. Investigations have shown that scrapped rubber tyres contain materials that do not decompose under environmental conditions and cause serious problems. Based on these problems, tyres can be used as aggregates in concrete. The basic material required in construction of buildings by using concrete are aggregate and cement. India has been recycling and reusing waste tyres for four decades, although it is estimated that 60% are disposed of through illegal dumping. Recycling waste tire rubber by incorporating it into concrete has become the preferred solution to dispose of waste tires. The mechanical and durability properties of waste rubber tyre concrete with different replacement forms and volume contents had been investigated. In this study, the performance of waste materials waste tyre rubber as partial replacement for fine aggregates in M30 grade of concrete mix at different percentages and its effect on concrete properties like compressive strength, flexural strength and split tensile strength were investigate by acidic nature. Based upon this point of view durability property with acid curing for 28 days compressive strength is to be done instead of treatment of rubber with solutions. One of the major concerns of the material is the ingress moisture and aqueous solutions or the contact with an alkaline environment when durability is considered.

Kunal Bisht and Ramana investigated the mechanical and durability properties for the different proportion 0%, 4%, 4.5%, 5% and 5.5% of Waste Tyre Rubber of concrete. It has been observed that with an increment of Waste Tyre Rubber workability of concrete decreases. The output of flexural and compressive strength slight decreases with 4% replacement of fine aggregate by rubber [1]. EshmaielGanjian et al., investigated the performance of concrete mixtures incorporating 5%, 7.5% and 10% of discarded tyre Rubber as aggregate and cement replacements in the investigation the result stated that: Compressive strength was reduced with increased percentage of rubber replacement in concrete, though with 5% replacement of aggregate or cement by rubber, decrease in compressive strength was low (less than 5%) without noticeable changes in other concrete properties. Tensile strength of concrete

* Corresponding author.
E-mail addresses: dr.gaja07@gmail.com (R. Gajendra Rajan), sakthistructrichy@gmail.com (N. Sakthieswaran), oganeshbabu@gmail.com (O. Ganesh Babu).

https://doi.org/10.1016/j.matpr.2020.06.279
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

ATTESTED
BALAN, M.E., Ph.D.
PRINCIPAL

Please cite this article as: R. Gajendra Rajan, N. Sakthieswaran and O. Ganesh Babu, Experimental investigation of sustainable concrete by partial replacement of fine aggregate with treated waste tyre rubber by acidic nature, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.06.279

ARTICLE IN PRESS

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Experimental study on effects of natural admixture on blended mortar

M. Abarna Munisha [a,*], N. Sakthieswaran [a], O. Ganeshbabu [a], K.K. Gaayathri [b]

[a] Department of Civil Engineering, Anna University Regional Campus-Tirunelveli, Tirunelveli 627007, Tamilnadu, India
[b] Department of Civil & Structural Engineering Annamalai University, India

ARTICLE INFO

Article history:
Received 17 May 2020
Received in revised form 28 May 2020
Accepted 13 June 2020
Available online xxxx

Keywords:
Mortar
Natural admixture
Heat curing
Compression strength
Flow table
Tensile strength

ABSTRACT

The present study deals with the incorporation of the Natural admixture Egg as an admixture to the mortar and also the Silica fume and Fly ash as partial replacement materials for cement. Construction industries are the paramount key to find alternatives for the industrial byproducts. Since they possess the pozzolanic property they are used in this study for the replacement of cement. The study aims at heat curing of mortar at specified temperature to compare the results that of normal mortar. The natural admixture with 3 different percentages respect to water to bind ratio are chosen and the respective results were found. The mechanical and durability properties of mortar were done to analyze the conclusion for this project. The mortar with 15% of partial replacement for cement with Silica fume and Fly ash were found to be optimum with 0.50% of Natural admixture Egg.
© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Mortar is a workable paste used to bind together the construction materials and also used to seal the breaches between the irregular structures. The main constituents of mortar are the cement and sand. In olden days instead of Cement the natural materials like jaggery, egg, surkhi, clay and mud were used [1]. In recent times the usage of various types of cements are found to be used due to their capacity of good mechanical strength. Even though the usage of cement has its advantages there also exits the major disadvantage of emission of carbon di oxide in to the environment. So in order to overcome this disadvantage the experts found the way for partial replacement of cement with industrial by products. The usage of industrial byproducts for the partial replacement of cement has dual advantage of reducing the impact of greenhouse gas on environment and also acts as an alternative for disposal of industrial by products.

Due to over exploitation of river sand now it is usual to take advantage of the manufactured sand as a replacement material for river sand. Admixtures are used in concrete structures to enhance the setting time of concrete and some are used to increase its strength parameters of them. There are wide range of chemical admixtures are used by the construction industries but we must use the natural admixtures like banana peel, egg, sugarcane bag gase ash, wood waste ash, etc. can be used to enrich the properties of mortar and concrete.

The present paper aims at promoting the usage of Natural admixture Egg and also the industrial by products silica fume and fly ash as partial replacements for cement, in order to make the mortar economically feasible and also to improve the strength of the mortar by making use of the natural admixture without any harmfulness to the environment.

2. Materials

2.1. Cement

The ordinary Portland cement of grade 53 was used in this study. The Standard consistency of water was 33% and the initial and final setting time of cement was found to be 35 min and 10 h respectively.

2.2. Manufactured sand

The specific gravity and fineness modulus of manufactured sand used in this experimental work was 2.73 and 4.66 respectively.

* Corresponding author.
E-mail addresses: abarnam21@gmail.com (M. Abarna Munisha), sakthistructrichy@gmail.com (N. Sakthieswaran), oganeshbabu@gmail.com (O. Ganeshbabu), drphd88@gmail.com (K.K. Gaayathri).

https://doi.org/10.1016/j.matpr.2020.06.284
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.
PRINCIPAL
Thethi, Nagore - 611 002
Nagapattinam (Dt) Tamil Nadu

ARTICLE IN PRESS

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Natural admixture in blended mortar- mechanical properties study

J. Ponnaiah [a,*], N. Sakthieswaran [a], O. Ganesh Babu [a], K.K. Gaayathri [b]

[a] Department of Civil Engineering, Anna University Regional Campus-Tirunelveli, Tirunelveli 627007, Tamilnadu, India
[b] Department of Civil & Structural Engineering, Annamalai University, India

ARTICLE INFO

Article history:
Received 17 May 2020
Received in revised form 28 May 2020
Accepted 13 June 2020
Available online xxxx

Keywords:
Mortar
Egg
Fly ash
Silica fume
Acid curing

ABSTRACT

In this paper a detailed review about the utilization Natural admixture Egg as an admixture and cement partially replaced by Fly ash and Silica fume. Since Egg is rich in its calcium content the mechanical properties of mortar can be influenced to great extent. By fixing the water to binder ratio as 0.45 and varying the percentages of an admixture with respect to the water to binder ratio and similarly by varying the proportions of Fly ash and Silica fume commencing from 5% to end with 20% of that of cement, different mortar specimens were casted. Acid curing is done on the mortar samplings and then the results were competed with the water cured samplings. The mechanical and durability properties of the mortar were carried out and their corresponding results were assessed.
© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Cement mortar is the vital material in modern day construction. Long term durability and its great compressive strength are its well-known possessions. The consumption of cement mortar is increasing gradually due to the increase in construction industries and eventually it leads to the exploitation of natural resources. In order to reduce the usage of currently available raw materials efforts are being made to replace them by other materials. Solid waste disposal problems can be reduced by using them as supplementary cementitious materials, the concrete industry is looking for those materials which can fulfill this objective of disposing the wastes. Fly Ash (FA) and Silica Fume (SF) are among the solid litters generated by industries. Industrial backlashes can be used as a partial alternative for Portland cements since there will be substantial energy and cost savings. An increased demand for cement and concrete can be met by partially replacing the cement in conjugation with Fly ash (FA) and Silica Fume (SF) in addition to the natural sand with manufactured sand.

The present study aims at the feasibility of using locally available Fly ash (FA) and Silica fume (SF) as partial replacements for cement. By doing this, the objective of reducing the construction cost and the problems associated with the disposal including environmental problems of the region can also be met.

In modern constructions the usage of Chemical admixtures is inevitable one. By using those chemical admixtures in concrete there will be reduction in water demand and also they can improve the properties of concrete [1]. Even though the usage of chemical admixtures provides better structural properties these are also responsible for environmental pollution. Impact of chemical admixture on environment can be seen when those concretes with these chemical admixtures are exposed to environment. Thus it is anticipated to find alternative admixtures that can provide better concrete properties, also doesn't produce adverse effect on environment.

The usage of Natural organic materials can provide concrete with better properties without affecting the environment [2]. Therefore in this study the utilization of Natural admixture Egg is preferred since it can enhance the mechanical properties of mortar.

2. Materials

2.1. Cement

Throughout the course of the study the Ordinary Portland Cement of grade 53 was used. With the help of the tests conforming to Indian Standard IS : 1489--1991 the physical properties

* Corresponding author.
E-mail addresses: ponnaiah96@gmail.com (J. Ponnaiah), sakthistructrichy@gmail.com (N. Sakthieswaran), oganeshbabu@gmail.com (O.G. Babu), gaayathrikk14@gmail.com (K.K. Gaayathri).

https://doi.org/10.1016/j.matpr.2020.06.293
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

ATTESTED
S. RAMABALAN, M.E., Ph.D.
E.G.S. Pillay Engineering College
Thethi, Nagore - 611 002
Nagapattinam (Dt) Tamil Nadu

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Experimental investigation on strength and properties of natural fibre reinforced cement mortar

M. Mathavan *, N. Sakthieswaran, O. Ganesh Babu

Department of Civil Engineering, Anna University Regional Campus-Tirunelveli, Tirunelveli 627007, Tamil Nadu, India

ARTICLE INFO

Article history:
Received 17 May 2020
Received in revised form 11 June 2020
Accepted 13 June 2020
Available online xxxx

Keywords:
Mortar
Natural fibres
Cotton
Wool
Silk
Linen
Nylon
Polyester

ABSTRACT

Mortar is the binding material used to bind the masonry of a structure. Mortar is paste made of sand, cement, lime and water. Scientists are involved in finding new alternatives to reduce the cracks that can be used effectively in mortar and also make a use of recycled materials in construction to achieve sustainability in a safe way. In this study, it has been attempted to conduct experiments by using the natural fibres to building materials in order to evaluate the use of the natural fibres in construction sector. Six types of natural fibres such as Cotton, Wool, Silk, Linen, Nylon, Polyester, were used as an additive in 1%, 2%, 3%, by mortar volume and casted and cured for 7 and 28 days. Their role in cement mortar is analysed by evaluating mechanical, physical and durability properties. Finally the above test results were compared with normal mix mortars.
© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Mortar is an important element of ancient construction which has its footsteps throughout the evolution of human civilization. The archaeological evidences proves that the earliest known man-made structures which are even existing at the present are made by mortars which stands as an evidence for their strength. Many old structures made of mud and clay were reinforced with natural fibres, which shows the use of natural fibres is a prominent reinforcement to enhance the mechanical properties and structural behaviour. The coconut fibre, palm fibre and bamboo fibre are well known fibres used in natural fibre recycling for which there are several studies also to support their contribution. The aspect ratio can be defined as the ratio of fibre length to diameter of the fibre which can be given as L/D, mostly the aspect ratio lies between 30 and 150 for length of 6–75 mm. Fotint Kesikidou, Maria Stefanidou et al (2019), In this experiment, the coconut fibre, jute fibre and kelp fibre is used as reinforcement in mortar volume of 1.5%. The physical, micro structural and mechanical properties were tested for both the cement and lime mortar. The cubes were casted and tested for compressive strength by 28 days. The best result were observed in 28% addition of kelp fibre which is followed by 24% addition of coconut fibre, the least performance is observed in 16% addition of jute fibre. Overall the natural fibres enhances strength more in lime mortar than cement mortar. It is obvious that natural fibre reinforcement enhances the strength and durability and also counters the social and economic issues. The basic properties such as flexural can be promoted in mortar without affecting the economic and environmental factors [1]. Leonidas Alexandos et al (2018), In this paper the author deals with the properties of textile reinforced cement mortar and gives an idea about the experiments and results of textile reinforced mortar with the supporting evidences and suggestions to face the durability issues. The textile reinforced mortar is a mixture of textile fibres and cement mortar, the fibres can be from organic and inorganic traces. This paper also discusses the shear and flexural properties of the textile fibre reinforced walls and some structural elements such as masonry arches were also analysed [2]. Mohammad S. Islam et al (2018), In this investigation the jute fibre is taken in the length of 10 mm and 20 mm and four volumes of 0%,0.25%,0.5%,1% were taken for both. The cube cylinder and beam was tested for 28 days and the cube is tested for 7 and 90 days additionally and cylinder is tested for 90 days additionally. To the

* Corresponding author.
E-mail addresses: mathavanshiva307@outlook.com (M. Mathavan), sakthistructrichy@gmail.com (N. Sakthieswaran), oganeshbabu@gmail.com (O. Ganesh Babu).

https://doi.org/10.1016/j.matpr.2020.06.295
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

ATTESTED
Dr. S. RAMABALAN M.E., Ph.D
PRINCIPAL
E.G.S. Pillay Engineering College

Please cite this article as: M. Mathavan, N. Sakthieswaran and O. Ganesh Babu, Experimental investigation on strength and properties of natural fibre reinforced cement mortar, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.06.295

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

Journal homepage: www.elsevier.com/locate/matpr

Experimental study on mortar as partial replacement using sawdust powder and GGBS

D. Shanmuga Priya*, N. Sakthieswaran, O. Ganesh Babu

Department of Civil Engineering, Anna University Regional Campus-Tirunelveli, Tirunelveli 627007, Tamilnadu, India

ARTICLE INFO

Article history:
Received 17 May 2020
Received in revised form 27 May 2020
Accepted 13 June 2020
Available online xxxx

Keywords:
Ground granulated blast furnace slag
Saw dust powder
Super plasticizer
Compressive strength
Thermal insulation

ABSTRACT

Increasing demand and depletion of natural resources in construction world, so we need for the replacement of conventional mix. In this project main objectives is the sawdust powder 5%,10%,15%partially replaced by fine aggregate and the cement mortar consists of ordinary Portland cement with 10%,20%,30% partially replacement by ground granulated blast-furnace slag. Then add superplasticizer water reducing admixture very high workability and strength. Use of sawdust powder in mortar permit disposal of waste (saw dust), reduce the weight of the concrete. Good thermal insulation, efficient energy and low cost of material. The experimentation will be performed for 1:4 cement mortar 0.45% water cement ratio at various temperatures 50°c, 100°c. Result was expected to be used low carbon materials and eco-friendly solution to wood waste recycling for the construction industry.
© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Mortar is a combination of cement, fine aggregates and water, which are mixed in a particular proportion to get a particular strength. The mortar mix design is to achieve maximum durability and compressive strength as possible as without any compromise with the quality. Ordinary Portland cement is one of the most popular materials in construction world and demand is increased due to the rapid development of infrastructure construction. Reuse of waste or by-products shows great potential and developed as one of the main directions of low carbon materials. Now a day's ecologists are facing a big problem of disposing waste substance produced due to the cyclic production of wastes from various industries and agriculture. The new techniques and materials should be developed to construction world. River sand has been the most popular choice for the fine aggregate components of concrete in the construction. The over use of river sand has led to environmental concerns. The several research persons are working on the use of alternative materials in place of normal traditional materials to bring down the expenditure to be spent or building materials by using materials which is available in surrounding in construction works. It reduces the cost of concrete production and will reduces the cost of building construction. The replacement of fine aggregate (sand) with certain wooden powder in mortar that makes the structure light weight in construction. LW materials used to make a precast construction like floors, walls and othe plastering works. A number of advantages of partially replacement sawdust mortar over other conventional mortar. Including better insulation properties, fire performance and strength properties. It can reduce materials cost, reuse wood waste and has similar thermal performance and improved strength. Wood-crete is a new material made from sawdust or other wood wastes with consideration for locally cheapest materials, reduces the construction cost for sustainable development and addition of NaOH was able to extract soluble content of sawdust. Raw materials are treated with NaOH at various percentage [1], the technical and economic interests better thermal insulation, energy saving and low cost of materials [2], the properties studied show that the polymers are compatible with sawdust then solid waste recycling for construction work after treated, many types wood particles collected in sawmills wood in country [3], Experimental study with partial replacement cement by GGBS in various percentage 0%,5%,10%,15% and 20%. It is increasing the strength of concrete [4]. The sawdust concrete wall has better thermal resistance than

* Corresponding author.
E-mail addresses: shanmugapriya.db@gmail.com (D. Shanmuga Priya), sakthistruc trichy@gmail.com (N. Sakthieswaran), oganeshbabu@gmail.com (O. Ganesh Babu).

https://doi.org/10.1016/j.matpr.2020.06.292
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
Engineering College.
Nagappattinam

Please cite this article as: D. Shanmuga Priya, N. Sakthieswaran and O. Ganesh Babu, Experimental study on mortar as partial replacement using sawdust powder and GGBS, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.06.292

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Experimental study of an eco-friendly concrete by inbuilt with treated crumb rubber

Mohamed Thameem Ansari, N. Sakthieswaran, O. Ganesh Babu *

Department of Civil Engineering, Anna University Regional Campus-Tirunelveli, Tirunelveli 627007, Tamil Nadu, India

ARTICLE INFO

Article history:
Received 17 May 2020
Received in revised form 28 May 2020
Accepted 13 June 2020
Available online xxxx

Keywords:
Eco friendly
Crumb rubber
Fine aggregate
Surface treatment
Solid chemical strength
Mechanical properties

ABSTRACT

An Eco-friendly concrete is one of the essential concretes for this current environment. Increasing of automobile industry leads to produce a huge amount of waste tyres in the entire world. The disposal of waste tires continues to pose a serious threat to environmental protection and health. The main aims of this study are the utilization of Crumb rubber material as partial replacement for sand in M30 concrete mix at various percentages to produce an eco-friendly concrete. It has the extra benefit of saving in natural sand. In this study, a surface treatment process was proposed to make solid polarity groups to rubber surface to generate a solid chemical strength among the rubber and the concrete matrix. It is an effective process to enhance the mechanical properties of concrete.
© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Indian automobile industry is one of the largest in the world. The utilisation of vehicle in conveyance is also increasing day by day, therefore the use of tyres for the vehicles increased. In most of the parts of the world the use of vehicle tyre as crumb rubber is very less, so very often they are normally burn or just buried in landfills which are harmful to environment and causes Global Warming too. Crumb rubber which means small piece or the powdered form of tire (used in vehicle) which is being made after removing thin steel wire from the tire. The Scope of this study is to reduce the waste tyre rubber in the environment and utilised in the concrete at various percentage replacement of natural sand to gain better engineering properties of concrete. This has the extra benefit of saving in natural sand which are becoming lack in availability. The Utilization of crumb rubber from waste tyres could benefit the environment and construction industry. The main aims of this study are the using the treated Crumb rubber material in the Concrete as well as investigate the strength properties. In this research, we take M30 grade concrete. Then these cubes were cured in normal water for 28 days. Treated Crumb rubber were mixed in varying proportion of 0%, 2.5%, 5%, 7.5%, 10%. For strength parameter compressive strength are found as per IS 516–1979, tensile strength is found as per IS 5816:1999, flexural strength is found as per ASTM C 78, permeability test and water absorption test for concrete are found. The Values obtained are studied with respect to controlled specimen.

2. Literature review

Mustafa Maher et al. [1] they investigated that the effects of partial replacements of sand by waste fine rubber on the long-term performance of concrete under low impact mid-point bending loading. Specimens were prepared for 5% and 10% replacements by volume of sand. The output appeared that the average compressive stress of the plain concrete in 28 days is 37 MPa. As the sand is replaced by fine crumb rubber, the compressive stress reduces by 14 and 22% with 5and 10% of volumes respectively. The variation of tip load with time in which the peak amplitude of the tip load increase by 5 and 7% with replacements of 5 and 10% of sand volume by fine crumb rubber. The increases in tip load and bending load are attributed to the high plastic energy capacity of rubber which when added to the concrete, improves the mix ductility and the ability to absorb the impact load.

Kunal Bisht, Ramana (2017) [2] in the investigation they evaluated Mechanical properties and Durability properties for the various proportion 0, 4, 4.5, 5 and 5.5 percentages of crumb rubber of concrete. It has been observed that with an increment of crumb

* Corresponding author.
E-mail addresses: tansari055@gmail.com (M. Thameem Ansari), sakthistructrichy@gmail.com (N. Sakthieswaran), oganeshbabu@gmail.com (O. Ganesh Babu).

https://doi.org/10.1016/j.matpr.2020.06.287
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.

Please cite this article as: M. Thameem Ansari, N. Sakthieswaran and O. Ganesh Babu, Experimental study of an eco-friendly concrete by inbuilt with treated crumb rubber, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.06.287

ARTICLE IN PRESS

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Effect of micro silica and ground granulated blast furnace slag on performance of rubberized mortar

R. Aswin Maria Sebal [a,*], N. Sakthieswaran [a], O. Ganesh Babu [a], K.K. Gaayathri [b]

[a] Dept of Civil Engineering, Anna University Regional Campus Tirunelveli, Tirunelveli 627007, Tamilnadu, India
[b] Department of Civil & Structural Engineering, Annamalai University, India

ARTICLE INFO

Article history:
Received 17 May 2020
Received in revised form 28 May 2020
Accepted 13 June 2020
Available online xxxx

Keywords:
Compressive strength
Industrial waste products
Masonry structures
Mortar
Rubberized mortar
Waste rubber tire powder

ABSTRACT

Mortar is a cement based paste widely used for constructing masonry structures. It is made by mixing cement and fine aggregate with adequate water cement ratio. Mortar is evenly applied on the wall structures to give a smooth surface finish and it also serves as a joint when applied between bricks. In the present world, Construction industry is facing much difficulty in collecting river sand as there are lot of restrictions imposed by the Government. Recent studies revealed that the waste rubber tire powder can be used instead of river sand. It is also well known fact that the cement manufacture industry causes environmental pollution and so it is better to use alternative eco-friendly material for cement. Micro silica (MS) and ground granulated blast furnace slag (GGBS) are industrial discarded goods and can be utilized as cement alternatives. In this study, Rubberized mortar is prepared by replacing sand with chemically treated rubber tire powder at 5%, 10%, 15% and 20% replacement levels and also replacing cement by MS and GGBS collectively. MS is replaced at 10% and 20% for cement whereas GGBS is replaced constantly at 10% for cement. The study analyses the performance of the rubberized mortar with combined effects of GGBS as well as MS and finally the ideal replacement level of each material is determined. It is found that 10% rubber tire powder for sand, 20% of MS and 10% of GGBS collectively for cement give better performance than other replacement levels.
© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

As long as there is functioning of Automobile industry in the country, there will be production of tires. Tires are produced in large scales globally due to recent boom in the automobile industry. Tires became worn out when they finished their designed life. The waste tires are then collected and have to be disposed safely. These type solid wastes are generally incinerated or landfilled. Landfill method degrades the naturally enriched soil quality and depletes it. On the other hand, Incineration technique involves high temperature burning of tires which leads to environmental pollution due to liberations of hazardous gases into atmosphere. Therefore both these methods are not eco-friendly and unadoptable. So we are in the necessity to find an effective method of disposing waste tires without causing damage to the natural resources and environment. Many studies suggested the idea of using waste tire rubber in powdered form as an alternative material for river sand in the construction field. In the study done by Ahmed A. Gheni et al., durability properties of mortar are enhanced by adding rubber fiber powder. Mortar blends using up to 20% rubber fiber powder indicated better-quality oxidization resistance [1]. "Kaveh Afshinnia and Amir Poursaee clarified that rubber particles acts as an energy absorbers during the Alkali-Silicate reaction (ASR) in mortar and also declines the ASR enlargement" [2]. "Oikonomou and Mavridou observed that there is improvement in chloride ion resistance in mortar but the strength characteristics of mortar has to be compensated. They studied modified mortar with tire granules as a replacement for the sand" [3]. "The Tire rubber

Abbreviations: RTP, Rubber Tire Powder; GGBS, Ground Granulated Blast Furnace Slag; MS, Micro Silica.

* Corresponding author.
E-mail addresses: aswinmaria94@gmail.com (R. Aswin Maria Sebal), sakthistructrichy@gmail.com (N. Sakthieswaran), oganeshbabu@gmail.com (O. Ganesh Babu), gaayathrikk14@gmail.com (K.K. Gaayathri).

https://doi.org/10.1016/j.matpr.2020.06.278
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College
Thethi, Nagore - 611 002.

Please cite this article as: R. Aswin Maria Sebal, N. Sakthieswaran, O. Ganesh Babu et al., Effect of micro silica and ground granulated blast furnace slag on performance of rubberized mortar, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.06.278

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Experimental investigation of concrete incorporating HDPE plastic waste and metakaolin

V. Punitha, N. Sakthieswaran, O. Ganesh Babu

Department of Civil Engineering, Anna University Regional Campus-Tirunelveli, Tirunelveli 627007, Tamilnadu, India

ARTICLE INFO

Article history:
Received 17 May 2020
Received in revised form 27 May 2020
Accepted 13 June 2020
Available online xxxx

Keywords:
HDPE plastic powder
Fine aggregate
Metakaolin
Cement
Compressive strength

ABSTRACT

This paper deals with the investigation of using Metakaolin and HDPE plastic waste with various percentages in concrete to make the concrete economical with desired properties and to reduce the consumption of naturally available construction materials. Six percentages of High Density Polyethylene (HDPE) Plastic powder (5%, 10%, 15%, 20%, 25% and 30%) and 10% metakaolin are incorporated with the weight of fine aggregate and cement respectively. The concrete with 10% metakaolin and 15% HDPE plastic powder gives better result on compressive strength in comparison with conventional concrete. The flexural strength and split tensile strength of concrete shows up to 80% and 90% replacement with 10% metakaolin and 5% HDPE plastic powder respectively.

© 2020 Elsevier Ltd. All rights reserved.

Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Due to the utilization of river sand in a large amount, there is a demand for fine aggregate in making concrete. Hence, plastic waste is used as an alternative material which is discarded in landfill and causing environmental issues. The use of waste plastics in concrete enhances the mechanical properties of concrete and is a good water resisting material. To get the better result the HDPE plastic wastes are pulverized to a fine powder and are partially replaced with various percentages (5%, 10%, 15%, 20%, 25% and 30%) to the fine aggregate. During cement production a large amount of CO_2 is emitted which affects the environment majorly; hence cement is partially replaced with metakaolin in order to reduce CO_2 emission and also to improve the strength of concrete. The properties of each material in this study are investigated to find out the better result and the values obtained in testing hardened concrete are compared with controlled specimens.

Various studies showed that the employment of plastic waste in concrete as a partial replacement of fine aggregate gives better results. Awham Mohammed Hameed and Bilal Abdul-Fatah Ahmed explained that the mechanical properties of concrete at 1% PET content shows better result. The concrete density decreases with incorporation of plastic content [1]. Rajat Saxena et al., described that the compressive strength of concrete decreases when plastic PET aggregate is incorporated to it [2]. Azad A. Mohammed, Ilham I. Mohammed and Shuaaib A. Mohammed explained that the fine or coarse aggregate is replaced upto 30% of PVC aggregate in order to get desired properties [3]. Alireza Mohammadinia et al., in their study explained the employment of RPW and RCG in concrete in which coarse aggregate is replaced up to 20% by volume for RPW and up to 30% by volume for RCG which is used in the construction of footpath [4]. Thorneycroft.J, et al., explained that by replacing 10% sand with volume of recycled plastic is a feasible solution to save up to 820 million tons of sand every year [5]. Ankur Bhogayata C and Narendra K. Arora in their study explained that the addition of Metalized plastic waste (MPW) into the controlled concrete can reduced the environmental hazards and also enhanced the mechanical and durability property of concrete [6]. Rakesh Muduli and Bibhuti Bhusan Mukharjee investigates about the incorporation of metakaolin with varying percentages of recycled coarse aggregates (RCA) in concrete to improve its properties. The results shows that the concrete mix incorporating 100% RCA and 15% metakaolin having similar properties in comparison with controlled concrete [7]. Hence, in this study in order to increase the mechanical and durability properties of concrete the fine aggregate is replaced partially with HDPE plastic waste and cement by metakaolin.

E-mail addresses: vmpunithacivil@gmail.com (V. Punitha), sakthistructrichy@gmail.com (N. Sakthieswaran), oganeshbabu@gmail.com (O. Ganesh Babu)

https://doi.org/10.1016/j.matpr.2020.06.288
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College
Nagapattinam - 611 002

Please cite this article as: V. Punitha, N. Sakthieswaran and O. Ganesh Babu, Experimental investigation of concrete incorporating HDPE plastic waste and metakaolin, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.06.288

AUSTRALIAN JOURNAL OF MECHANICAL ENGINEERING
https://doi.org/10.1080/14484846.2020.1761007

Taylor & Francis
Taylor & Francis Group

ARTICLE

Check for updates

Design optimisation of mating helical gears with profile shift using nature inspired algorithms

N. Godwin Raja Ebenezer[a], S. Ramabalan[b] and S. Navaneethasanthakumar[c]

[a]Department of Mechanical Engineering, Loyola - ICAM College of Engineering and Technology, Chennai, India; [b]Department of Mechanical Engineering, EGS Pillay Engineering College, Nagapattinam, India; [c]Department of Mechanical Engineering, Sri Subramanya College of Engineering and Technology, Palani, India

ABSTRACT

Profile shift of the gear significantly affects its form, zone, stress factors, transversal and face load factors. In this paper, an optimum solution to the problem of mating helical gears design considering profile shift is given. The objective of the problem is to minimise volume taking into account tooth root bending strength, contact pressure, face width, and addendum modification coefficients as constraints. The design variables, namely, the module, the face width, the number of teeth, and profile shift coefficients of both gears are considered. Nature-inspired algorithms, namely, Simulated Algorithm (SA), Fire Fly Algorithm (FA), Cuckoo Search (CS), Particle Swarm Optimisation (PSO) and Teaching Learning-Based Optimisation (TLBO) algorithms are employed. Results of simulation with and without profile shift, performance of various algorithms are analysed and validated with literature. Results show that CS and PSO algorithms give the best optimum volume. They also significantly reduce volume by 1.91%, when compared to literature. CS algorithm gives the best optimum design parameters. Furthermore, results show the volume of the mating helical gears with profile shift is much lesser than the pair without profile shift.

ARTICLE HISTORY
Received 21 January 2020
Accepted 21 April 2020

KEYWORDS
Design OPTIMISATION; helical gear; profile shift; nature inspired algorithms; TLBO

1. Introduction

Gears are mechanical elements used to transmit power and motion. As helical gears have maximum precision and high power transmission efficiency, they are more preferred in industrial machines. There is a great demand of gear with higher load carrying capacity, lesser weight and noise. A depiction of mating helical gears is shown in Figure 1.

Profile shift is employed by designers to overcome undercut, when shaping gears with few teeth. Profile shift is also known as addendum modification. It is the displacement of the basic rack or cutting tool datum line from the reference diameter of the gear. A gear tooth with profile shift is presented in Figure 2.

It is also used to increase the load-carrying capacity, the lifetime of the gears, to decrease the noise level, increase or decrease the centre distance and change tooth thickness of gears. A gear tooth with various values of profile shift coefficients is shown in Figure 3.

The size of the profile shift is generally made to be non-dimensional by dividing it by the normal module, and it is then defined by the profile shift coefficient, x. Profile shift coefficient may be positive or negative. For instance, a profile shift coefficient of $x = +0.25$ means that the tool profile is shifted outwards by 0.25 times the module*m*. A positive profile shift increases the tooth thickness, whereas a negative profile shift decreases tooth thickness.

Volume minimisation of gear is of great interest in high-performance power transmissions systems. It is also desirable to obtain reliable gear designs. Although there are sufficient load capacity calculations and literature available for gear design, the presence of a mixed type of variables, requirement of special designs and gear geometry of gear make the design procedure a complex one. To obtain quality gears, designers strive to consistently improve economic, safety and effectiveness aspects. In such situation, it is good for the designer to resort to optimisation (Arora 2012), to obtain better solutions with computationally efficient and smarter algorithms.

The following is the account of various researches on low volume optimisation. Yokota et al. (Yokota, Taguchi, and Gen 1998) used an improved Genetic Algorithm (GA) to optimise the weight of a gear pair by considering gear bending strength and torsional strength of the shaft. Marjanovic et al. (Marjanovic et al. 2012) developed a practical approach to optimise spur gears trains. Golabi et al. (Golabi, Fesharaki, and Yazdipoor 2014) applied a non-linear programming to obtain parameters for optimum design of gearbox. They employed a two-phase evolutionary algorithm to optimise the design of a two-stage helical gear reducer. Mendi et al. (Mendi et al. 2010) obtained the optimum volume of the gearbox by GA. The reduction in volume was 1.47% compared to analytical

CONTACT N. Godwin Raja Ebenezer greraja@gmail.com

© 2020 Engineers Australia

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

International Journal of Engineering and Advanced Technology (IJEAT)
ISSN: 2249-8958 (Online), Volume-8 Issue-6, August, 2019

Practical Optimal Design on Two Stage Spur Gears Train Using Nature Inspired Algorithms

N. Godwin Raja Ebenezer, S. Ramabalan, S. Navaneethasanthakumar

Abstract*: The accurate design of spur gear drive has a tremendous impact on size, weight, transmission and machine performance. Also, the demand for lighter gears is high in power transmission systems, as they save material and energy. Hence this paper presents an enhanced method to solve a two stage spur gear optimization problem. It consists of a mathematical model with a nonlinear objective function and 11 constraints. A two stage spur gear is considered. To obtain minimum volume of spur gear drive is objective of the problem. The considered design variables are: Module, number of teeth, base width of the gears and, shaft diameter and power. Besides considering regular mechanical constraints based on American Gear Manufacturers Association (AGMA) requisites, six more additional critical constraints on contact ratio, load carrying capacity, power loss, root not cut, no involute interference and line of action are imposed on the drive. Nature inspired optimization algorithms, namely, Simulated Annealing (SA), Firefly (FA) and MATLAB solver fmincon are used to find solution in MATLAB environment. Simulation results are analyzed, compared with literature and validated.

Keywords: Gear optimization, Spur gear drive, AGMA, Nature inspired algorithms

I. INTRODUCTION

The simplest of all gears is the spur gear. They offer considerable precision and high power transmission efficiency than any other gears. Hence, they are favourites in industrial machines. In this arrangement, two meshing gears are mounted on parallel shafts. In spur gears, teeth are cut and arranged parallel to the axis of gear. A spur gear and a typical two stage spur gear train are shown in Figure 1 and Figure 2.Normally, spur gears design is a very intricate task, as it involves many empirical formulas, graphs, tables and the use of number of linear functions and discrete variables. Minimizing volume of gear is of great interest, since gear trains of many high performance power transmissions systems such as automotives, aero space and machine tools require low volume. Hence it is desirable to develop low volume, quiet and more reliable gear designs. In such situation, it is attractive for the designer to prefer optimization [28] in order to obtain optimum solutions that are computationally efficient through reliable algorithms [23]. A fair amount of research has been done in mechanical gear design optimization using various algorithms in single and two stage gear pairs by many scholars [1~5]. Single gear pair optimization accounted optimum bending and contact stresses, displacement on the gear tooth pertaining to space needs, transmitted power, weight, profile of tooth and material. Mendi et al. [1] optimized volume of gearbox by Genetic Algorithm (GA).The reduction in volume was 1.47% compared to analytical method. Thompson et al [2] performed minimum volume and surface fatigue life optimization for two and four stage gears trade off analysis. Chong et al. [3] employed GA to get minimum geometric volume of a two stage gear train and plain planetary gear train. They achieved 40% reduction in pitch diameter and face width, and 3% error reduction in gear ratio. Chong et al [18] solved a Multi-criteria optimization problem. They considered cylindrical gear pairs to decrease gear size and vibrations. Gologlu and Zeyveli [4] reduced volume of the gear train in a two stage gear drive preliminary design. Tudose et al [5] automated a two stage transmission design taking into account helical gear, including shafts, bearings and housing. He applied a two phase evolutionary method for solving he same. Abiud and Ameen [19] established an optimum design procedure for a two stage spur gear system. Buiga and Tudose [35] presented mechanized optimal design for a two-stage helical coaxial gear drive using Genetic Algorithms (GAs). The problem had mass of the speed reducer as objective function, 17 mixed design variables and 76 non-linear constraints. They observed GA offers better design solutions than traditional design method.

Fig. 1 A spur gear

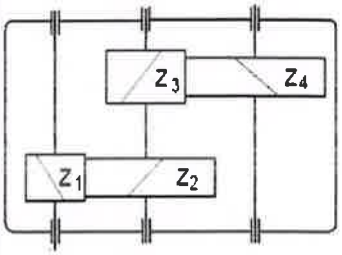


Fig. 2 A two stage spur gear train

Revised Manuscript Received on October 30, 2019.
* Correspondence Author
N. Godwin Raja Ebenezer*, Professor,Department of Mechanical Engineering, Loyola - ICAM College of Engineering and Technology, Chennai , 600 034, Tamil nadu, India,
S. Ramabalan, Professor, Department of Mechanical Engineering, EGS Pillay Engineering College, Nagapattinam– 611 002, Tamil nadu, India,
S. Navaneethasanthakumar, Professor, Department of Mechanical Engineering, MLR Institute of Technology, Hyderabad, 500 043 , Telengana ,India,

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.
PRINCIPAL
E.G.S. Pillay Engineering College
Nagore - 611 002.
Nagapattinam (Dt), Tamil Nadu

Research Article

Advanced design optimization on straight bevel gears pair based on nature inspired algorithms

N. Godwin Raja Ebenezer[1] · S. Ramabalan[2] · S. Navaneethasanthakumar[3]

© Springer Nature Switzerland AG 2019

Abstract
Gears are used to transmit mechanical power in systems such as automotives, automation and machine tools. The demand for lighter and optimally designed gears is high in power transmission systems, as they save material, energy and also considerably influence performance. Hence, in this paper, a bevel gear pair is optimized. The problem consists of a non linear objective function, four design variables and eight inequality constraints. The objective is to minimize the volume of the gear. The design variables are: number of teeth, module, face width and diameter of the shaft, which is a new addition. Apart from considering regular mechanical constraints, six other additional critical constraints on contact ratio, load carrying capacity, power loss, root not cut, no involute interference and line of action are also included. Nature inspired algorithms, namely, simulated annealing, fire fly, cuckoo search and fmincon solver are employed in MATLAB environment. Results of simulation are analysed, compared and validated with literature.

Keywords Design optimization · Bevel gear · AGMA · Nature inspired algorithms

1 Introduction

Bevel gears are used to change the direction of rotation of a shaft. They are usually mounted on shafts that are 90° apart. Three types of teeth can be identified on bevel gears viz. teeth straight, spiral or hypoid. Straight bevel gears have straight cut teeth, and a taper as shown in Fig. 1. They find their application in transmission systems, where low speed and production cost are required [1]. Bevel gears provide high coincidence and smooth transmission.

Designing a bevel gear pair is a tiresome job, as it involves various factors such as gear geometry, heat treatment and manufacturing, while accounting for practical considerations such as high strength, high accuracy, low noise and low volume. Low volume gears offer a considerable decrease in energy consumption [2]. The stipulations of AGMA are used for standard mechanical constraints.

Here is an account of the various researches done by the researcher. Yokota et al. [3] deployed an improved GA to optimize the weight of the gear pair. They accounted gear bending strength and torsional strength of the shaft. Marjanovic et al. [4] established a realistic approach to optimize spur gears trains. Golabi et al. [5] applied a non-linear programming to find parameters for optimum design of gear box. They employed a two-phase evolutionary algorithm to optimize the design of a two-stage helical gear reducer [5]. Mendi et al. [6] got optimum volume of gearbox by using genetic algorithm (GA). The volume reduction was 1.47% as compared to that of analytical method. Thompson et al. [7] minimized volume of two and four stage gears taking into account surface fatigue life and executed trade off analysis. Gologlu and Zeyveli [8] demonstrated the capability of GA, for obtaining minimum volume of two stage helical gearbox. Zhang et al. [9]

✉ N. Godwin Raja Ebenezer, greraja@gmail.com; S. Ramabalan, cadsrb@gmail.com; S. Navaneethasanthakumar, snscrk@rediffmail.com | [1]Department of Mechanical Engineering, Loyola - ICAM College of Engineering and Technology, Chennai, Tamilnadu 600 034, India. [2]Department of Mechanical Engineering, EGS Pillay Engineering College, Nagapattinam, Tamilnadu 611 002, India. [3]Department of Mechanical Engineering, MLR Institute of Technology, Hyderabad, Telangana 500 043, India.

SN Applied Sciences (2019) 1:1155 | https://doi.org/10.1007/s42452-019-1171-3

Received: 29 January 2019 / Accepted: 27 August 2019 / Published online: 4 September 2019

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Electronic transport, HOMO–LUMO and computational studies of CuS monowire for nano device fabrication by DFT approach

K. SenthilKannan [a,*], V. Sivaramakrishnan [b], V. Kalaipoonguzhali [c], M. Chinnadurai [d], S. Kannan [d]

[a] Dept. of R&D, Edayathangudy G S Pillay Arts and Science College, Nagapattinam 611002, TN, India
[b] Dept. of Mechanical Engg., E.G.S Pillay Engineering College, Nagapattinam 611002, TN, India
[c] Dept. of Electronics and Communication Engg., E.G.S Pillay Engineering College, Nagapattinam 611002, TN, India
[d] Dept. of Computer Science and Engg., E.G.S Pillay Engineering College, Nagapattinam 611002, TN, India

ARTICLE INFO

Article history:
Received 3 January 2020
Accepted 29 January 2020
Available online xxxx

Keywords:
Electronic transport
CuS monowire
DFT
Transport

ABSTRACT

The electronic transport on these nanostructures is important in the field of molecular electronics since nano structures possess different behavior compared to their bulk counter parts. In general, molecular devices consist of three regions namely left electrode, right electrode and the device molecular region or scattering region. It is very important to analyze the behavior of each region of the device theoretically before fabricating the device. The electrode effects are very important since they are the key components in the molecular device. Many reports are available in the literature describing the electrode effects of a molecular device. On the other hand, the contribution of the device region or scattering region in a molecular device for the device performance is very crucial. Numerous reports are available in the literature which regard the transport properties of the device molecule and in that most of them are based on the organic molecules. Lesser number of reports is available describing the device molecule as inorganic. The present work is aimed to study the electronic transport properties of CuS molecular device with the help of non-equilibrium Green's function (NEGF) method combined with density functional theory (DFT). In addition, the adsorption effect of acetylene and nitraso functional groups on the CuS monowire nano devices are also studied. The transport properties of CuS and organic functional group adsorbed CuS monowire nano devices are ascribed in terms of their density of states, transmission spectrum and the V-I characteristics of the corresponding devices.
© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Nanotechnology: Ideas, Innovation and Industries.

1. Introduction to computational methods

In the form of nano structures, CuS has a wide range of applications such as solar cells [1–3], gas sensors [4], hydrogen storage devices [5], battery electrodes [6] and as catalyst [7]. They have been prepared experimentally by various methods such as soft chemical method, wet method [8], sono-chemical [9], electrodeposition method [10], micro-chemical methods [11] etc. Nanostructures of CuS are prepared in various forms like nano tubes [12], nano ribbons [13–16], flakes, nano wires etc. The DFT calculations for CuS, is performed using Gaussian 09 package. The optimizations of the device structures are done using LANL2DZ basis set with B3LYP as energy functional. The energy convergence is set to 10^{-5} eV for the optimization process of the CuS device structures. The transport properties along the device are calculated by NEGF using Keldysh formalism implemented in TRANSIESTA in SIESTA package. Besides the chemical potentials of the electrodes which usually originate the transport properties of a device, the applied bias voltage is also changes the electronic transport properties through the device. The transmission probability curves and the density of states are calculated using TBTRANS utility available with TRANSIESTA.

2. Results and discussion – Structures of the devices

The optimized structure of CuS is shown in the Fig. 1. The average bond length between the Cu and S atoms are obtained by optimization is 2.07 Å which is very close to the experimentally available data [17]. The designed CuS device structures are shown

* Corresponding author.
E-mail address: mscgoldmedalist@yahoo.in (K. SenthilKannan).

https://doi.org/10.1016/j.matpr.2020.01.574
2214-7853/© 2020 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International Conference on Nanotechnology: Ideas, Innovation and Industries.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.

Please cite this article as: K. SenthilKannan, V. Sivaramakrishnan, V. Kalaipoonguzhali et al., Electronic transport, HOMO–LUMO and computational studies of CuS monowire for nano device fabrication by DFT approach, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.01.574

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Study of mechanical and thermal behaviours of zea-coir hybrid polyester composites

N.S. Balaji [a,*], S. Chockalingam [b], S. Ashokraj [c], D. Simson [a], S. Jayabal [d]

[a] Department of Production Engineering, National Institute of Technology, Trichy 620015, India
[b] Department of Mechanical Engineering, E.G.S. Pillay Engineering College, Nagapattinam 611002, India
[c] Department of Mechanical Engineering, Francis Xavier Engineering College, Tirunelveli 627003, India
[d] Department of Mechanical Engineering, Government College of Engineering, Sengipatti 613402, India

ARTICLE INFO

Article history:
Received 6 August 2019
Accepted 12 September 2019
Available online xxxx

Keywords:
Zea fiber
Coir fiber
Polyester composites
Mechanical properties
DSC

ABSTRACT

The current investigation is to develop the Zea-Coir (ZC) fibers reinforced polyester hybrid composite using a compression sheet molding process. Hybrid composites made with naturally available fibers are finding applications in many of the engineering fields due to their low cost and strong nature of the natural fibers. The composites were manufactured with polyester resin and Zea-Coir fibers were used at a ratio of 60:40 (by volume) with five different proportions of Zea-Coir natural fiber. The mechanical and thermal behaviors of Zea-Coir hybrid composite were analyses by tensile, flexural, impact strength and DSC synthesis. The highest tensile strength value of 25.4 MPa, the flexural strength value of 34.6 MPa and the impact strength value of 45.3 kJ/mm^2 were obtained from Zea-Coir reinforced polyester hybrid composite.
© 2019 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International conference on Materials and Manufacturing Methods.

1. Introduction

From the last century, researchers from materials science engineering were trying to replacement of artificial fibers instead of natural fibers. The different types of man-made fibers are olefin, nylon, rayon, acrylic, lastex, acetate, carbon, kevlar, aramid and glass. Even though, the artificial fibers have excellent benefits and simultaneously having a negative effect like non-degradable, unavailability of fibers and high cost. To overcome the above reasons, the bio-based composites are becoming as reinforcement in thermosetting composites [1–4]. The renewable resources of natural fibers are widely used for engineering fields in developing countries. They are abundantly available renewable resources and doesn't cause any health hazards. Finally, it gives a realistic remedy for environmental soil pollution by finding new uses for agricultural-based degradable materials. The natural fiber reinforced composites forming a unique variety of polymer composite materials which seems to have an excellent potential as a replacement for wood based materials in load bearing application areas in future [5]. The natural fibers have proved to perform well as a reinforcement material in a polymer matrix, such as coir, dharbai, sisal, jute, christmas palm, flax also proved well as a reinforcement material, It makes a versatile opening of research for newly introducing fibers [6].

The lignocellulosic leaf fiber of zea is extracted from the sheath of the corn plant (Zea mays sub), this Corn plant was cultivated large amount in South Asia, Zea fiber has some instinctive properties than other natural fibers for its bio-degradability, functional strength, modulus and it is obtained from the agricultural wastes [3,4].The coir fiber is one of the lignocellulosic fiber derived from the coconut husk (Cocos nucifera), mostly available in South Asia. Nearly 42 million metric tones of coconut based products produced in annum from 50,000 million coconuts. The coir fiber based investigations were done to understand the structure of fibers, mechanical, thermal properties, and the strength improving mechanism (chemical treatments) on coir fibers which extracted from different part of coconut trees [7]. The coir fiber is having a better empirical characteristic such as physical, chemical stability and other features since it can be used for a wide variety of applications [8–11]. Hybrid composites are the composites which have two or more fiber in a single matrix [9]. The natural fibers reinforced hybrid polymer composites establish high flexibility to composite materials with exclusive properties which are difficult to obtain

* Corresponding author.
E-mail address: nsbalajicad@gmail.com (N.S. Balaji).

https://doi.org/10.1016/j.matpr.2019.09.056
2214-7853/© 2019 Elsevier Ltd. All rights reserved.
Selection and peer-review under responsibility of the scientific committee of the International conference on Materials and Manufacturing Methods.

ATTESTED
Dr. S. RAMA BALAN, M.E., Ph.D.
PRINCIPAL
E.G.S. Pillay Engineering College,
Nagapattinam (Dt) Tamil Nadu.

Please cite this article as: N. S. Balaji, S. Chockalingam, S. Ashokraj et al., Study of mechanical and thermal behaviours of zea-coir hybrid polyester composites, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2019.09.056

Wireless Personal Communications (2021) 118:1393–1404
https://doi.org/10.1007/s11277-021-08081-3

Effective Energy Adaptive and Consumption in Wireless Sensor Network Using Distributed Source Coding and Sampling Techniques

S. Manikandan[1] · M. Chinnadurai[1]

Accepted: 10 January 2021 / Published online: 28 January 2021
© The Author(s), under exclusive licence to Springer Science+Business Media, LLC part of Springer Nature 2021

Abstract

Multimedia is the process of handling multiple medium of messages over network with high rate data services in wireless cellular area networks. Communication is the process of exchanging information form one service to another. In wireless networks are significantly growth of affecting network performance and energy consumption. The major problem is end to end delay in each node and meets the quality of services. The followings are considered for implementing wireless sensor network such as reduces the network delay, propagation delay and energy consumption. The senor node can sense the encoding value and reduce the network traffic delay using mitigation method. This paper propose a unique approach to provide simple routing services with reduced traffic delay, end to end delay network performance and to achieve better performance using Distributed Source Coding and Effective Energy Consumption methods. In this paper we use optimal early detection algorithm for improving network performance and energy consumption problem. An iterative Shannon fano and Tuker method is used for finding optimal solution of each node values. Network Simulator-3 is used for simulating network environments and setup the experiments. Our proposed method shows high data rate, good performance and low energy consumptions. The results compare with existing methodologies and performance is good.

Keywords Wireless sensor networks · Effective energy consumption · Distributed source coding · End-to-end propagation delay · Optimal early detection

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

✉ S. Manikandan
profmaninvp@gmail.com

M. Chinnadurai
mchinna81@gmail.com

[1] E.G.S. Pillay Engineering College, Nagapattinam, Tamil Nadu, India

International Journal of Future Generation Communication and Networking
Vol. 13, No. 1, (2020), pp. 1006-1012

Real Time Traffic Flow Prediction and Intelligent Traffic Control from Remote Location for Large-Scale Heterogeneous NETWORKING USING TensorFlow

S. Manikandan [1*], M. Chinnadurai [2],
D. Maria Manuel Vianny [3], D. Sivabalaselvamani [4]
[1] Assistant Professor/IT, E.G.S. Pillay Engineering College, Nagapattinam, Tamil Nadu, India
(profmaninvp@gmail.com) (*Corresponding Author)
[2] Professor/CSE, E.G.S. Pillay Engineering College, Nagapattinam, Tamil Nadu, India
[3] Assistant Professor/SCSE, Galgotias University, Greater Noida, Uttar Pradesh, India
[4] Assistant Professor/MCA, Kongu Engineering College, Perundurai, Erode, Tamil Nadu, India

Abstract

Deep learning is an emerged technique to predict future and intelligent mechanism to monitor the process. Traffic Flow prediction is important function of collection traffic information and dissemination. Conventional intelligent approaches are used in large and small scalenetworks using supervised and unsupervised learning techniques.Traffic flow prediction and mitigating traffic control in remote location is an important factor in large scale networks. In this paper, we used Deep convolution neural network and Tensorflow is used to prediction of traffic flow using real time traffic data from various locations. Deep belief network is an intelligent traffic control mechanism for predicting traffic load, deep neural network and analyzing decision networks. The computer based Tensorflow is applied in deep neural networks demonstrates that our proposed supervised model is trained by deep learning approach. Our proposed model is able to achieve an improved performance in traffic flow, demonstrate large scale network traffic control using conventional l routing approach and the accuracy rate is 95% tested by Tensorflow.

Keywords: Traffic flow prediction, Intelligent Traffic Control, Tensorflow, Deep Convolution Network, Deep belief network

1. Introduction

Industry 4.0 is a recent revolution of next generation of heterogeneous networks such as 5G, Deep Learning, 3D modelling, Internet of Things, Data Analytics. The high volume of data and dynamic changes of technology are played vital role in rapid development in heterogeneous networks. The latency and high availability are the two important factors to measure traffic flow and traffic control. The exciting communication medium wired and wireless communications are used widely and increased large volume of data processing and prediction. The traditional routing mechanism and packet simulation are designed for large networks, traffic flow, traffic control and packet forwarding [1].

In recent research, the artificial intelligence are used several areas which includes speech recognition, image recognition and data analytics. Deep learning is an artificial convolution neural network can be classified into deep neural network, convolution neural network, Q-Learning and Deep belief networks. The deep learning can be implemented in various software such as AWS tools, Caffee, Keras, CuDNN and Tensorflow [3]. Tensorflow is an open source platform to implement deep learning network and analyze the prediction.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt), Tamil Nadu.

ISSN: 2233-7857 IJFGCN
Copyright © 2020 SERSC

Journal of Ambient Intelligence and Humanized Computing
https://doi.org/10.1007/s12652-020-01758-w

ORIGINAL RESEARCH

Cloud-based robotic system for crowd control in smart cities using hybrid intelligent generic algorithm

K. Manikanda Kumaran[1] · M. Chinnadurai[2]

Received: 8 October 2019 / Accepted: 1 February 2020
© Springer-Verlag GmbH Germany, part of Springer Nature 2020

Abstract
In recent years, cloud robotics in smart cities emerged with the technology of cloud computing and robotic enabled services such as ubiquitous computing based on internet resources, wireless sensor network, communication technologies, and large scale storage system for smart systems. The Internet of things is a complement to generate an enhanced system where robots offload the pervasive cloud to ensure the quality of the service from the data-intensive computation. In general the robots offloading is a crucial issue because of their skill learning, decision-making capabilities, a unique feature of mobility, and data collection. In this paper, a cloud-based robotic system for the crowd control system in smart cities using the hybrid intelligent generic algorithm has been proposed for smart crowd management. The cloud enhanced robots are employed to execute the essential task while taking into consideration of different complexity in a smart city. Furthermore, the integrated framework has been introduced to handling the task offloading and task completion through the robotics movement with minimum time and energy. The experimental results shows that the proposed system achieves powerful computation, storage, energy-efficient and reduce the cost with the help of cloud computing for smart city management.

Keywords Smart city · Cloud computing · Robotics · Energy · Storage

1 Introduction

In general the cloud robotics utilizing various remote computing resources to enable powerful computation, high memory, interconnectivity and collective learning for robotic applications (Rahman et al. 2016a, b). When storage demands or computational techniques which overcome the on-board capacity of a robot, they are offloaded to the cloud, where the huge facilities of a data center can addition their limited local resources. Cloud robotics also provides a substantial improvement for robot learning (Ermacora et al. 2016) Here the Cloud robotics provides many advantages of distribution in smart city crowd control system which are listed as follows:

1. cloud robotic exploit to update libraries of images, object/product data, and maps for the integration of Big Data.
2. it provides motion planning, statistical analysis, parallel grid computing on demand for learning, and to simple cloud computing (Ermacora et al. 2013).

In the recent past the robot systems in power to control policies, sharing trajectories and outcomes. Further, in smart city crowdsourcing to tap human skills to learnings, investigate images and video, error recovery and classification, etc. The cloud likewise can deliver access to simulation tools, models, datasets, publications, open-source software and benchmarks (Limosani et al. 2016).

A robot can access an immense library of known objects with an internet or Wi-Fi connection to cloud-based resources to identify the things in the smart city environment (Shakeel et al. 2018). Object recognition supports a robot to enhance the performance tasks like cleaning, sorting and using appliances. Depending on the cloud for resources also means that the robot itself can be simpler, decrease the computational cost and the associated cooling and electrical power consumption. Due to this offloading,

✉ K. Manikanda Kumaran
manikandakumarank31@gmail.com

[1] Department of Information Technology, E.G.S. Pillay Engineering College, Nagapattinam, Tamilnadu, India

[2] Department of Computer Science and Engineering, E.G.S. Pillay Engineering College, Nagapattinam, Tamilnadu, India

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

Published online: 10 March 2020

International Journal of Engineering Education Vol. 36, No. 6, pp. 1783–1790, 2020
Printed in Great Britain

0949-149X/91 $3.00+0.00
© 2020 TEMPUS Publications.

Evaluation of Students' Performance in Educational Sciences and Prediction of Future Development using TensorFlow*

S. MANIKANDAN[1]** and M. CHINNADURAI[2]
[1] Assistant Professor/IT, E.G.S. Pillay Engineering College, Nagapattinam, Tamil Nadu, India. E-mail: profmaninvp@gmail.com
[2] Professor/CSE, E.G.S. Pillay Engineering College, Nagapattinam, Tamil Nadu, India.

Artificial Intelligence is the domain of computer science which includes the solving of problems in reasoning, knowledge representation, prediction, learning and perception areas. The large volume of data can be used for social media, e-learning, distance learning and e-commerce environment. Our research work includes the classification and prediction of students' performance in educational sciences. The analyzed results are forecasting the future plan in higher studies. In this work, we use TensorFlow Artificial Intelligence engine for classification. Deep learning is used for measuring academic performance in core courses such as mathematics, physics, chemistry, biology and computer Science. The performance can be measured in nonacademic activities also such as sports, yoga, art and social services. These papers gives prediction result using machine learning tools and give more comprehensive study of both academic and nonacademic activities. Here we take number of intermediate nodes from students' performance and number of deep learning objects from students' activities. The result is generated and compared using TensorFlow. The input of two thousand five hundred students' data is taken from Tamil Nadu Nagapattinam and Thirvarur Districts from education science department, 65% of data is trained data and 35% of data are test data. The accuracy factor is 75% to 85%. The prediction factor accuracy can be determined by using optimal configuration of TensorFlow engine. This result can be used for the benefit of the students to select their future studies and career development of students based on their higher secondary academic and nonacademic performance factors.

Keywords: artificial intelligence; deep learning; convolution artificial neural networks; TensorFlow; prediction

1. Introduction

Intelligence Agents are used for various AI applications for planning, machine learning and decision making. In Computer Science, AI research includes the device perceives input from sensor from different environment and machine can learn the input and make effective decision. The following are the AI research areas like Driverless car, natural language processing, content delivery network with intelligent routing, drone assisted network, etc. The common problems are in AI such as knowledge reasoning, machine learning and perception. The many AI tools are used in optimization, logical computation and statistical analysis based problems.

Now the AI can be used for game playing and virtual reality. The UiPath: NIDIVA survey says that all the academic research part which includes AI, Deep learning approach for predicting and forecasting the future study. Pariwat et al., the government and research organization are moving towards AI for implementing results and prediction. GPUs are used for parallel processing, storage, transaction and multimedia applications. How and what way to predict the future from students' performance is very important and huge volume of data to be needed for analyzing results. The objective of this work is to use TensorFlow for predicting higher secondary students' performance in both academic and nonacademic activities. The input taken from students' database is collected from education department. We use different questionnaires' for predicting the factors.

The involvement of stakeholders' students, teachers and parents and input of final examination, internal examinations, extra and co-curricular activities are taken as input. It is very challenging and interesting areas because here we are going to analyze different kind of students based on their category. The input dataset can be taken from educational database and could produce forecasting plan about studies of the students.

Previously number of data mining tools is used for predicting future such as decision tree, k-means, k-mediots, native bayes, support vector machines, etc. But the above tools gave good results, now the technology and industry 4.0 are played vital role for analyzing intelligent data analysis. So, the Google TensorFlow AI engines are used to analyze the students' performance. In this paper, we deploy and analyze how the students will select the future

** Corresponding author.

* Accepted 29 May 2020.

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College
Thethi, Nagore

2020 International Conference on Emerging Smart Computing and Informatics (ESCI)
AISSMS Institute of Information Technology, Pune, India. Mar 12-14, 2020

Vehicle Navigation Protocol in Real-Time Fleet Management

R.Kannadasan
School of Computer Science and Engineering
VIT University
Vellore, India

Keerthan Satya Devineni
School of Computer Science and Engineering
VIT University
Vellore, India

A.S.Anakath
School of Computing
E.G.S.Pillay Engineering College (Autonomous)
Nagapattinam, India

Rohin Sri Kumar
School of Computer Science and Engineering
VIT University
Vellore, India

N.Prabakaran
School of Computer Science and Engineering
VIT University
Vellore, India

A.Jayanthiladevi
Computer Science and Information Science
Srinivas University
Bengaluru, India
drjayanthila@ieee.org

Abstract- **In Real-Time Fleet Management, vehicle routes are built dynamically according to travel durations, location of the vehicles and also customer requests which are revealed gradually. To account for such situations, algorithms which are fast and can accommodate the uncertainty are needed. We here highlights the use of parallel computing strategies for solving real-time vehicle routing problems. The vehicle routing problem is related to linear optimisation and falls under the domain of logistics and transport. Vehicle routing problems comprise of determining optimal vehicle routes according to various constraints such as the total demand should not exceed the total capacity, service durations are met The objectives of solving the Vehicle Routing Protocol varies depending upon the dynamically of the system. In general, systems, which are weakly dynamic, focus on optimising or minimising the routing costs. The systems, which are strongly dynamic, focus more on minimising the expected response time.**

Keywords: Realtime fleet management(RTFM), Vehicle Routing Protocol(VRP), Vehicle Routing Problems(VRPro)

I. INTRODUCTION

The vehicle routing problem is related to linear optimisation and falls under the domain of logistics and transport. Vehicle routing problems comprise of determining optimal vehicle routes according to various constraints such as the total demand should not exceed the total capacity, service durations are met. There are two haul options, long and short. In long haul routing, the vehicles are required to perform a single job whereas in short haul routing, vehicles perform a multitude of jobs. Heuristic and met heuristic approaches have been observed to perform better[1].

The most significant implication of VRP can be seen in what follows-

1) Couriers: Couriers which are to be sent long distance are needed to be collected locally. Then the parcels are required to be sent to a remote facility to consolidate loads. Then finally the parcels need to be delivered to the location specified.

2) Dynamic Fleet Management: Most large-scale trucking establishments require real-time dispatch of vehicles to collect and/or deliver shipments.

3) Taxi Services: In cab services, the requests or the customers are dynamic. Thus, some vehicles remain idle while some are overwhelmed with demand. In such a scenario, relocating idle taxies can help in lowering the workload and optimizing profits.

4) Emergency Services: Emergency services are comprised of ambulance service, police and fire fighting services. The demand for emergency is, in general, low which leads to most vehicles being idle. Thus, relocating idle vehicles to areas where anticipated future needs are high is a big issue.

Recent advancements in technology and information gathering like GPS (Global Positioning System), sensors observing traffic flow and GIS (Geographic Information System) have made management of vehicle fleets possible in real-time[2]. The data provided by these sources can be refreshed/updated periodically to dynamically find optimal solutions.

Another development which has helped in the real-time management of fleets is the development of parallel algorithms, the increase in power of hardware equipment and more efficient metaheuristic approaches. The combination of these three can provide real-time solutions in dynamic situation

II. LITERATURE SURVEY

Vehicle Routing Problem is an academic discipline which comprises various managerial, informational and theoretical disciplines. Various algorithmic designs along have been proposed which solve different criticality's of the problem, and yet keep the field open for future enhancements and discoveries in this area. The VRP literature has seen a multitude of applications which have been discussed at length in the past. The applicability and adaptability of the problem to various real-time scenarios makes its importance really high. The first recorded paper in the history of VRP literature

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

978-1-7281-5263-9/20/$31.00 ©2020 IEEE

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue V May 2020- Available at www.ijraset.com

Application of GIS in COVID -19 Monitoring and Surveillance

Raju K[1], Lavanya R[2], Manikandan S[3], Srilekha K[4]
[1]*Assistant Professor, Department Of Information Technology, E.G.S. Pillay Engineering college , Nagapattinam, Tamilnadu, India*

Abstract: ***COVID-19 is a virus part of corona virus family that causes a range of familiar disease from the common cold to SARS, COVID-19 is referred as novel corona virus because it is new to human. According to virus it spread from one person to other person through contact. So research public health practices and guidelines, one of the tool to our society can use to understand the disease is Geographic information systems (GIS) provide the utilization ,easy access and manipulation of geospatial information. The main advantage of GIS is mapping the many different locations of country and other facilities with human on a dashboard which helps in better monitoring and surveillance. Also, detailed studies are possible with respect to diseases forecasting, prediction of outbreaks, identification of disease cluster or hotspot and to evaluate different strategies to prevent the spread of infectious diseases.***

Geospatial industries have come to rescue in a lot of crises and disasters by boosting relief and rehabilitation efforts. In the case of COVID -19 geospatial communities is proactive in tracking the spread of the virus. Constantly updating the number of people affected and providing real-time information company like ESRI, CSSE(JHU)which help to manage disaster mapping and helping agencies with data gathering it helps to transfer the data in dashboard , Apps, Information and data using the GIS technique GIS operations, mainly overlay analysis, buffer analysis, network analysis, statistical analysis, query, time series analysis, temporal cluster analysis, spatial-temporal analytic techniques to identify the catchment areas, vulnerable groups, health centers, movement of carriers etc.GIS provide ideal platform for the convergence of disease- specific information and their analyses in relation to population settlements, surrounding social and health services and the natural environment.

Keywords: Covid-19, GIS, Dashboard, Data, Surveillance

I. INTRODUCTION

A geographic information system (GIS) is a computerized information system in which user can capture, analyze, manage, present, retrieve, store, manipulate and share all types of spatial or geographic data. GIS is user friendly computer software which can show many different kinds of data on one map or dashboard and enables user to analyze and interpret data on different locations plotted on map to understand relationships, patterns, and trends.

GIS provide ideal platform for the convergence of disease-specific information and their analyses in relation to population settlements, surrounding social and health services and the natural environment and provide data which are highly suitable for analyzing data, revealing trends.

Surveillance is a mechanism applied to collect and interpret data on the health of human populations, to accurately describe their health status with respect to specific diseases of concern. In general, surveillance is aimed at demonstrating the absence of disease or infection, determining the occurrence or distribution of disease or infection, while also detecting as early as possible exotic or emerging diseases.

Human health surveillance is an essential tool to detect disease or infection, to monitor disease trends, to facilitate the control of disease or infection, to support claims for freedom from disease or infection, to provide data for use in risk analysis, for public health purposes, and to substantiate the rationale for sanitary measures. Human Disease Surveillance is a key for improving disease analysis, early warning and prevents the spread of diseases .Surveillance is used for the detection of new or exotic diseases while monitoring is aimed at detecting changes in established or endemic infection levels that may signal the recurrence of a disease outbreak.

Monitoring of the epidemiological patterns (Human, place, time) of diseases and pathogens within populations provides a vital system for the identification of changes in disease status within this population (whether this relates to all human worldwide, or those within a single country, region, cities or village). For this reason, most countries have systems that prevention is better than cure. Techniques such as human landscape monitoring, Spectrum monitoring tool, Hexagon dashboard and smart App

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu

©IJRASET: All Rights are Reserved

HBRP PUBLICATION

Recent Trends in Information Technology and its Application
Volume 2 Issue 1

Secure Hashing Algorithm for Third Party Auditing in Cloud Environment

K.Raju[1*], M.Chinnadurai[2]

[1]Research scholar, Asst Prof/IT, E.G.S. Pillay Engineering College, Nagapattinam, Tamilnadu, India

[2]Professor/CSE, E.G.S. Pillay Engineering College, Nagapattinam, Tamilnadu, India

****Corresponding Author***

E-mail ID:- profgkr@gmail.com

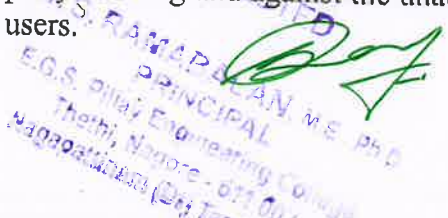
ABSTRACT

Cloud computing is the platform of next generation can efficiently provide services to service providers and provide massive storage capabilities. Virtual machine also play a vital role by providing environment to application developers security is one of the constraints for companies to use cloud computing fully. TPA (Third Party Auditing) become very important in cloud .Auditor work with the issues such that trust and processing overhead a) Archive good auditing without requiring the data storage area b) Avoid injecting new malicious code during the auditing work. In this paper we provide a security algorithm to protect the data so introduce the new scheme which involves cloud server. TPA and Owner integrity of data verify by TPA. Auditing scheme involves cryptographic algorithm is SHA. Sensitive data may get exposed to unauthorized parties. If security isn't robust and consistent, benefits that cloud computing have to provide will have little believeability.SHA algorithm for the security purpose on the cloud environment.

Keywords: *Cloud Storage, TPA, SHA, Cloud server, Security issues.*

INTRODUCTION

Cloud environment which offers the efficient resources such as storage, server, services, networking and application. Cloud computing is very dominant for technology it has some problem such as data storage and assurance of data security like compliance, privacy, legal and trust. Security which involves the confidentiality, integrity, authentication of data stored in cloud. Vital issues in cloud security are data location, data privacy, data availability, data protection, secure transmission. Prime security issues are a) Information isolation b) Consistency c) Recuperation.TPA work divided into 1) private audit-allow owner and user can check the integrity of data here the no access to enquiry the server about information 2) Public audit confidentiality of data is checked by TPA. So audit should efficiently or frequently audit the cloud data storage without asking another copy of data. The three main models of cloud are SaaS where allowing one to utilize the software running on virtual cloud. PaaS where allow to use the cloud infrastructure user-generated or purchase software. IaaS offer primary computing infrastructure service, storage and networking. Accurate data in a cloud environment can came in challenge and increased cost. So involvement of a TPA (Third Party Audit) to increase the end user confidence in deploying their IT resource in the cloud. Imperiled the security of data in server or transmission and because of harmness many schemes were proposed to ensure protection in cloud computing during third party auditing and against the unauthorised users.



HBRP Publication Page 1-5 2019. All Rights Reserved