Chapter 11
Tribo-Corrosion Behaviour and Characterization of Biocompatible Coatings

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ABSTRACT

Commercially available metallic orthopaedic implant materials cause major problems like stress shielding and the release of harmful ions due to corrosion and wear. Also, the secondary operation is a must for the implant removal. Therefore, the biodegradable and biocompatible magnesium (Mg) implant materials have been investigated. Mg shows favorable biological properties and matching mechanical properties with the natural bone. Mg alloys rapidly corrode in the physiological environment, which cause failure of the implant before completing the expected function. Surface coating is the most effective method for improving the corrosion performance of Mg and its alloys. Hydroxyapatite (HA), being the most stable phase of calcium phosphates in physiological conditions, is preferred as a coating material. The chapter focuses on the tribo-corrosion and characterization of HA coatings prepared by electrodeposition process on Mg alloys. The results are useful for the designer community in the selection of biocompatible coatings and process parameters to maximize the life of bio-implants.

DOI: 10.4018/978-1-7998-9683-8.ch011

College of Engineering Pune

(An Autonomous Institute of Govt. of Maharashtra)
Wellesely Road, Shivajinagar, Pune- 411005, Maharashtra, India

2nd International Conference & Exposition on
Advances in Mechanical Engineering

(ICAME-2022)

Certificate of Participation

This is to certify that

Amol B. Chavan

of

Sanjeevan Engineering and Technology Institute, Panhala, Kolhapur

has presented the paper titled

A Review on surface coating techniques on Mg based bio-degradable implants

by

Amol B. Chavan, Sanjaykumar S. Gawade, Amrut P.Bhosale

*in the 2nd **International Conference & Exposition onAdvances in Mechanical Engineering**, organized by the **Department of Mechanical Engineering**, **College of Engineering Pune** during **June 23-25, 2022**.*

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December 2022

Conference: 2022 IEEE North Karnataka Subsection Flagship International Conference (NKCon) · At: Karnataka

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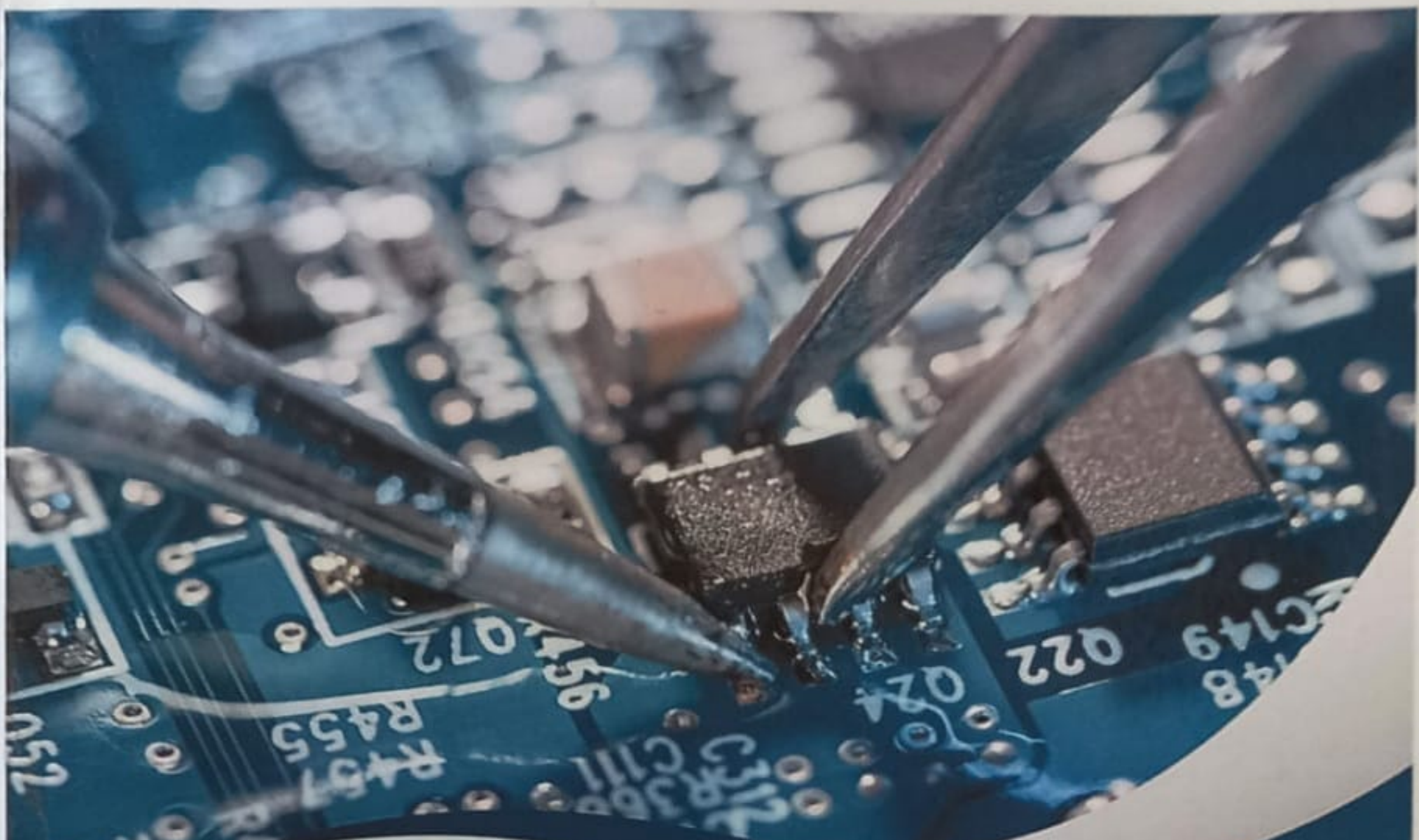

FUNDAMENTALS OF MICRO-ELECTRO MECHANICAL SYSTEMS (MEMS) AND ITS APPLICATIONS

Dr. GAJANAN CHANDRASHEKHAR KOLI
Dr. S.KARTHIK
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A prototype model for detection and classification of landslides using satellite data

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Abstract. Landslides are natural and manmade disasters that cause threat to human life and lead to huge economic loss**.** Last few decade number of approaches have been developed for early detection of landslide for protecting life and saving properties. This paper proposes a prototype for an artificial intelligent model to detect and predict different types of landslides in hilly area with remote sensing techniques. All developing countries are following a steep increase in development of infrastructure like buildings, roads tunnels bridges railway tracks. Demand of connecting remote area is very high but on other side of environment it is also true that high demand of construction in morpho material area is causing many disasters like landslide. Landslide causes the loss of property and life so an early alarming will be help full for disaster management. Remotely sensed data pre-processed with artificial intelligent technologies will be helpful for landslide detection, creating landslide susceptibility map and inventory. Focus of this study is on enhancing the accuracy to detect landslide, list out the different features for extraction from satellite images and pre processing steps. This research also focuses on application of robust early prediction of type of landslide. This research will help in detection of landslide early to protect economical losses and human lives.

1. Introduction

In hilly terrains like Utrakhand , Himachal Pradesh landslides are one of the major natural disasters which take place in all the seasons , Some time because of rainy weather , some after snowfall and some time because of the fragile nature of rock forming mountains . By survey of Building Material & Technology Promotion council (BMPTC) & TARU data landslide hazard probability is divided into three categories: Low, Medium and High.[1] Landslide Hazard zonation Atlas claims that 8% of entire area of Himachal Pradesh is under high risk zone and by revised methodology Expert knowledge 3.2%area is under high risk and AHP indicate 5.65% area is under high risk zone. In mountain areas landslides are most dangerous geological hazard.[2]

Landslides are rapid movement of flow of material downward and outward. It is the movement of mass rocks, debris or earth down a slope under the influence of gravity. The size and shape of ditched mass depends on the nature of discontinuities in the rock, degree of weathering and steepness of slope. Material in landslide mass is rock, solid or both[3].Landslide can be initiated by many natural

Past, Present and Future of Automated Mammographic Density Measurement for Breast Cancer Risk Prediction

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Abstract: Mammography is one of the essential screening technologies which is helpful to save the lives of women against breast cancer. Prediction of breast cancer from mammograms is not reached on its optimal level; hence there is a constant enhancement in clinical applications for mammographic breast density measurement. Optimal results in breast density measurement can be helpful to provide better care for women who have dense breasts. The sensitivity of digital mammograms reduces significantly in case dense breast, which may lead further to hide the cancerous lesions and may be converted into high stage breast cancer. Many research innovations and clinical applications are developed to support radiologists for the second opinion and predict breast cancer risk in advance. But still, there is an unsolved research question: which one is “dense breast” and which screening modularity is suitable for the dense breast to avoid the risk of breast cancer. Hence, currently, radiologists measure mammographic breast density with the help of BI-RADS classification, which is subjective.

RESEARCH ARTICLE | JUNE 22 2023

Review on pre-processing algorithms for breast density classification using digital mammograms FREE

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+ Author & Article Information
AIP Conference Proceedings 2717, 040002 (2023)
https://doi.org/10.1063/5.0130189

Mammographic breast density is one of the substantial threats to breast cancer. Breast density and the possibility of concealing breast cancer are directly proportional. So as breast density increases the possibility of detecting breast cancer in its early stage decreases. Breast density measurement follows the path of the image processing pipeline, which includes preprocessing, segmentation of fibro-glandular tissue, and density classification. Accurate breast density classification depends on the successful development of all the image processing pipeline stages. Despite the immense research efforts in quantitative methods during the last two decades, there is still moderate

RESEARCH ARTICLE | JUNE 22 2023

Disease detection on pomegranate fruits using machine learning approach FREE

Shrihari Khatawkar; Supriya Jadhav; Suhas Sapate; Pallavi Patil; Anil Shinde

+ Author & Article Information
AIP Conference Proceedings 2717, 020004 (2023)
https://doi.org/10.1063/5.0130455

Traditional mechanisms for manual detection of disease on pomegranate is tedious and time consuming task leading to further delay in the treatment of early stage diseases. Diseases not detected and treated in time leads to the loss of quality and quantity resulting in the great nutritional, economic, and postharvest losses to both, the farmers and nation. Automatic detection of diseases in early stage is very important to prevent all the losses. The existing disease detection solutions based on digital image processing and machine learning are not transformed into the practically applicable technology due to unsatisfactory efficiency and ease of operations. The problems such as insufficient datasets, consideration of multiple diseases at a time etc. are the main hurdles on the way to

Social Distance Monitoring at Public Places Using YOLO V3 and Euclidean Distance

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Abstract. During the coronavirus disease 2019 (COVID-19), it was a difficult task to ensure that people maintain the required social distance while standing in a queue or gathering around public offices and places, like banks, govt. offices, airports, railway stations, temples, churches, mosques etc. This problem not only violates the necessity of social distancing, but also escalates fear, concern, and risk, among and for people standing in a queue and the person or people providing service in the vicinity. The authorities can monitor and control the social distancing rule being followed by persons in the crowd at public places, if some automatic system is available to make them alert. The purpose of this research is to present an automatic monitoring system to calculate distance between two persons in the given scene and produce an alert if social distancing norms are violated. The authorities will come across an alert and they will initiate an appropriate action to control the situation. The system takes live video footage as input and calculate the distance between persons and alert the authorities in output video using colour bounding boxes. The persons appearing in the footage are standing with different angles between them, such as 90º, 30º, 120º, 180º. The results are 90 percent accurate. Thus the proposed system can be used to monitor social distancing at public places.

Keywords: COVID-19, Social Distance Monitiring, Pandemic situation, YOLO v3, Euclidean distance

INTRODUCTION

As of May 1, 2021, COVID-19 has spread to more than 180 nations, resulting in an estimated 162 million [1] confirmed cases and 3.3 million global deaths. The population's vulnerability is exacerbated by a lack of active therapeutants and immunity to COVID-19. Several healthcare organisations, medical specialists, and scientists are striving to develop efficient treatments and vaccinations to combat this deadly virus, but no progress has been documented to date. This predicament has compelled the international community to seek alternative methods of halting the spread of the contagious virus. Even if there are vaccines available, it's shortage and after effects is worrisome. As a result, social isolation is the only way to battle the pandemic [2].

According to this research, social distancing is a vital and critical containment method for SARSCoV-2 prevention, even people with mild or no symptoms can inadvertently spread corona artery illness to others [3]. As shown in Fig. 1, the greatest method to limit infectious physical contact and thus the rate of infection is to maintain enough social

International Conference on Innovations in Computer Science, Electronics & Electrical Engineering-2022
AIP Conf. Proc. 2717, 040003-1–040003-7; https://doi.org/10.1063/5.0129776
Published by AIP Publishing. 978-0-7354-4495-9/$30.00

RESEARCH ARTICLE | JUNE 22 2023

Dynamic trust management for community-based application using IoT FREE

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+ Author & Article Information
AIP Conference Proceedings 2717, 050001 (2023)
https://doi.org/10.1063/5.0130462

Today's Internet of Things (IoT) interacts with social media platforms, allows people and devices to interact easily to share vital information over variety of smart applications including smart cities. The physical world connects because of smart devices and these smart devices can be accessed from anywhere due to IoT systems. These devices are vulnerable to security attacks by the malicious nodes. Trust management provides few lightweight mechanisms to identify and prevent the malicious attacks by strengthening confidentiality, integrity and availability like pillars of information security. Trust management plays a major role in community based network applications for data collection, data mining, relevant content-sensitive services etc. with enhanced customer privacy and data security which are important for handling security in the vulnerable network.

A Second Order Energy Consumption Model for Improving Performance of 802.15.4 MAC

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Abstract. IEEE 802.15.4 is popular protocol used in low-rate personal wireless sensor networks with the battery operated sensor nodes which poses the major challenge of saving the power. WSN should have the minimum possible energy consumption with the maximum possible throughput so that the lifetime of the WSN is maximum possible. In this paper, the second-order model for energy consumption of 802.15.4 which is built on experiments conducted using fractional factorial design and Central Composite Inscribed design (CCI) is proposed. This is achieved by utilizing a Response Surface Methodology (RSM) experimental design and Castalia-3.2 simulator using parameters Superframe Order, Beacon Order, packet size, packet rate, the number of nodes, Guaranteed Time Slots and path loss .The energy consumption of Fractional Factorial design is 0.9 Joules per node, whereas for RSM, it is 0.4 Joules per node. Our results show that the energy consumption per node using RSM is less as compared to Fractional Factorial design. This model would help in discovering suitable values for the parameters, to guarantee lower energy consumption.

Keywords: Wireless Sensor Network (WSN), Wireless Body-Area Networks (WBANs), IEEE 802.15.4 MAC, Energy efficiency, Response Surface Methodology (RSM).

INTRODUCTION

A wireless body-area network (WBAN) is a form of wireless sensor network that is made up of battery-powered wireless nodes. Due to accessibility issues, it may be difficult to repair or recharge expended batteries in a deployed network. Thus, the lifetime of the WSN should be the maximum possible. Further, within this lifetime the WSN must transmit the maximum possible data for it to be useful. To ensure this, the WSN should have the minimum energy consumption with the maximum throughput.

A WBAN utilizes 802.15.4 [1] and is used for many applications like defense, sports, medical, amusement and other applications[2]. WBAN devices (e.g. sensors for patient monitoring) have small battery capacity. A WBAN should consume minimum possible energy for a prolonged network life span.

A number of factors would affect the energy consumption of a WBAN. They are the superframe order (SO), the packet rate (pktr), number of nodes (nn) requesting guaranteed time slots (GTS) for transmission and path loss (PL). A model relating the energy consumption of a WBAN, and these factors would be helpful in determining the optimal settings for a specific requirement. The superframe structure is described below in Figure 1[1].

International Conference on Innovations in Computer Science, Electronics & Electrical Engineering-2022
AIP Conf. Proc. 2717, 050004-1–050004-8; https://doi.org/10.1063/5.0129461
Published by AIP Publishing. 978-0-7354-4495-9/$30.00