

Effect of Moisture Absorption on Interfacial Shear Properties of the Bio-Composites

Dheeraj Kumar, Ranjan Kumar Mitra, Trilok Chouhan, Md Farrukh & Nadeem Faisal

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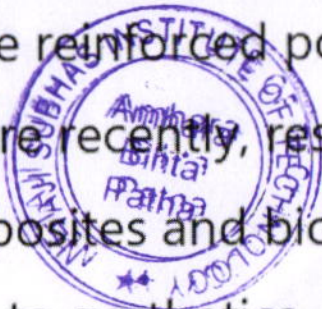
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Abstract

Composites are having a massive and extraordinary impact on modern society. Composite manufacturing has witnessed a considerable growth in several areas, including aerospace, structural, and vehicle manufacture. Fibre reinforced polymer composites have become popular throughout the last decade. More recently, researchers have begun paying attention to natural fibre reinforced polymer composites and bio-composites, which are both sustainable and mechanical comparable to synthetics. Also is not only vital in sectors like

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9 Experimental and Machine Learning Approach to Evaluate the Performance of Refrigerator and Air Conditioning Using TiO₂ Nanoparticle

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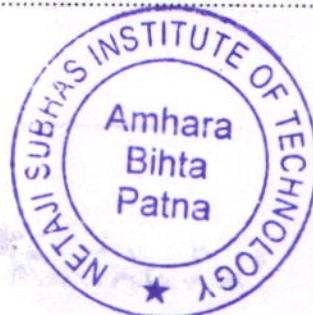
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A Deep Learning Based Approach for Classification of News as Real or Fake

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Abstract. In recent past, the growth of both the printed and digital media has greatly facilitated the business and the society. On account of the reach of social media, even the smallest news or event could be spread like wildfire. Often due to this, the news gets amplified and distorted drastically resulting in generation of fake news. This fake news not only misleads the masses but also causes severe impacts in real world. The rapid increase in the area of fake news and its abrasion to judiciary, democracy and trust in the public made the development of a system for detection of fake news vital. Here, in this paper, we have dealt with the proposal of a model in order to detect fake news, by the use of deep learning algorithms to predict whether the given data is real or fake. The experiments were executed using various deep learning algorithms like Convolutional Neural Network (CNN), Long short-term memory (LSTM) and Bidirectional LSTMs (Bi-LSTM). Thereby we compared the results obtained. The model proposed here, has a great accuracy of about 99%.

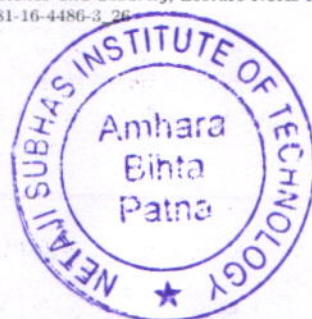
Keywords: Fake news detection · Natural language processing · Deep learning

1 Introduction

Fake News is a terminology used to depict altered news or agendas consisting of misleading information channeled through the conventional media such as television and print and also unconventional media medium like social media. The mainspring of spreading altered news is to delude the commoners, hamper stature of a syndicate, or to benefit from emotionalism. Fake news is abundantly being shared and can be prominently seen on internet communities such as Twitter and Facebook. These platforms act as a general medium for the commoners to express and channelize their views and opinions in an unprocessed and unedited way.

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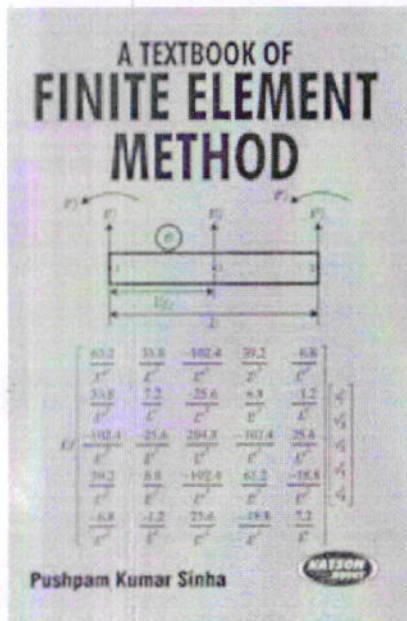
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Introduction Shape Functions Variational Approach of FEM Beam Element Two Dimensional Boundary Value Problems Tir Dependent and Eigenvalue Problems Other Approaches of FEM Appendices Index.

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EXPERIMENTAL INVESTIGATION ON MECHANICAL BEHAVIOR OF PALM BASED NATURAL FIBRE REINFORCED POLYMER COMPOSITES

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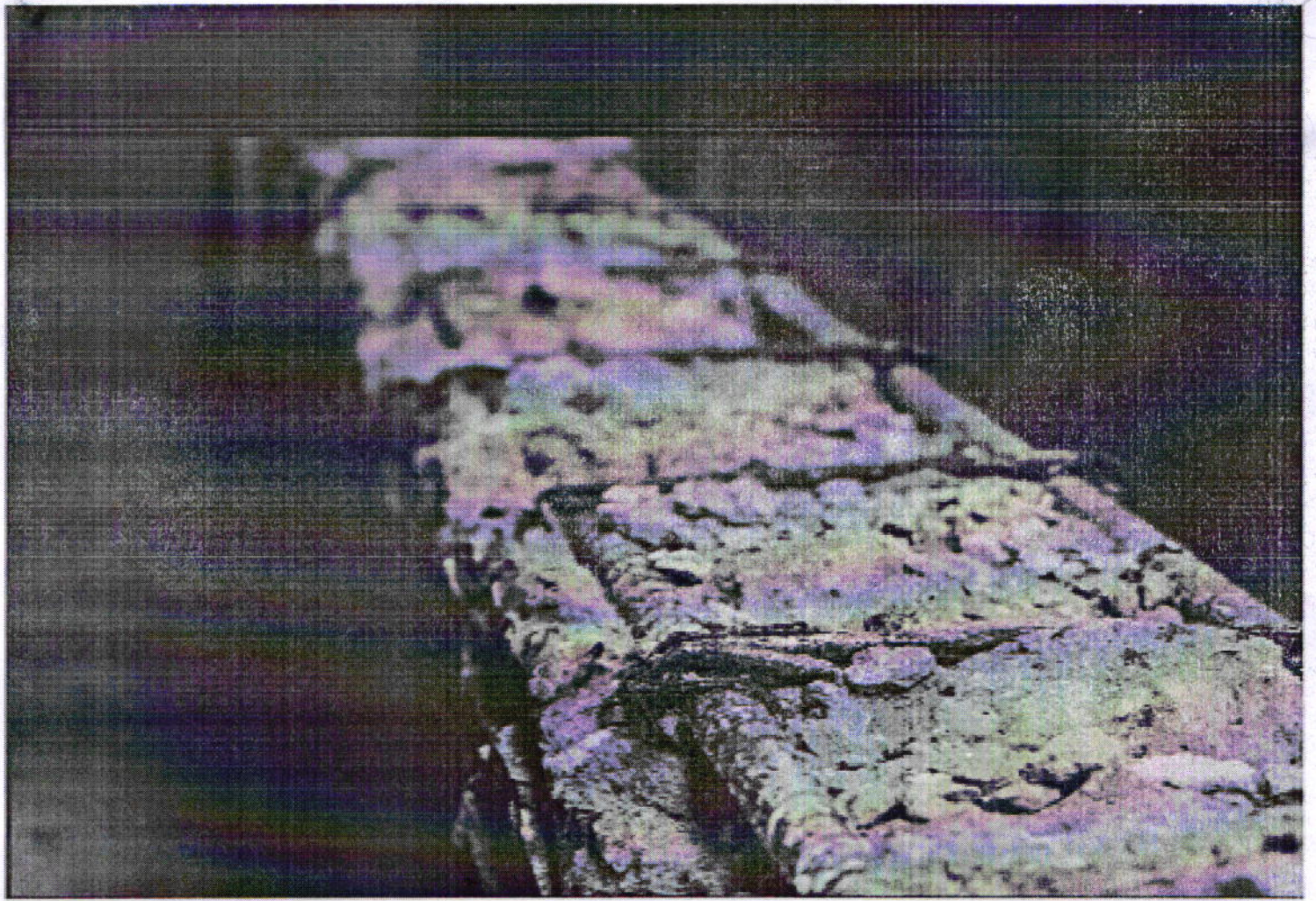
ABSTRACT

Natural fibre provides a strong and a green biodegradable substitute to the popular synthetic reinforcement, i.e. glass fibre, with low cost and basic mechanical properties. They may not provide strength equal to that of synthetic fibres but can be considered on the grounds that they are environmentally friendly. The present work deals with a natural fibre-reinforced polymer composite prepared using a polyester resin as the matrix material and palm fibres/glass sandwich as reinforcement adopting hand-layup technique. Various parts of palm tree were used like leaf stalk (PLst), leaf sheath (PLsh), leaf spine or petiole (PLsp) and fruit (PFrt) that are less utilized and possess appreciable fibre strength for preparing specimen of different combination. The specific objectives of this study were developing an eco-friendly NFRPC to be used in various parts of an automobile, studying the effects of pretreatment on fibres, filler addition, hybridization of fibres, and evaluating the mechanical characteristics of the FRP composites like hardness, tensile, flexural, impact strength and water absorption rate. It has been found that palm fibres can be used as a successful natural reinforcement to develop biobased composites after suitably bonding with the resin. The surface treatment by potassium permanganate on natural palm fibres is possible and it improves the mechanical characteristics. The sandwiching of palm fibres within the glass fibre layer combines the strength of both the natural and synthetic fibres. The cheaper and naturally-available coconut shell nano-filler can be added to the composite resin system which disperses uniformly within the polyester resin enhancing the overall characteristics of the composites. The characterization also proved that the hybridization and addition of filler materials have definitively created impacts on increasing the mechanical properties of natural palm fibre based composites.

Keywords: Natural-fibre · Palm · Mechanical behavior · Tensile-Strength · Ecofriendly · Hardness ·



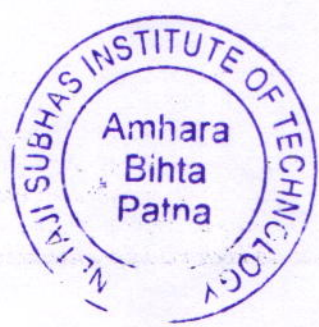
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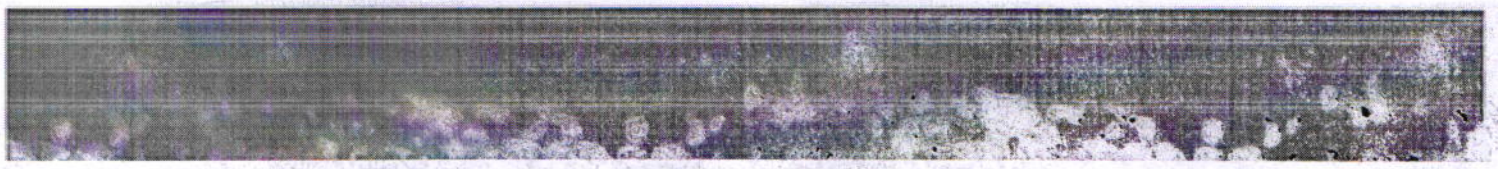
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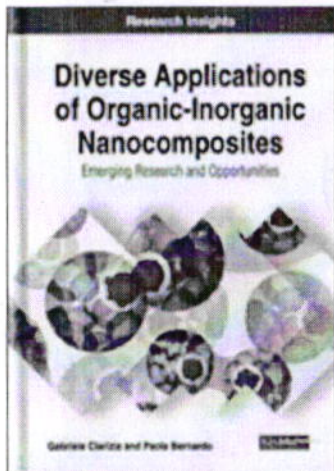
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Fibre Reinforced Polymer For Structural Applications



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Nanocomposites in the Food Packaging Industry: Recent Trends and Applications

Dheeraj Kumar, Md. Farrukh, Nadeem Faisal

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Performance Analysis of Single Phase Multilevel Inverter using dsPIC30F2010 Microcontroller

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Abstract—This paper presents a single phase multilevel inverter (MLI) topology for 7, 9, 11, 13 and 15 level. MATLAB simulation of proposed topology is carried out by taking R and RL load for different levels. Total Harmonic Distortion (THD) in the output voltage of MLI is evaluated and presented in the paper. To validate the proposed topology hardware implementation is also done using commercially available microcontroller (dsPIC30F2010). The proposed topology provides less THD so becomes an attractive solution for PV based inverters and can be suitable for stand-alone applications like PV fed water pump used in agriculture, multi-story buildings or industries.

Keywords—Multilevel inverter, Total Harmonic Distortion (THD), dsPIC30F2010 microcontroller.

I. INTRODUCTION

Recently renewable energy sources such as wind, solar and bio mass are used for producing generate electricity as an alternative to the fossil fuel. Among these available energy resources solar is the most suitable option because of its eco-friendly nature and abundant accessibility for either using in isolated mode or grid connected mode. In grid connected mode inverters are required to connect with grid as the output of PV is DC. For grid connected mode, conventional two level inverter produce alternating square wave output, so not suitable for most of the application [1]. So to connect with grid the output from the inverter must be sinusoidal with reduced THD and frequency of the inverter must be match with grid frequency. The sinusoidal output voltage with less THD content in inverter is obtained by increasing the number of inverter's voltage levels. In other words to get good quality of output voltage increased level of multi level inverter can be used. For this reason multilevel inverters are drawing more attention in the small to large industrial, commercial as well as agriculture applications.

Multilevel inverter is introduced for high power and medium voltage applications such as fans, compressors, pumps, conveyors, ship propulsion drives, locomotive traction drives (including linear motor drives for linear maglev trains) and steel rolling mills [2]-[5]. In 1975 concept of multi level inverter was introduced [6]. Mainly multilevel inverters are classified into three types (i) Diode clamped (ii) Flying capacitors (iii) H bridge inverter.

Unfortunately, multilevel inverters have some disadvantages. One disadvantage is requirement of more number of power semiconductor switches. Although voltage rating of switch is low but each switch requires a gate driver and protection circuit. This cause the overall system to become complex and expensive.

This paper proposes a novel single phase H bridge inverter topology of different level starting from 7 level to 15 level. To validate the designed inverter, simulation is done using MATLAB. Digital controllers, such as Texas Instrument DSP (Digital Signal Processing), or or Field Gate Arrays (FPGA) FPGA and application specific integrated circuits (ASIC) are gaining importance in the power electronics applications as they can easily implement to generate PWM signals with better performance but at high cost. On the other hand, Multilevel converters often require complex control algorithms which cannot be implemented in real-time using standard low cost conventional 8-bit microcontroller. In this regard, Microchip provides a substitution between cost and performance. Microchip developed a Digital Signal Controller (DSC) which is nothing but a single-chip, embedded controller that effortlessly integrates the Microcontroller with Digital Signal Processor (DSP) in a single core. The real-time performance of dsPIC DSC is superior to other conventional microcontrollers, it also offers a number of highly enabling features specifically designed to enhance system reliability and robustness, and reduce system cost by eliminating external components. The dsPIC30F and dsPIC33F have Pulse Width Modulation (PWM) outputs, fast analog-to-digital conversion and plenty of computation power. In this paper, Hardware implementation of proposed 7 level inverter is done using dsPIC30F2010 microcontroller.

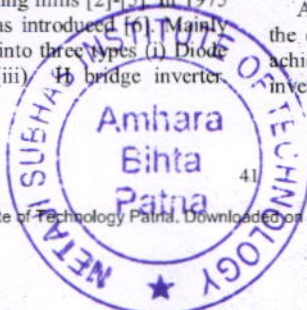
The rest of the paper is organized as follows, section II describes about different topologies of multilevel inverter. Section III presents proposed multilevel inverter and its operation. Simulation results are brought in section IV. Hardware implementation is carried out in Section V followed by conclusion of the paper.

II. INVERTER TOPOLOGIES

Mainly multilevel inverters are classified into three types and described as follows.

A. Diode-clamped multilevel inverter

A diode-clamped inverter, in which the diode is used as the clamping device to clamp the dc bus voltage so as to achieve steps in the output voltage. The diode-clamped inverter was also called the neutral-point clamped (NPC)



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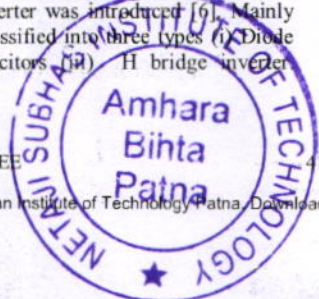
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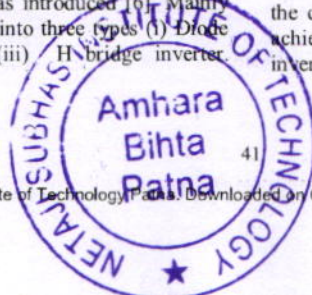
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Energy Conservation through Data Prediction in Wireless Sensor Networks

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Abstract: Energy conservation is one of the main issue in wireless sensor networks (WSNs) which needs to be minimize. In WSNs, the sensor nodes have generally limited supply of energy due to limited size of the batteries. Since, the communication consumes maximum energy hence, by minimizing the number of communications in the network between sensor nodes and base station (BS) without compromising the quality of information be the logical way to conserve energy. This paper proposes a data prediction model that predict the next data within some limited error bound. Data prediction is one of the important techniques for data reduction. This data prediction model works on sensor nodes as well as on BS and makes the same predictions. The sensed data in WSN changes slowly with the time and follow some specific pattern. The variations in sensed data can be interpreted as an autoregressive model of order p i.e. $AR(p)$. The order p is determined and it is observed that most of them are of order 1 only. $AR(p)$ is one of the model of time series analysis which is a proven concept for predicting future data by understanding the past data. The dataset of sense data are analyzed by the Gretl and Matlab tools and also compares their results in the form of p -values and AIC (Akaike Information Criterion) parameters. The predicted data is considered as the final sensed data for the further processing. It will reduce the transmission from sensor nodes to BS and thus energy can be conserved.

Keywords: Wireless sensor networks, Data prediction, Time series analysis, Autocorrelation, Autoregressive modeling, Energy conservation.

1. Introduction

A WSN is a collection of large number of small sensor nodes which are applied in several areas such as health care systems, power monitoring, outdoor and indoor environmental surveillance, object tracking, crop monitoring, robotics exploration, military applications etc (Akyildiz et al., 2002). A WSN consists of tiny sensor nodes which are deployed in remote areas for the monitoring of physical phenomenon such as humidity, temperature, landslide detection, seismic events etc (Ahmad Abed and Baicher, 2012).

Typically, a sensor has basic elements like a sensing subsystem for acquiring data from natural environment, a processing subsystem, a storage, and a transducer communication subsystem for data transmission and reception. Apart from these, a power source is present that fulfill the energy requirements of the sensor to perform any task. Generally, the source of power in sensor nodes are non-rechargeable batteries that have limited energy. Energy consumption operation of a WSN can be divided into sensing, processing and transmission. Among these three operations, transmission consumes the most of the energy approximately 80% (Anastasi et al., 2009). Energy in the WSNs can be conserved by reducing the communication or transmission between sensor nodes and the BS. Most of the works to reduce the energy consumption of WSN has been done related to routing, MAC and mobility as shown in the survey by Anastasi et al. (Anastasi et al., 2009). In routing, a large number of papers recommend that the clustering is a better way to reduce the transmission and saves the energy of WSN (Afsar and Tayarani-N, 2014), (Singh et al., 2017). Recently, Mobile elements has become an important technique to enhance the performance of WSN (Wu et al., 2016), (Wu and Tseng, 2013). The conventional methods to improve the performance of WSN are not that much effective due to their overheads in routing, complexity in MAC protocols and high cost mobile elements. Therefore, the most important question is how to minimize the energy consumption in the WSN and prolong the lifetime of the network. It can be achieved through simple data analysis method where we can predict the future data and restrict the number of data communications. This technique reduces the size of data by not considering the similar reading. By reducing the communication between sensor nodes and BS without compromising data quality can be achieved by predicting the trend or pattern followed by the sensed data. Data prediction is the most efficient way to reduce the number of transmissions in between sensor and BS by using the predicted values instead of the real ones. Data prediction tools and techniques focuses on how to minimize the number of data transmission from the sensor nodes to BS. However, the accuracy of the prediction within an error bound is one of the major issue. For the periodical sensing applications especially environmental supervision,

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