Velammal College of Engineering and Technology,Madurai.

Department of Information Technology

Faculty Publication in Books

Academic Year 2022-23

S.No	Title of the Paper	Name of the Author	Published by
1.	Machine Learning based Predictive Analysis and Algorithm for Analysis Severity of Breast Cancer	Dr.R.Perumalraja, Dean	Bentham Science DOI: 10.2174/9789815136531123010008
2.	Optimal Cellular Microscopic Pattern Recognizer- (OCMPR-) Based Wireless Detection Network for Efficiently Leveraging the Parallel Distributed Processing Capabilities	Dr.R.Kavitha, Prof & Head	Wiley Hindawi August 2022 https://doi.org/10.1155/2022/5875260
3.	AI and IOT based intelligent healthcare & Sanitation	Dr.S.Kamalesh, ASP	Bentham Books ISBN: 978-981-5136-54-8
4.	Evolution of Deep Learning for Biometric Identification and Recognition	Mrs.C.Manjula Devi, AP	IGI Global book series Advances in Computational Intelligence and Robotics (ACIR) ISSN: 2327-0411; eISSN: 2327-042X DOI: 10.4018/978-1-7998-8892-5.ch009
5.	Shallow CNN Model for Recognition of Infant's Facial Expression	Dr.P.Uma Maheswari	Lecture Notes in Electrical Engineering, Springer Vol 998, May 2023
6.	Application of Machine and Deep Learning Techniques to Facial Emotion Recognition in Infants	Mrs.A.Vinora / AP-III	InfotechOpen DOI: 10.5772/intechopen.109725

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Dr.R.Kavitha, Professor

AI and IoT-based Intelligent Health Care & Sanitation

Back Book Details

Machine Learning based Predictive Analysis and Algorithm for Analysis Severity of Breast Cancer

Author(s): B. Radha*, Chandra Sekhar Kolli, K R Prasanna Kumar, Perumalraja Rengaraju, S. Kamalesh and Ahmed Mateen Buttar

Pp: 83-97 (15)

DOI: 10.2174/9789815136531123010008

Abstract

Breast cancer is the 2nd frequent occurrence of cancer among women, after skin cancer, according to the American Cancer Society. By using mammography, it is possible to detect breast cancer before it has spread to other parts of the body. It primarily affects females, though males can be affected as well. Early identification of breast cancer improves survival chances significantly, however, the detection procedure remains difficult in clinical studies. To solve this problem, a Machine Learning (ML) algorithm is used to detect breast cancer in mammogram images. In this study, 100 images from the mini-MIAS mammogram database were used, 50 of which were malignant and 50 of which were benign breast cancer mammograms. Before training the model, the sample image datasets are pre-processed using numerous techniques. The required features are then extracted from the sample images using Feature Extraction (FE) techniques, such as Daubechies (DB4) and HAAR. Finally, the extracted features are fed into ML classifiers such as Linear Discriminant Analysis (LDA), Support Vector Machine (SVM), and Random Forest (RF) to create a model. Several performance metrics are used to evaluate FE and classification. According to the results of the analysis, the HAAR FE with the RF model is the ideal combination, with an accuracy level of 91%.

Keywords: Accuracy, Breast Cancer, Confusion Matrix, Diagnosis, Feature, Metrics.

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Research Article

Optimal Cellular Microscopic Pattern Recognizer- (OCMPR-) Based Wireless Detection Network for Efficiently Leveraging the Parallel Distributed Processing Capabilities

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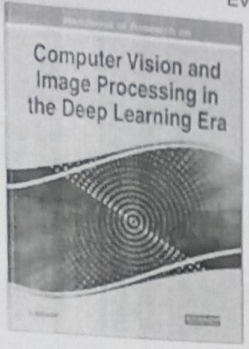
Recognizing patterns associated with particular events enables the detection of specific critical changes in the events. Due to the resource constraints inherent in WSNs, pattern recognition is highly dependent on the complexity of the computation, the number of iterations, and the requirements for node training. Iterative learning is frequently used in computer-based computer vision. As a result, these methods are in conflict with the perfectly alright architecture of the WSN. The proposed technique, Optimal Cellular Microscopic Pattern Recognizer (OCMPR), enables the detection of macroscale events in WSN. Using the distributed system computational resources of WSNs, the approach reduces calculations for conserving energy and improves recognition. The method generates promising results by combining a well-known optimization technique (the genetic algorithm) with CMPR. This approach addresses the resource-constrained WSN's real-time mission-critical application needs. Global and quick recognition is achieved by dispersing processing over a network's nodes, allowing for loosely connected communication. The results demonstrate the suggested scheme's versatility.

1. Introduction

To detect a single or a group of related events, a network analyses sensory data. Consider structural health monitoring. Install a WSN on the Golden Gate Bridge to collect and analyse vibrations. The same field uses multiscale WSN to detect SHM damage [1]. Another researcher used sensor networks to monitor and detect elderly behaviour. These apps must be able to detect and report accurately in noisy environments [2]. Recognize event-related patterns to detect events. WSN pattern recognition is resource intensive due to computation complexity, iterations, and node training. Computers usually use iterative machine learning. These methods clash with the WSN's highly distributed architecture [3].

This article introduces the Optimal Cellular Microscopic Pattern Recognizer (OCMPR) as a novel computational scheme for resource-constrained WSNs. [4]. Global and rapid recognition is achieved with minimal computational overhead thanks to the proposed scheme's distributed computation and loosely coupled communication. This method solves optimization problems using a genetic algorithm [5].

WSNs collect environmental data through the use of thresholds, statistics, syntactical and associative memories, and graph neurons. Threshold-based pattern recognition is the most basic and widely used WSN pattern recognition technique. These sensors have a single threshold or a set of thresholds. The desired pattern is discovered when a sensor's reading reaches a threshold. Chen et al. [6] created a model that calculates thresholds based on average sensor signal measurements. An alarm is triggered in the event of a threshold violation. The node transmits a DETECT signal to the base station. Simple, light-weight thresholds may exist. These techniques are ineffective against noisy patterns and may result in false alarms [7].



Evolution of Deep Learning for Biometric Identification and Recognition

S. Miruna Joe Amali, Manjula Devi C., Rajeswari G.

Source Title: Handbook of Research on Computer Vision and Image Processing in the Deep Learning Era (/book/handbook-research-computer-vision-image/274342)

Pages: 14

DOI: 10.4018/978-1-7998-8892-5.ch009

Abstract

Biometrics is a method based on the recognition of the biological characteristics of an individual like fingerprint, vocal, and facial features. Biometric features hold a unique place when it comes to recognition, authentication, and security applications as they cannot be easily duplicated. Deep learning-based models have been very successful in achieving better efficiency in biometric recognition. They are more beneficial because deep learning-based models provide an end-to-end learning framework.

Chapter Preview

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Deep Learning Models

Deep learning models in general are prepared based on an objective function, yet the way in which the objective function is planned uncovers a ton about the reason for the model.

Deep Learning in Computer Vision

Computer vision is the technological advancement which exemplifies interpretation capability of machines with respect to images and videos. Computer vision algorithms extract specific features and criteria in images and videos for analysis purpose. They then use the extracted features for interpretations, predictions or for decision making. In recent years deep learning techniques have gained prominence in the application of computer vision. In particular, Convolutional Neural Networks (CNNs) architecture is prominently used. CNN is a multi-layered architecture that enables a neural network to focus on the most relevant features in the image. CNNs have been successfully applied to various fields relating to computer vision like object recognition, face recognition, scene identification etc.

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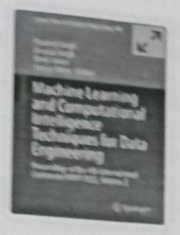


International Conference on Machine Intelligence and Signal Processing

MISP 2022: **Machine Learning and Computational Intelligence Techniques for Data Engineering** pp 783–791

Shallow CNN Model for Recognition of Infant's Facial Expression

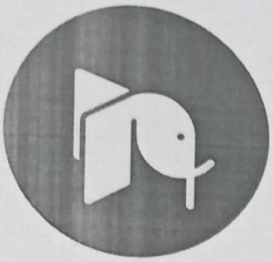
P. Uma Maheswari, S. Mohamed Mansoor Roomi, M. Senthilarasi, K. Priya & G. Shankar Mahadevan

Conference paper | First Online: 16 May 2023

Part of the Lecture Notes in Electrical Engineering book series (LNEE,volume 998)

Abstract

Infant facial expression recognition is one of the most important directions in the field of computer vision and surveillance of parental care, and it plays a vital role in intelligent interpersonal interactions. The development of an automated infant facial expression recognition technology has become critical, and the need for an infant action database has become essential. In this proposed work, a dataset is created from the videos and website for



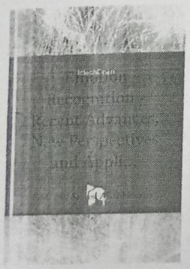
OPEN ACCESS PEER-REVIEWED CHAPTER - ONLINE FIRST

Application of Machine and Deep Learning Techniques to Facial Emotion Recognition in Infants

Submitted: December 6th, 2022 , Reviewed: December 27th, 2022 , Published: March 7th, 2023

DOI: 10.5772/intechopen.109725

WRITTEN BY
Uma Maheswari Pandyan, Mohamed Mansoor Roomi Sindha, Priya Kannapiran, Senthilarasi Marimuthu and Vinora Anbunathan



FROM THE EDITED VOLUME

Emotion Recognition - Recent Advances, New Perspectives and Applications [Working Title]

Dr. Seyyed Abed Hosseini

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Title of the paper : PLANT DISEASE IDENTIFICATION USING DE LEARNING

Co-Author(s) : Dr. V. AKILANDESWARI

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Chapter 5
Enhanced BiLSTM Model for EEG Emotional Data Analysis

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ABSTRACT

Emotion recognition based on biological signals from the brain necessitates sophisticated signal processing and feature extraction techniques. The major purpose of this research is to use the enhanced BiLSTM (E-BiLSTM) approach to improve the effectiveness of emotion identification utilizing brain signals. The approach detects brain activity that has distinct characteristics that vary from person to person. This experiment uses an emotional EEG dataset that is publicly available on Kaggle. The data was collected using an EEG headband with four sensors (AF7, AF8, TP9, TP10), and three possible states were identified, including neutral, positive, and negative, based on cognitive behavioral studies. A big dataset is generated using statistical brainwave extraction of alpha, beta, theta, delta, and gamma, which is then scaled down to smaller datasets using the PCA feature selection technique. Overall accuracy was around 98.12%, which is higher than the present state of the art.

DOI: 10.4018/978-1-6684-3843-5.ch005

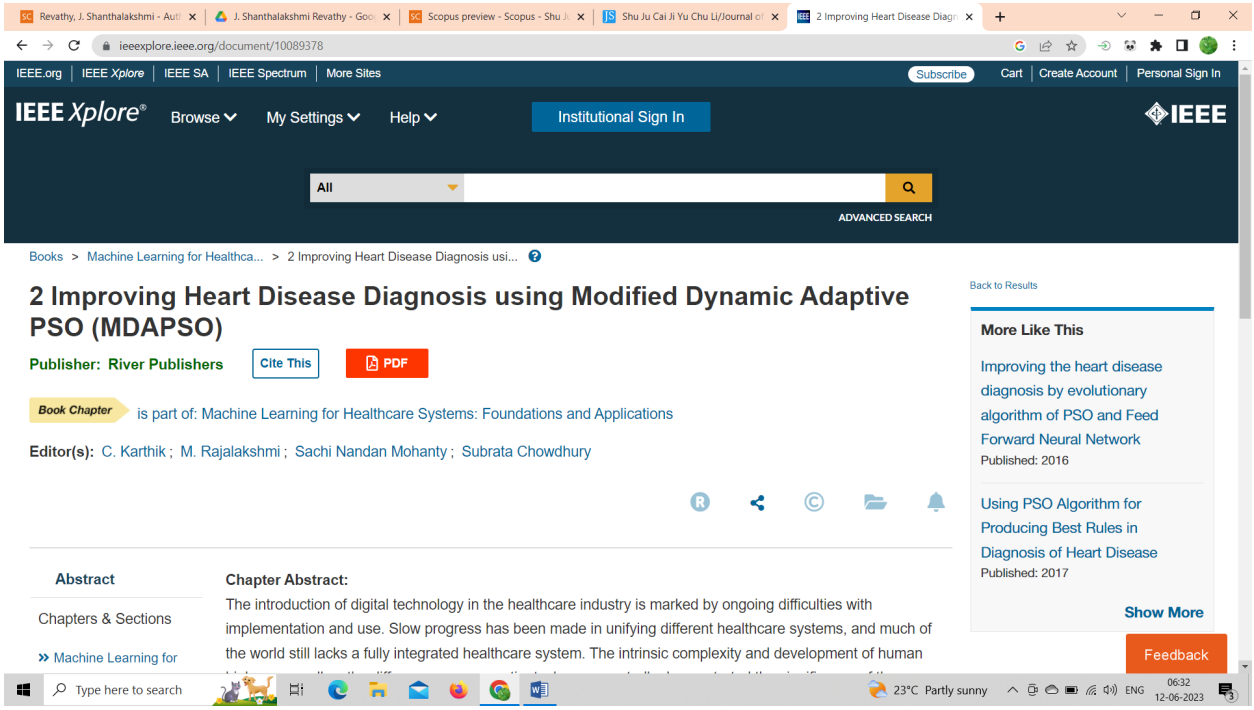
1. INTRODUCTION

Human emotions are vital in daily life and influence daily activities (Bos, 2006). The goal of affective computing is to create an emotional model that can monitor and interface with human emotional states. The subjective nature of a person's inner emotions is based on feelings, and experiences, both internal and external to the individual (Alarcao & Fonseca, 2019). To name a few, voice, facial, and physiological signals can all be used to detect and evaluate emotional states. The subject might disregard or falsify their mood states, which can lead to erroneous choices, according to the defects of the speech and facial approach. These shortcomings have been overcome by analyzing using physiological signals (Liu et al., 2010). The use of electroencephalogram (EEG) to detect emotions is quickly rising due to factors such as no interference with brain signals and the availability of numerous portable data-gathering equipment. This has allowed for the development of medicinal and non-medicinal applications (Molina et al., 2009).

The importance of EEG has been vastly exaggerated over time, and it is far from a panacea for brain activity. It can be detected if someone is awake, asleep, brain dead, suffering a seizure, and a few other things clinically. The EEG is the sum of all electrical stimulation on the surface of the brain. Because this action must pass through layers of soft tissue, bone, and skin, the data is naturally noisy.EEG data is collected using a standard setup of 20 electrodes spread across the scalp. The letter in each lead denotes which section of the brain it is closest to (Temporal, Frontal, Parietal, and so on), with odd numbers and even numbers on the left and right respectively. In the clinic, usually consider the potential difference between pairs of electrodes rather than the electrical potentials at each electrode. This allows deducing what the brain is doing in that location by looking at the electrical field in the brain region between these two places. When any two electrodes are chosen and it generates 20 factorial distinct potential differences, not all of them will be beneficial.

As Montages, the arrangement of selecting pairs of electrodes to compare potential differences. There are several other montage systems, but the 10-20 system is the most prevalent. Looking at the firing rate is where the EEG data gets fascinating. The neuronal activity begins to synchronize in quite amazing ways with specific medical illnesses and mental states. This activity's firing rate is measured in Hz and divided into bands:

- Delta (<4Hz) Continuous attention activities, slow-wave sleep
- Theta (4-7Hz) Repression of evoked responses, drowsiness
- Alpha (8-15Hz) Closed eyelids, relaxed
- Beta (16-31Hz) Active thinking, concentration, and vigilance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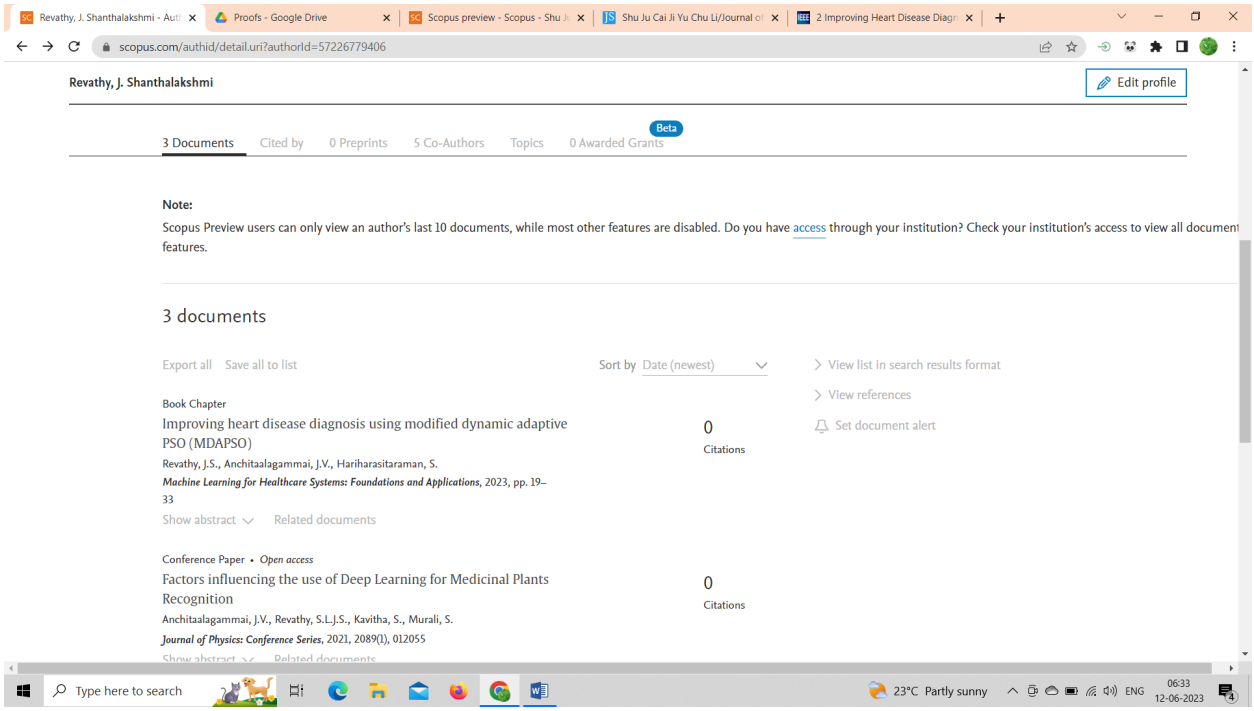
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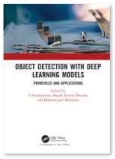

Chapter

Human Behavioral Identifiers

A Detailed Discussion

By T. Suba Nachiar, T. Shanmuga Priya, P.R. Hemalatha, J.V. Anchitaalagammai

Book Object Detection with Deep Learning Models

Edition	1st Edition
First Published	2022
Imprint	Chapman and Hall/CRC
Pages	16
eBook ISBN	9781003206736

ABSTRACT

Behavioral identifiers render a new era of individual security solutions that detect the user based on how they interact with mobile or handheld devices like mobile phones, tablets, palmtops, laptops, etc. Unlike other physical identifiers or biometrics, which are limited to a particular pattern of human characteristics, the only restriction is the special behavior of a person or human fantasy. Currently, this method is widely used to distinguish between humans and machines. This contributes to the present technological world to discriminate spam or to sense cyberattacks. As expertise grows, machines will get more accurate and precise in identifying authentic users. Recent developments in deep learning make this technique more user-specific, which allows AI to identify the traits of each user's behavior that are unique, as it differentiates them best from all the other users, which enables a far better experience. So, this study is an in-depth classification of characteristic identifiers based on the motor skills, individual style, preferences, knowledge, and strategies people use while doing different tasks on devices.

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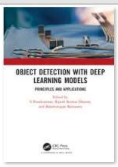

Chapter

Real-Time Tracing and Alerting System for Vehicles and Children to Ensure Safety and Security, Using LabVIEW

By R. Deepalakshmi, R. Vijayalakshmi

Book Object Detection with Deep Learning Models

Edition	1st Edition
First Published	2022
Imprint	Chapman and Hall/CRC
Pages	16
eBook ISBN	9781003206736

ABSTRACT

Real-time tracing and alerting system for vehicles and children is mandatory to trace and communicate the collected information at regular intervals to ensure the safety and security of children. The prototype of the real-time tracing and alerting system consists of two units: a tracker unit that traces the location information, transmits it to a central monitoring station, stores the information in the database and uses these data to locate the position of the vehicle with Google Maps. The second unit is an alerting unit which tracks the students using active radio frequency identification devices (RFID) which will be placed on student ID cards. A radio wave trans-receiver transmits a common radio wave which is received by the RFID in the ID card. This radio wave is modified by the RFID's coil and resent to the receiver. RFID tags are also used for attendance which is updated directly to the database and displays the other student information.

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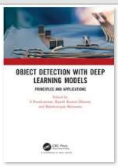

Chapter

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Chapter 7
Current Trends in Integrating the Blockchain With Cloud-Based Internet of Things

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ABSTRACT

Blockchains are shared, immutable ledgers for recording the history of transactions. They substitute a new generation of transactional applications that establish trust, accountability, and transparency. It enables contract partners to secure a deal without involving a trusted third party. The internet of things (IoT) is rapidly changing our society to a world where every "thing" is connected to the internet, making computing pervasive like never before. It is increasingly becoming a ubiquitous computing service, requiring huge volumes of data storage and processing. The stable growth of the internet of things (IoT) and the blockchain technology popularized by cryptocurrencies has led to efforts to change the centralized nature of the IoT. Adapting the blockchain technology for use in the IoT is one such efforts. This chapter focuses on blockchain-IoT research directions and to provide an overview of the importance of blockchain-based solutions for cloud data manipulation in IoT.

DOI: 10.4018/978-1-7998-6694-7.ch007

I INTRODUCTION

IoT is a network system in both wired and wireless connection that consists of many software and hardware entities such as manufacturing management, energy management, agriculture irrigation, electronic commerce, logistic management, medical and healthcare system, aerospace survey, building and home automation, infrastructure management, large scale deployments and transportation.

There is a need of an advanced prototype for security, which considers the security issues from a holistic perspective comprising the advanced users and their intercommunication with this technology. Internet is primary of IoT hence there can be security loophole. Intercommunication paradigms are developed based on sensing programming for IoT applications, evolving an intercommunication stack to develop the required efficiency and reliability. Securing intercommunication is a crucial issue for all the paradigms that are developing based on sensing programming for IoT applications (Choudhury et al., 2017). Data generated by the IoT devices is massive and therefore, traditional data collection, storage, and processing techniques may not work at this scale. Furthermore, the sheer amount of data can also be used for patterns, behaviors, predictions, and assessment. Additionally, the heterogeneity of the data generated by IoT creates another front for the current data processing mechanisms. Therefore, to harness the value of the IoT-generated data, new mechanisms are needed. If we provide good solution which insures about security of the cloud storage system and communication between IoT device and cloud, then there is no problem to accept cloud storage to store IoT data.

Figure 1. Illustration of Cloud based IoT

Brain-Computer Interface: Using Deep Learning Applications

Chapter 5

A Review of Innovation to Human Augmentation in Brain-Machine Interface – Potential, Limitation, and Incorporation of AI

T. Graceshalini, S. Rathnamala, M. Prabhanantha Kumar

Book Editor(s):M.G. Sumithra, Rajesh Kumar Dhanaraj, Mariofanna Milanova, Balamurugan Balusamy, Chandran Venkatesan

First published: 10 February 2023
https://doi.org/10.1002/9781119857655.ch5

Summary

The beginning of Industrial Revolution in late 1700s manifested a revolving fact in the history of humans: a phase for effective and increasing human beings/machinery interactions. In the coming decades, there were many more inventions followed, which gave rise to an increasing sense of interest and a need for imagination. Several areas of human capacity development were addressed. These are (i) neurotechnology, (ii) nootropics, (iii) genetic engineering, and (iv) brain-computer interfaces, ordered by increasing the possibility of implementation in the global economy. Brain-machine interface (BMI) utilizes existing neuroscience and engineering expertise to enable voluntary, thought-oriented control of external machines. This study underlines the increasing ability of BMI and BMI technologies to be introduced into our sector. The study also shows the limitations needed to push BMI technology out of infancy and incorporate it into artificial intelligence.

Grenze International Journal of Engineering and Technology, Jan Issue

Smart Application to Enhance in-Store Shopping

T.Subanachiar[1], Dr.M.Arunachalam[2], P.R.Hemalatha[3] and Dr.J.V.Anchitaalagammai[4]
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Email: tsn@vcet.ac.in,prh@vcet.ac.in,anchithaalagammai@gmail.com
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Email: arunachalamm@skcet.ac.in

***Abstract*—Most of us have spent what seemed like forever in a retail store, waiting for the person in front of us in the queue to bill a large number of items, when we just needed a single item to be purchased. Long lines at the cashier counters can cause people to wait for a significant amount of time, before they can pay for their products, and leave, regardless of the number of items being purchased. We feel that this can be changed, and our idea is to automate the check-out process, enabling automatic payment, striving towards a new-age digital shopping experience. We propose to do this by using a smart phone application that allows the user to scan the products he or she wishes to purchase, generate the bill for all the products scanned, make the payment and simply walk out of the store. This process will ensure easy customer, inventory management and finance handling, making both management and customer happy. This application will help avoid long queues and provide a hassle free checkout. It will not only reduce the amount of waiting time, but it will also reduce or eliminate the need for a cashier. In addition to this, in accordance to today's trend of e-transactions, the entire process will be free of any hard cash.**

***Index Terms*— PayU, Firebase , Smart Shopping, Intelligent Shopping Cart, Digital Cart.**

I. INTRODUCTION

Today, Smart phones have become an important asset to us, without which our life would be incomplete. When it comes to shopping, our smart phones are not used as much as booking cabs, movies, buses etc. It is of a great concern, especially in metropolitan cities, where these shopping will be very time consuming as there will be long queues for the payment of bill. The main aim of this system is that the whole system will provide you a way for queue-less shopping and online payment with inventory management. The shopping is usually the most time consuming and provides us our daily essentials, so this system enables you to keep this asset at your fingertips using only your smart phones. Shopping means to feel comfort and ease the steps involved in it. There are various factors to keep in mind when it comes to traditional way of shopping such as products search, billing and payment. In today's world smart phones has become an important asset to us, without which our life would be incomplete. But, when it comes to the shopping our smart phones are not used as much as booking cabs, movies, buses etc. It is of a great concern, especially in metropolitan cities, where these shopping will be very time consuming as there will be long queues for the payment of bill. It is important that you take steps to eliminate the queues in the shopping. Think for a moment just how much more of a hassle it would be to do all of the payment of the bill in one place which will be on first come first serve basis. The main aim of this system is that the whole system will provide you a way for queue-less shopping and online payment with inventory management. The

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shopping is usually the most time consuming and provides us our daily essentials, so this system enables you to keep this asset at your fingertips using only your smart phones.
It is important that you take steps to eliminate the queues in the shopping. Think for a moment just how much more of a hassle it would be to do all of the payment of the bill in one place which will be on first come first serve basis. If someone in front of you has two trolley of products and you have only a single product you need you have to wait until the customer before you has completed his payment process. It would be very time consuming and it would quickly become frustrating. Even though you have a single product, it will still be a massive hassle. Overall, it's a hassle that no one should have to deal with. By having the right application to save your time that will be possible. When you have the android application for queue-less shopping it can provide you with more peace of mind, as you will not have to worry so much about how much time it will consume for the bill payment. You know you have the technology to keep it easier and faster to provide you a seamless shopping experience. An android application is developed to provide an interactive environment and enhance the shopping experience. The android application will provide a way for the inventory management and easy selection of the products.

II. LITERATURE SURVEY

To improve the In-stores customers shopping, Terblanche [1] proposed a android application which provides the customers comfort, efficient, and convenient shopping experience. The proposed work developed an Android mobile application that uses the phone camera to capture the product's barcode label and also price labels. By using this mobile application, customers and stores both gain improvement. Store's shopper gets full product information immediately and correctly in a convenient and fast way by only scanning the product's barcode then it can translate this information into several languages. Also, this project serves customer shopping experience in calculating the total cost of their purchases while they are shopping in any store and in any gallery by only capturing the written prices' labels.
Rawabi [2] et al developed a smart app which mainly focuses on navigation to the item's location and automatic billing of the products that the user has purchased. An RFID reader was used to scan the products. Jagdish Pimple[3] et al proposed a Digital Cart which uses the Barcode scanners, LCD display, Keypad and Wi-Fi module to sends the data wirelessly to the main server. It have product details which the customers scans the products on screen in the display connected to Arduino which was situated in Digital Cart. The cart interfaces with the main server and it will have the facility to generate the bill for all products added into the cart.
Zlatko Bezhovski [4] identifed a basic optimization scheme to design shopping guide system run on smart phones, with the help of QR code generation and recognition technology. For proficient shopping system, exclusive QR codes are produced to record the article name, number, location, detailing of goods placed .Smart phone reads the QR Code through the camera. REST protocols are used to scan QR codes to complete end to end business process flow execution to complete task at hand. Multiplexing and DE multiplexing algorithm for recognizes QR code image using smart phones. Special Symbols were scanned at receiving end and image was recognized. The image was DE multiplexed to its original QR code pattern with three part Data in each QR code pattern were concatenated back to form the original information message. QR filtering method is used to get the information which is hidden inside the QR code securely. The concept of OTP was also used for security using QR code.
Bhasha Chaure [5] presented a new concept called "SMART SHOPPING TROLLEY" has which consists of Raspberry pi that follows the customer while purchasing the items and ultrasonic sensor maintains the safe distance between the customer and itself. When a person drops any products into the trolley, its bar code will be detected and the price of those products will be displayed. As the scanned products were dropped the cost will get added to the total bill. Thus the billing will be done in the trolley itself. By using this trolley, customer can buy large number of products in a lesser time with less efforts
Rajesh kumar Megalinagam [6] author proposed a system that replaces barcode technology with RFID technology as it does not require perfect line of sight to eliminate long queues. Every customer was given a unique RFID card by paying some amount and the customer's account will be created in an android application through which customers can check their wallet balance. At the end of shopping the finalbill is transmitted to the billing section through zigbee communication and the net amount will be automatically deducted from the customer's prepaid balance. The proposed model was based on raspberry pi processor and uses RFID reader and tags for simultaneous billing, thus solves the problem of long queues.

III. PROPOSED SYSTEM

The Smart shopping application is used to provide seamless shopping experience. The Android application is connected to the firebase server where the product descriptions are stored. After the barcode is scanned the product will be retrieved from the firebase server. After adding all the products the bill will be generated. The Payusdk is used for the payment of the bill. The application will generate a hash value which will be used by the payu server for the payment process. After the payment is done the successful payments will be added to the checkout list where the products can be collected by the customer. The manager of the super market can manage the inventory and can view all the orders of the customers. They can add, remove and stock the products in the super market.

Despite the various technologies that have been introduced in providing a seamless shopping experience they require changes in the trolley. These smart trolleys provide a smart way but it requires additional cost as each trolley will have to be changed and they will be complex to use for the new customers. A separate billing system will be made for these smart trolleys rather than common method. It will be heavy for the customer to carry around the super market. The proposed smart system in this project is designed to scan the products and pay the bills through the smart phones which is owned by the customer. This system does not requires any additional cost for its implementation.

The system has three main units. The first is a user unit which is used by the customers. This unit consists of a login page and the products page. The customer will login to the application using the login page. After successful login the products page will be shown. The products page is used to scan the products which the customer needs to buy. The camera of the smart phone is used to scan the products. The products description will be retrieved from the firebase server. The scanned products will be added to the products lists and the customer can generate the bill for the products. The payment unit is used for the payment of the bill. The payusdk is integrated with the application which will be used by the customers for the payment process. The application will generate a hash value for the products chosen by the customer and that hash will be used by the payu server for the payment of the bills. After successful payment the bill will be added to the checkout list where it can be collected by the customer. The admin unit is used for the inventory management and they can be used to add, remove and stock the products of the super market. The admin can also view the checkout products by all the customer of the super market.

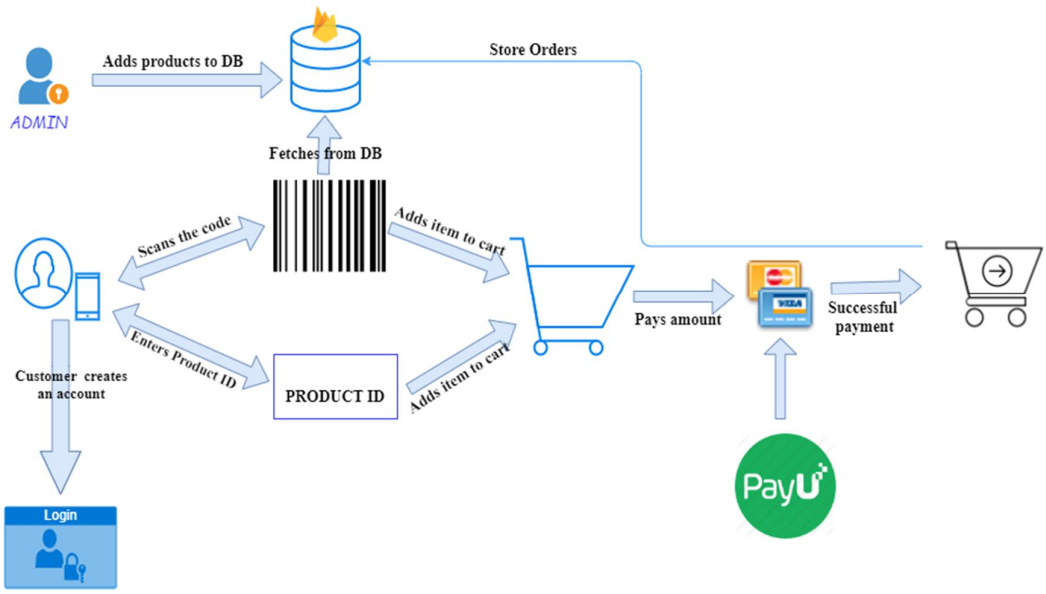

Figure 1. System Architecture for In Store Shopping System

Figure 1, shows the System Architecture of In Store Shopping System. This system is divided into three modules:

1. Shopping Module
2. Payment Module
3. Admin Module

The System Starts with Sign In page as every new customer signs into the application. User uses the same credentials to log into the application. Adding item into the cart can be done in two ways 1. Add Manually with Product ID 2. Scans the Product to add to cart. Once the user adds an item into the cart quantity of the item needs to be entered. These products are stored in the database. Each products assigned with the price. Admin has privilege to manipulate the products. Bill will be auto incremented based on the quantity of the items added.
Payment is done through card and Net Banking. Payment phase is initiated by entering the required credentials. Payment is carried over by PayU module.Admin has special privilege to introduce new items into the market and in the application. Admin allocates price to products and also manages the inventory of the products.

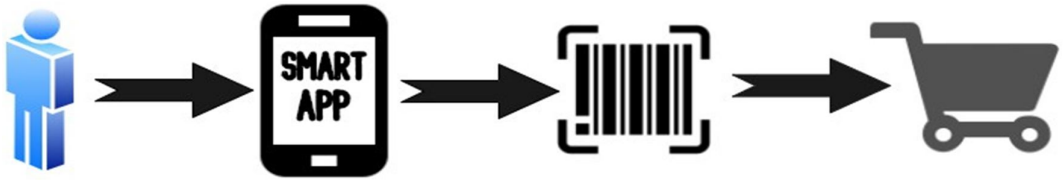

Figure 2. Shopping Illustration

Figure 2, illustrates the process of the shopping application. Initially, customer signs into the application with the Email ID and a Password. Password must have atleast six characters. The Credentials are verified on clicking the register Button. Same credentials are used to log onto the application. Admin has the privilege to add items available in the store and assigns the price to the added items. Customer chooses the items to the cart. This can be done in two ways. One can add item into cart by entering the product ID. Other way is by scanning the QR code of the product. Once the products are added quantity of the respective products are chosen and total amount will be autoincremented as products gets added into the cart.

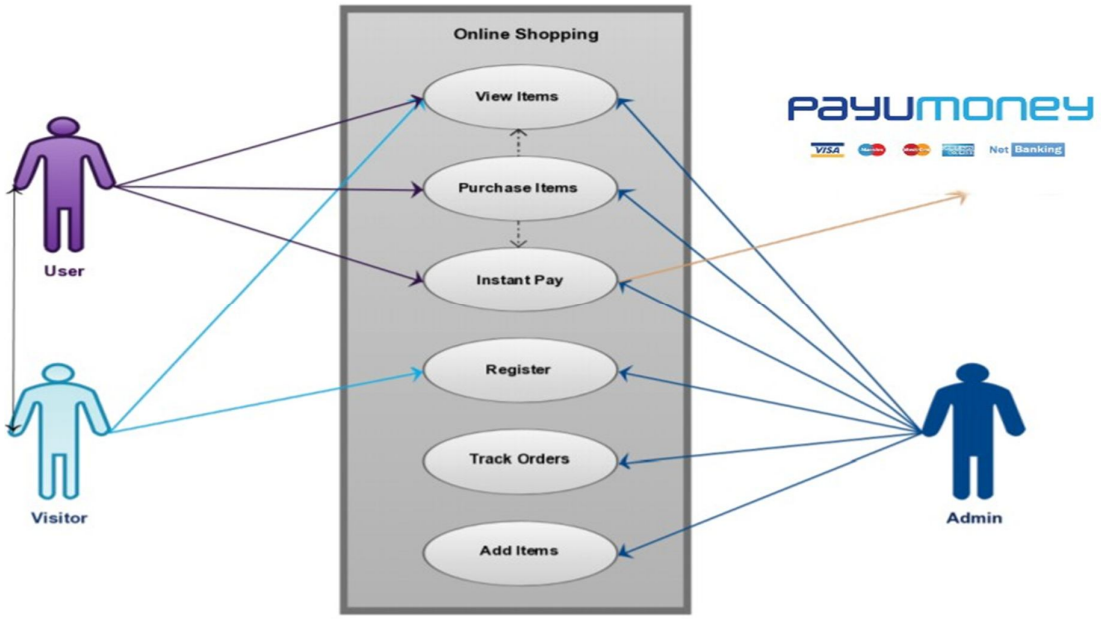

Figure 3. Use case diagram for In-store Shopping

Figure 3, represents the user interaction with the system. Initially User Signup into the application to create an account. Admin has access to all the activities in the system. The user scans the product and add the item to cart. Once all the items were added payment system is processed through Paypal.

IV. Result And Discussion

Our Smart shopping application is used to provide seamless shopping experience. Results are shown below for the application. Initially our application begins with shopping module. Furthermore if the customer has finished shopping payment phase is initiated.

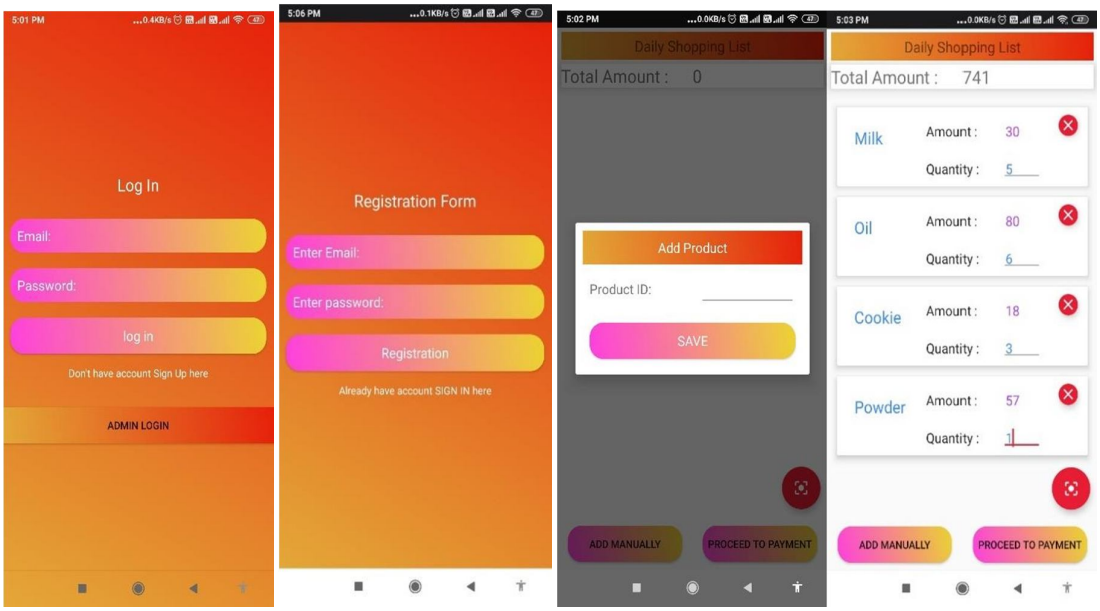

Figure 4. Login and Payment phase of the application

V. CONCLUSIONS

Few supermarkets have digital presence enabling online purchase of items but do not have applications for various instore interactions. Almost everybody owns a smart-phone with a camera which is all that is required to perform the software automation that we propose. In exchange, the speed of shopping and the convenience that the customer gets is immense. This leads to a win-win situation where the customer is happy to come back for the convenience that this system provides, and the management is happy with the customer retention they get. Additionally, the scope of the idea is immense, when used in conjunction with prediction algorithms. By keeping track of the data that the application produces, stores can use data-mining to customize the entire shopping experience to each and every individual, by means of showing the customer personalized messages based on their buying patterns. Also, it could use prediction to prompt the user to what he or she might have forgotten to purchase in the visit to the store.

Our future works are aimed at incorporating the following features into the application. A customized user interface will be provided to the app with artistic features. The app will be extended to make it compatible to serve a large number of users. In order to make the app more productive, hosting it on cloud platforms will be investigated. The app will be designed to suggest personalized offers and discounts to users based on customer shopping patterns. The app will provide more details about the items like product life history, nutritional values, items often bought together etc.

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Document details - An Optimal Energy Competent Mission based Collision Avoidance Protocol Scheme for Multi-Rotor UAV's

13th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2022

Volume 8, 1 January 2022, Pages 837-846

13th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2022; Virtual, Online; ; 27 June 2022 through 28 June 2022; Code 184560

An Optimal Energy Competent Mission based Collision Avoidance Protocol Scheme for Multi-Rotor UAV's(Conference Paper)

GraceShalini, T., Rathnamala, S.

[a]Velammal College of Engineering and Technology, India
[b]Sethu Institute of Technology, India

Abstract

Currently, with the advancement of computer control technology, unmanned aerial vehicles (UAVs) have developed greatly. In contrast to the remote manipulation used in the early stages, most UAVs can now fly autonomously. As the number of potential applications for Unmanned Aerial Vehicles (UAVs) keeps rising steadily, the chances that these devices get close to each other during their flights also increases, causing concerns regarding potential collisions. To solve the problem of intercepting a moving target by a multirotor unmanned aerial vehicle (UAV) swarm, an optimal strategy along with clustering strategy is proposed. This paper proposed the Energy Competent-Mission Based Collision Avoidance Protocol (EC-MBCAP) using Adaptive whale optimization approach. The clustering technique is carried using Gradient clustering metric based passive clustering method (GCM-PC). This optimization process is employed so as to enhance and optimize the energy in collision avoidance protocol. Experimental and simulation results demonstrated the validity and effectiveness of the proposed solution, which typically reduces the energy consumption and in turn optimizes the protocol efficiency thereby reducing the collision for each risky situation successfully handled. © Grenze Scientific Society, 2022.

Author keywords

Adaptive whale optimization | Energy Competent-Mission Based Collision Avoidance Protocol | Gradient clustering metric based passive clustering method | multirotor | unmanned aerial vehicles

Indexed keywords

Engineering controlled terms: Antennas | Cluster analysis | Energy efficiency | Energy utilization | Unmanned aerial vehicles (UAV)

Engineering uncontrolled terms: Adaptive whale optimization | Aerial vehicle | Clustering methods | Clusterings | Collisions avoidance | Energy | Energy competent-mission based collision avoidance protocol | Gradient clustering metric based passive clustering method | Multirotors | Optimisations | Passive clustering | Unmanned aerial vehicle

Engineering main heading: Collision avoidance

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Hybrid Algorithm for Resource Aware Predictive Scheduling: A case-study to Human Activity Recognition

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***Abstract*—Analyzing big stream data is a significant task for real-time high-voluminous data. Various research works have evolved to analyze those big stream data. However, state-of-the-art systems have certain limitations, such as scheduling time (ST), resource-aware predictive scheduling efficiency (RAPSE), memory consumption (MC), False positive rate (FPR), etc. This paper proposes a hybrid algorithm for predictive resource-aware scheduling to address the issues. The algorithm integrates Elastic-net regularization with Kernelized Fisher Discriminant (KDF) and Map Reduce classification process for a case study on a high volume of human activity recognition dataset. The Elastic-net regularization process selects significant features from the dataset and adds certain performance measures for efficient scheduling by the KFD process. The Map Reduce classifier classifies the data streams assigned to a respective processor by the KFD to achieve a low False positive rate. Experimentation has been validated with state-of-the-art systems using standard challenges RAPSE, MC, FPR, and ST. Results have also proven that the proposed system has certain merits in implementation over the other state-of-the-art systems in real-time human activity recognition.**

***Index Terms*—Kernelized Fisher Discriminant, Map Reduce Classification, Elastic-Net Regularization, Human Activity Recognition, Resource aware predictive scheduling efficiency.**

I. Introduction

Data has increased in the last two decades due to technical and technological advancements. Mining exciting and valuable insights from the generated data are challenging for research and industries. Technological advancements such as the Internet of Things (IoT) and smartness in all fields (Smart devices) make the process more robust and promote the growth of BigData [1]. In this era, all the research organizations and industries have a demand to implement more real-time processing algorithms to process those high volumes of continuous data [2]. It has evolved into a wide range of applications such as healthcare, trading, human activity recognition, etc. [3]. For instance, the human activity recognition (HAR) task identifies the person's activity in his/her smart home through ambient, vision systems, or wearable devices/ sensors [4]. The wearable device/ sensor generates tri-axial data for an accelerometer, gyroscope, and magnetometer to a total of 9-axis, and using those data. The activity has to be identified immediately at a shorter response time. The traditional process fails to recognize the events if the data is collected parallel from multiple sources, say two or three subjects. As the data involves human subjects, response and reporting actions constitute a significant concern, leading to severe mortality in the case of accidents such as falls [5]. To address the multi-source heterogeneous real-time data stream, computing evolves into the research [6]. Data stream computing has the facility for processing scalable data in a fast and fluctuating environment over time and unbounded space. Earlier, parallel/ distributed processing environments gained more attraction, dividing the task into pieces and processing them in parallel. However, those processes are not suitable for real-time processes such as HAR as they mainly rely on real-time static batch data processing. Several frameworks have also been incepted, such as [7]–[10]. However, their use cases are heterogeneous, simple, and different and need to be adaptable for the real-time activity recognition process.

This paper has modeled the proposed system as a directed acyclic graph (DAG) for data stream processing. Each vertex of the DAG refers to a processing unit (PU), and the edge indicates the data flow from one PU to another PU. The big data stream process handles an unbounded data stream of tuples and recognizes the activity in the shortest response time with a reasonable recognition rate. While handling the unbounded data stream, there may be specific latency, such as process and transfer latency between (PUs). The accurate modeling of the data stream and prediction of those latencies, also known as predictive scheduling accuracy, is a challenging task for the multi-source data stream that needs improvement.

Thus, to model a significant data stream process with high predictive scheduling time, accuracy, and memory consumption, this paper proposes a hybrid algorithm that integrates Elastic-net Regularization + Kernelized Fisher Discriminant process with Map reduce classification system.

The proposed system has the following three-fold contributions

- Elastic-net regularization - A regression-based method to

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correlate the relationship between the features and the target class accurately for feature selection.
- Regularization method - To reduce the overfitting of the classification model using the LASSO model.
- Map Reduce classification model - A classification model to reduce the scheduling time by utilizing the minimum resources.

Experimentation has been carried out using the human activity recognition dataset (HAR) from the UCI repository [11] for validating the resource-aware predictive scheduling efficiency (RAPSE), scheduling time (ST), False positive rate (FPR) of classification, and memory consumption (MC). The remaining section of the paper is organized as follows. Section 2 briefs the related work on big data stream computing for the human activity recognition process. Section 3 deals with the proposed hybrid algorithm, Section 4 details the experimental results and discussions, and Section 5 conclude the paper.

II. Related Works

In the last decade, various big data stream computing has been proposed, as discussed in the review paper [12]. Further, the methods, challenges, and opportunities related to scheduling in a distributed environment were discussed in [13]. To ensure fast data stream processing, [14] designed a dual-channel pipeline data processing model. However, the time complexity in predictive scheduling is challenging. Choi et al. [15] has initiated a distributed stream processing framework for IoT data, which is fast and efficient. In the meantime, Sun et al. [16] has proposed an advanced method of Elastic online scheduling framework for big data streaming applications (E-Stream) to reduce the system response time and application fairness. However, there needs to be more focus on predictive scheduling accuracy. The research work by [17] has introduced a feature selection analysis using the elastic net concept for the dataset acquired in the metallurgic company. The approach has been extended from the [18], which uses the multivariate Gaussian function to monitor the crucial variable during predictive scheduling accuracy. Similarly, [19] has focused on the limitations of the job scheduling process performed in a Hadoop environment for big data. Gautam and Basava [20] has proposed a resource-aware dynamic data stream model for the efficient high-performance computing of big data to overcome the limitations. Mortazavi-Dehkordi and Zamanifar [21] has proposed a deadline-aware scheduling framework to reduce the latency and utilization cost. This has been extended from [22] with the same objective to reduce the latency cost using a Graphic processing unit (GPU) for online data stream processing. The research work [16] also has a modified version of [22] to evolve a run time-aware data stream scheduling strategy using the first-fit process. Xu et al., [23] introduced a hybrid method by integrating genetic algorithm (GA) and ant colony optimization (ACO). A novel relative intelligent model using optimization technique was introduced by [24]. Chen et al. [25] have proposed a flexible resource-constrained project scheduling to address the scheduling process that has the facility of competency differences. However, still, certain complexity arises in managing complex data in terms of the scheduling process as reviewed by [26]. On comparing the reviews and as per the review work by [26], the dynamic scheduling of big data stream processing is challenging for real-time analysis, such as activity recognition. In addition, the significant process of handling big data with predictive scheduling has yet to be performed well in state-of-the-art works. To address this issue, this paper proposes a hybrid algorithm for Resource Aware Predictive Scheduling to address the challenges such as RAPSE, ST, FPR, and MC.

III. Proposed System

The term Big data stream refers to a high volume of data in which the streaming data must be processed for real-time insights. In this proposed work, the Big data stream has been processed using two different modules, such as feature selection, scheduling, and classification, to improvise the RAPSE, ST, and MC. The architecture of the proposed system is shown in Figure 1.

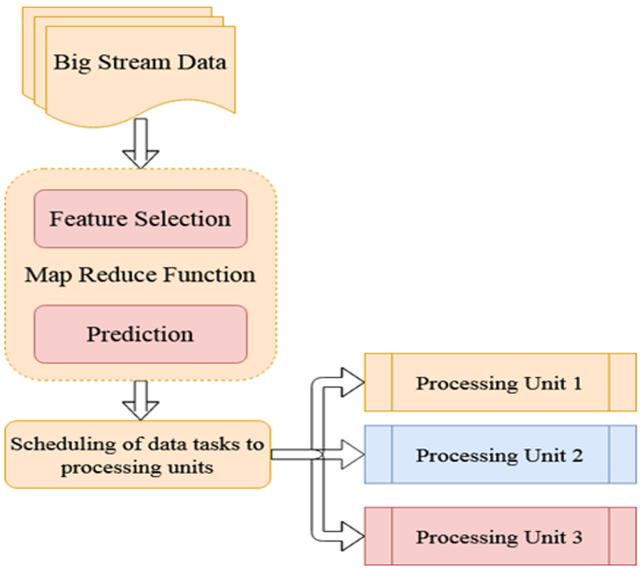

Fig. 1. Architecture of the proposed system

The input is the smartphone-based human activity dataset D_b used to recognize the HAR process. The data stream computing has m number of processing units $p_1, p_2, p_3, ...p_m$ and the number of data streams to be $ds_1, ds_2, ds_3, ...ds_n$. Initially, the elastic-net regularization process selects the relevant features from the D_b. Then the kernelized fisher process schedules the data streams to the process based on the CPU time (cpu_t), Memory Utilization (mu), Energy Consumption (E_c), and Bandwidth Utilization (bw_u). Then the selected features are classified using a map-reduce classifier in the efficient resource processing unit. The scheduled data stream task will achieve higher accuracy in the shortest response time.

A. Feature Selection

In this phase, the Elastic-Net regularization process selects the best features from the dataset D_b using a regression-based method. The method correlates the features F and the target class variable y relationship.The elastic net method overcomes overfitting and certain limitations of the LASSO method using an additional penalty function as referred to in equation 1.

$$\|\alpha\|_1 = \sum_{j=1}^{t} |\alpha_j| \tag{1}$$

The process groups a highly relevant variable by removing the redundant and irrelevant variables from the dataset D_b by integrating a regularization term α in the regression equation. The Elastic-Net Regularization process has been applied here to estimate the regularization and feature selection parameters. It is represented in the equation 2. F represents a feature set that has multiple features $F_1, F_2, F_3, \ldots . F_n$. $\|\alpha\|$ is a regularization term, L_1 and L_2 are regularization parameters that control the importance of the regularization term between $[0, 1]$. y is the class variable (expected output), and all these parameters determine the regression coefficient ρ. The features are more likely to be relevant if the ρ value is close to 1. Else, irrelevant close to 0.

$$\rho = argmin(\|y - \alpha F\|^2 + L_2\|\alpha\|^2 + L_1\|\alpha\|_1) \tag{2}$$

The elastic-net regularization process also determines the pathway for the next phase of our proposed system to schedule the particular data stream task ds_i based on the following metrics.

Performance Metrics Various performance metrics of the feature selection process that enhances the predictive scheduling are as follows.

CPU time (cpu_t) refers to the time taken to complete the data stream task sd_i also referred to completion time ct_i of a data stream task sd_i as given in equation 3.

$$cpu_t = ct_i(sd_i) \tag{3}$$

Memory Utilization mu refers to utilization of memory space (mu) by a process to complete a task. Referred as the difference in the total memory (t_m) with the unused memory space for the task (us_i) as given in equation 4.

$$mu = t_m - us_i \tag{4}$$

Energy Consumption E_c refers to the difference in the total energy T_E and the remaining energy R_E to process the task as given in equation 5.

$$E_c = T_E - R_E \tag{5}$$

Bandwidth Utilization bw_u is an average rate of data transfer of a processing unit, also referred to be the difference between available bandwidth bw_a and unused bandwidth bw_ud as given in equation 6.

$$bw_u = bw_a - bw_{ud} \tag{6}$$

Finally, the elastic-net regularization process selects the best features for each data stream task and its related performance metrics CPU time (cpu_t), Memory Utilization (mu), Energy Consumption (E_c), and Bandwidth Utilization (bw_u). For instance, the data stream task 3 ds_3 has following features and selected measures $< F_2, F_34, F_42, F_55 >, cpu_t = 0.4s, mu = 2kb, E_c = 2.6J, bw_u = 86kb$. Similarly, all the data stream tasks with the selected features and performance measures will be forwarded to Kernelized Fisher Discriminant for scheduling and, in turn, Map Reduce classifier for the classification process.

B. Scheduling and Classification

The selected features and the performance measures by the previous phase determine the best efficient computing resource to be scheduled by the Kernelized Fisher Discriminant (KFD) process. The KFD process analyzes the cpu_t, mu, E_c, bw_u with the selected feature set F for scheduling. Along with the KFD process, the Map Reduce classification has been integrated to improvise the recognition rate as a novelty of the proposed work. The Map Reduce has two phases; during the Map phase, inputs are converted into keys and values, in which the key has the performance measures determined by the elastic-net regression process. The KFD schedules the data streams based on the best measures for the best processing unit. At the same time, Reduce phase uses a discriminant vector maps the incoming data stream data into different classes.

Let us consider several data stream tasks $ds_1, ds_2, ds_3, ...ds_n$ as input, each with a set of selected features and performance measures, as mentioned before. The Fisher determines the discriminant function d_f, which is the ratio of the variance between (σ_b) and within (σ_w) the classes as defined in equation 7.

$$d_f = \sigma_b/\sigma_w = (ws_r(b)d)/(ws_b(b)d) \tag{7}$$

The Kernelized Fisher function determines the correspondence of the mean of the target class variables and the data stream tasks, and it is referred to be kernel function $k(sd_i, \mu_j)$ as given in the equation 8.

$$k(sd_i, \mu_j) = \|sd_i - \mu - j\|^2 \tag{8}$$

Then, the resultant value of the KFD process recognizes the shortest distance between the data stream task ds_i and the mean of classes μ_j as given in equation 9. The argmin signifies the minor capability contention for the classification, and the base distance determines the higher closeness among the mean of the class and data stream task. This implies that handling particular data streams improves predictive scheduling accuracy with less asset usage.

$$f(x) = argmin\|(sd_i, \mu_j)\|^2 \tag{9}$$

The algorithm for the entire process of feature selection, scheduling and classification is given here.

Input: Number of data stream task $ds_1, ds_2, ds_3, ...ds_n$, processing units $p_1, p_2, p_3, ...p_n$, Feature set F

Output: Scheduling of data stream task with low asset and high classification performance

Feature Selection:

$\rho = argmin(\|y - \alpha F\|^2 + L_2\|\alpha\|^2 + L_1\|\alpha\|_1)$
for each F w.r.t to ρ where $\rho > 0.5$ **do**
  calculate cpu_t, mu, E_c, bw_u
end for

Scheduling and Classification:

Initialize the classes C_j
Frame the Discriminant function $d_f = \sigma_b/\sigma_w = (ws_r(b)d)/(ws_b(b)d)$
Define mean of classes μ_j
for each data stream ds_i **do**
  for each μ of the class μ_j **do**
    Calculate the similarity $k(sd_i, \mu_j) = \|sd_i - \mu - j\|^2$
    Notice minimum distance $f(x) = argmin\|(sd_i, \mu_j)\|^2$
    Predict the best efficient resource p_i on $f(x)$ for ds_i
    Use Map - Reduce for classification
  end for
end for
return

IV. Experimental Results and Discussions

The significance of the proposed system Elastic-Net regularization + Kernelized Fisher Discriminant + Map Reduce Classification is validated using the Human Activity and Postural Transition (HAPT) dataset. The dataset was recorded with a group of 30 volunteers aged 19-48 years. They performed six different activities categorized into static and dynamic activities. Static activities are simple, whereas dynamic activities are little-bit complex (referred to as movement). The experimentation also includes postural transitions, an intermediate action between the dynamic activity. Twelve activities were grouped and given with the target class labels such as 1-standing, 2-sitting, 3lying, 4-walking downstairs, 5-walking upstairs, 6-walking, 7-stand-to-sit, 8-sit-to-stand, 9-sit-to-lie, 10-lie-to-sit, 11-stand-to-lie, and 12-lie-to-stand. The participants wore a Samsung Galaxy S II smartphone on the waist during experimentation. The dataset captures tri-axial linear acceleration and angular velocity at a constant rate of 50Hz. The signals were pre-processed by a noise filter and sampled into a fixed-width sliding window of 2.56sec and 50% overlap (128 recordings/window). Each window contains 128 readings/windows representing nine recordings axes (9*128). For each window, 561 features of 12 different classes will be generated, which has been considered here for experimentation purposes. A total of 10929 tuples have been generated from the HAPT Dataset, in which 70% is used for training, and the remaining 30% is used for testing.

The experimentation has been carried out against state-of-the-art systems such as deadline-aware scheduling (DAS) [21], Scheduling optimization (SO) [25], E-stream [16] and Predictive scheduling framework (PSF) [14]. The Performance of the proposed system has been analyzed using the performance metrics such as RAPSE, FPR on predictive analytics, ST, and MC of N number of data stream tasks ds_i. The data stream tasks refer to tuples in the HAPT dataset. For instance, 500 tasks refer to 500 tuples taken from the test instance and the like. The data tasks have been varied from 200 to 3500 tasks for experimentation purposes. The experimentation has been carried out in multiple Virtual machines of a system for scheduling tasks to the local VMs.

A. Resource Aware Predictive Scheduling Efficiency (RAPSE)

RAPSE is a number of data stream tasks ds_N scheduled to Resource aware Optimized Processing Unit $RAOPU_i$, which is represented in the equation 10.

$$RAPSE = RAOPU_i/ds_N * 100 \tag{10}$$

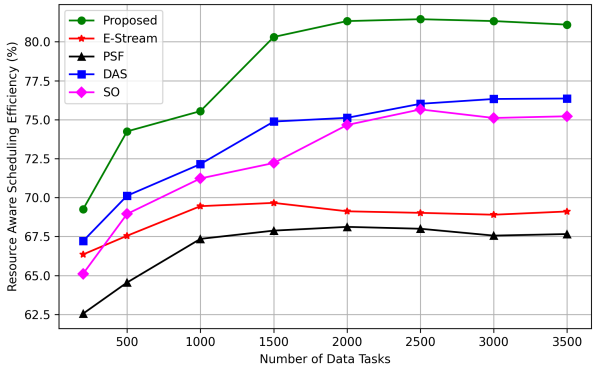

Fig. 2. Resource aware scheduling efficiency (%) of the proposed system with state-of-the-art systems

Figure 2 illustrates the performance of the proposed system with the state-of-the-art systems on resource-aware scheduling efficiency. Increase in the number of data tasks from 200 to 3500, the graph has a linear trend in the saturation level and saturates for many data tasks. On comparing the efficiency, the proposed system attains a better efficiency rate in all data tasks than the state-of-the-art systems. The resource-aware scheduling efficiency using the proposed system has shown better trends due to the application of Elastic-Net kernelized + Fisher discriminant + Map Reduce classification algorithm. The proposed system has a 10% to 12% variance and improvement in resource-aware scheduling efficiency than the other systems.

B. False Positive Rate (FPR)

FPR is the ratio of a number of incorrectly scheduled tasks $RAPU_Incorrect$ to the number of data tasks as given in the equation 11. Lower the FPR ensures the competency of the technique. The term $RAPU_Incorrect$ has also been

determined using the incorrectly classified instance of the feature set concerning the class in the Map-Reduce classification process.

$$FPR = RAOPU_{incorrect}/N * 100 \tag{11}$$

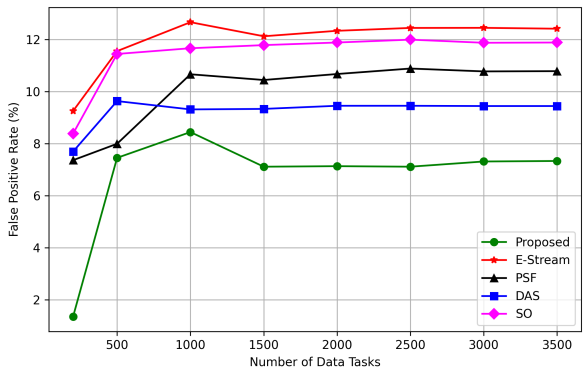

Fig. 3. Performance of proposed system as False Positive Rate (%)against state-of-the-art systems

Figure 3 illustrates the efficiency of the FPR of the proposed system with state-of-the-art systems. The number of data stream tasks increases the FPR of all the systems. On comparing, the proposed system has less FPR than the other state-of-the-art systems such as DAS [21], SO [25], E-stream [16] and PSF [14]. Moreover, the proposed system attains the very least FPR of 2% to 6%, which is meager in good classification performance. This proves the efficiency of using the Fisher Discriminant process for scheduling and the Map-reduce process for classification. On average, the proposed system differs from 3% to 5% in the FPR with the other systems.

C. Scheduling Time (ST)

ST is the time utilized in scheduling the resources for the N number of data streams ds_N, and it is calculated using the equation 12, where $Time[RAPS]$ is the time lasted for scheduled data tasks in milliseconds (ms).

$$ST = ds_N * Time[RAPS] \tag{12}$$

Figure 4 illustrates the Performance of the proposed system in terms of scheduling time (ST) against the state-of-the-art systems. On comparing the Performance of scheduling time from Figure 4, it is evident that the proposed system consumes less time in allocating the resources to the system. The variation in the trend of the proposed system depicts the efficiency of the proposed system with the state-of-the-art systems DAS [21], SO [25], E-stream [16] and PSF [14]. The Performance in scheduling time has improved mainly due to the feature selection by the Elastic-net regularization process. On average, the proposed system has 8% less scheduling time than the other systems.

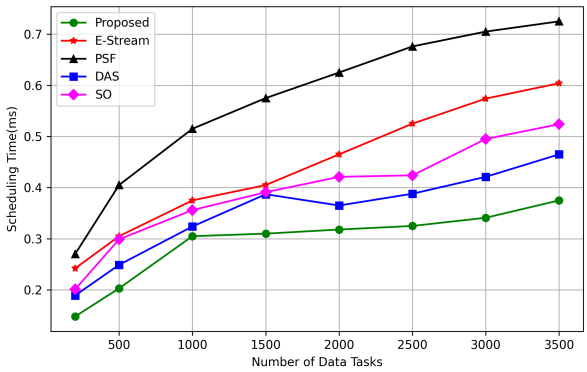

Fig. 4. Performance of proposed system in terms of Scheduling Time against state-of-the-art systems

D. Memory Utilization (MU)

MU is the memory utilized to schedule a resource for a single data stream task ds_i. It is formulated as given in equation 13, where space[RAPS] is for a single data in a resource-aware manner and calculated in terms of Kilobytes(Kb).

$$MU = ds_i * N * Space[RAPS] \tag{13}$$

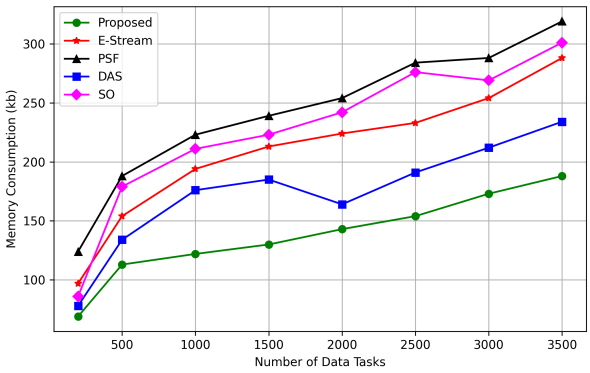

Fig. 5. Performance of the proposed system in terms of Memory consumption against state-of-the-art systems

Figure 5 illustrates the memory consumption of the proposed system for various data stream tasks. With the expansion in the number of data streams, the memory utilization consumes more memory because of the expansion in the size of information errands. However, Figure 5 clearly shows that the proposed system has a decrease in linear difference with the state-of-the-art systems such as DAS [21], SO [25], E-stream [16] and PSF [14]. Though the other systems have a sudden rise in memory consumption, the proposed system has a linear increase in memory consumption on the rise in the count of data tasks. On average, the proposed system has taken 8% memory less than the other state-of-the-art systems due to using the LASSO technique with penalty functions.

V. Conclusion

This paper presents a hybrid algorithm Elastic-Net regularization + Kernelized Fisher Discriminate + Map Reduce Classification strategy to classify a high volume of data streams in a predictive scheduled process. The Elastic-Net regularization process selects essential and relevant features to guarantee predictive scheduling efficiency at a low cost. Moreover, certain necessary performance measures also included features by the Elastic-net regularization process. The performance measures and the best-selected features are then used to predict the best computing process for scheduling by a Kernelized Fisher Discriminant process. Finally, the Map-reduce classifier classifies all the instances at its reduce phase on the scheduled processor. For experimentation, the smartphone-based human activity and postural transition (HAPT) dataset has been used with a large volume of data on a local virtual machine for scheduling. Experimentation results are validated using Resource Aware Predictive Scheduling Efficiency (RAPSE), False Positive Rate (FPR), Scheduling Time (ST), and Memory Utilization (MU). Results are signified by comparing with state-of-the-art systems such as deadline-aware scheduling (DAS), Scheduling optimization (SO), E-stream, and Predictive scheduling framework (PSF). In the future, the heterogeneous multi-variate model will be implemented for the human activity recognition task.

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Hourly Journal: A Mobile App for Optimizing Your Daily Routines

S Sureshkumar ; S Suryavarshini ; P. Chellammal ; K R. Senthil Murugan ; P. Kavitha Rani ; R Kaviyaraj **All Authors**

Abstract: There are certain apps to record how people spent their day and whether they lived the day as per their goals. But these only make people feel guilty for having wasted th... **View more**

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There are certain apps to record how people spent their day and whether they lived the day as per their goals. But these only make people feel guilty for having wasted the day or happy on being productive, but no app shows what is the pattern for success and failure. But with Hourly Journal it is possible to understand the pattern of daily time investments and fix it, empower it and grow in life overall. Mobile application development is becoming more popular due to the expanding popularity of smartphones and tablets. Traditional software development has had a significant influence on the development of mobile apps. However, the ultimate product is software designed to take use of mobile devices' specific capabilities and technology. To solve the problem of performance on each specific device, you must first design an app for that device. This implies writing code that is tailored to the exact hardware of a certain device. In the case of iOS devices, this is simple since mobile developers simply need to create apps for the iPhone and iPad to make their apps universally usable. For Android devices, on the other hand, the hardware and operating system versions vary from device to device. With the Hourly Journal available in the palm of your hand, people can use it as a modern-day diary, with revolutionary futuristic insights into the patterns of people's activities and tendencies. Based on tag tracking there is scope for human behavioral prediction in future too.

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IEEE MADRAS SECTION

IEEE COMPUTER SOCIETY

Bio-Inspired Optimization Technique for Feature Selection to Enhance Accuracy of BC Detection

Publisher: IEEE

V. Kalaiyarasi ; Meenakshi ; Sanjay Jain ; Shagun Jain ; Umapriya R ; Sarala R ; M.Siva Ramkumar **All Authors**

Abstract: The common type of cancer that results in death across the world is Breast Cancer (BC). It is necessary to detect cancer in its earlier stages when it is more treatable a... **View more**

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Abstract:
The common type of cancer that results in death across the world is Breast Cancer (BC). It is necessary to detect cancer in its earlier stages when it is more treatable and can be effectively managed The detection of BC can be carried out by employing a variety of different Machine Learning (ML) approaches in the diagnostic process. This study proposes a ML-based strategy for doing automated BC analysis. There are several steps in tumor detection, and feature extraction (FE) is one of them. The tumor condition's existence in an image can be determined using the powerful Gray Level Co-occurrence Matrix (GLCM) feature descriptor identification approach, in addition to the Ant Colony Optimization (ACO) and Particle Swarm Optimization (PSO) Feature Selection (FS) techniques are employed Techniques from the realm of ML, such as Support Vector Machine (SVM), Naive Bayes (NB), and Random Forest (RF) algorithm, are used throughout the data training and testing phases for tumor classification. The outcome of both optimized FS techniques is given to the ML models for identifying BC. From the experimental result, it is identified that the ACO with SVM gives greater accuracy of 97.4% than all other techniques.

Published in: 2023 International Conference on Inventive Computation Technologies (ICICT)

Date of Conference: 26-28 April 2023

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ISSN Information:

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Contents

According to the Centres for Disease Control and Prevention (CDC) Reliable Source, BC is the most common malignancy among women. Numerous factors contribute to the wide variation of BC survival rates. The type of cancer a woman is diagnosed with, as well as its progression at the time of diagnosis, are two of the most important factors. BC occurs when abnormal cells grow in the breast. BC usually starts in one of two places: the lobules or the ducts. Adipose tissue and fibrous connective tissue in your breasts are both possible cancer locations. Unchecked cancer cells may spread to the lymph nodes and muscles of the chest wall. BC occurs when cells in the breast grow abnormally and subsequently metastasize (spread to other areas of the body) at a rate comparable to Meta Size, according to medical authorities. That is why it is critical to detect and stop the growth of these aberrant cells as soon as possible to avoid the repercussions of the next phase. When a tumor is suspected, a doctor will first establish if it is benign or malignant. This is because each type of tumor requires a unique technique to deal with and avoid. While benign cells cannot become malignant and spread to other organs, Significant Cells can Reading is a severe public health problem because there is currently no viable early detection technology that can assist patients to begin therapy sooner rather than later to slow the spread of malignant cells and tumor. Most diseases can be healed with the correct amount of human involvement if detected early. In most situations, sickness lies undiscovered for a long time before being recognized as chronic. Mortality rates are rising, as a result, throughout the world. BC is one of the diseases that can be cured if diagnosed early before it has spread to distant organs. As a result, in the absence of prognosis models, practitioners have a more difficult time devising a treatment approach that could potentially enhance a patient's lifespan. As a result, it requires time and effort to create a strategy that produces minimum mistakes while still maximizing precision. Because conventional BC detection procedures such as mammography, ultrasound, and biopsy are time-consuming, a computerized diagnostic system based on ML was necessary. This method employs algorithms that accelerate and improve cell detection and tumor categorization.

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2021 7th International Conference on Computer and Communications (ICCC)
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Conference Chair

Principal

Model-based Controller Design for Automatic Two Wheeled Self Balancing Robot

Publisher: IEEE

V. M. Senthilkumar ; M.Siva Ramkumar ; P Velrajkumar ; T Kamalavalli ; V G Pratheep ; Kavitha S ; M. Sivaramkrishnan All Authors

Abstract: Autonomous mobile robots have been employed successfully for a variety of purposes throughout the past decade. Self-balancing robots (SBR) have recently received increasi... **View more**

Metadata

Abstract:
Autonomous mobile robots have been employed successfully for a variety of purposes throughout the past decade. Self-balancing robots (SBR) have recently received increasing attention and demonstrated outstanding performance. Several scenarios, such as robotics weaponry, inverted pendulums, bicycles, and rocket launchers, make substantial use of the mechanics of the two-wheeled self-balancing robot (TWSBR). This structure will stay unstable if a trustworthy means of control is not implemented. The dynamic structure of TWSBR exhibits extremely nonlinear behaviour. The primary goal of this study is to stabilize the TWSBR by transferring the signal from the controller's output to the robot's chassis. The TWSBR mathematical model is first derived using Newton's principles. Second, a Model Predictive Controller (MPC) is developed and put into place to ensure that the TWSBR remains stable even in the presence of external disturbance. Finally, the performance of MPC is evaluated on TWSBR in self-balancing against that of a traditional Proportional Integral Derivative (PID) controller. The optimal controller for TWSBR control is then identified and put into practice in real-time.

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Contents

A gadget that works on the idea of an inverted pendulum is known as an SBR. Its upright body pivots on two wheels, giving it the appearance of swinging back and forth. the system is incapable of being balanced and will continue to fall off if a suitable control technique is not implemented. Because of this, the system is intrinsically unstable, and the fact that it is nonlinear makes it difficult to manage. Consequently, the field of control engineering is faced with a challenging problem as a result [1]. As a prototypical illustration of nonlinear control problem, the SBR system is an unstable, high-order, multivariable, tightly coupled, and underactuated system It also has several variables. The well-established benchmark challenge is to assess certain control theories or a standard solution for an SBR system; as a result, new theories are being pushed forward. SBR has a design that is comparable to that of a missile or rocket launcher. This is because the centre of gravity of these robots is situated behind the centre of drag, which results in aerodynamic instability.

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Hybrid Deep Learning Model for Cyber-Attack Detection

M. Premkumar ; R Lakshmi ; P. Velrajkumar ; S.Gayathri Priya ; Rama Chaithanya Tanguturi ; S Murali ; M. Sivaramkrishnan **All Authors**

Abstract: Better detection and avoidance of intrusions solutions are in high demand because of the worldwide upsurge in hacking on computer networks. New technologies like fog comp... **View more**

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Abstract:
Better detection and avoidance of intrusions solutions are in high demand because of the worldwide upsurge in hacking on computer networks. New technologies like fog computing, cloud computing, and the Internet of Things have dramatically increased the potential for cyberattacks and other forms of cyber risk. These attacks can compromise computer network infrastructures, web services, and social media platforms, resulting in economic and reputation loss. Because of its usefulness in detecting and halting malicious actions, intrusion detection systems (IDS) play a crucial part in network defence mechanisms. In this study, a hybrid Deep Learning (DL) network was used to identify the cyberattack. This effort began with the collection and processing of cyber-attack data from the NSL-KDD. Convolutional Neural Networks (CNNs), Bidirectional Long Short-Term Memory (Bi-LS TMs), and hybrid CNN+Bi-LSTMs are the DL models trained with 80% of processed data. The remaining 20% of the data is used for testing the models after they have been trained. Both positive and negative metrics are used to assess the results of the testing phase. When compared to other networks, the recommended CNN+Bi-LSTM model achieves the highest score for positive metrics and the lowest score for negative metrics.

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Contents

Both political and commercial players have increased their use of advanced cyber-attack to destroy, interrupt, or suppress information content. When developing network protocols, it is critical to ensure that they will withstand attacks from even highly sophisticated adversaries capable of taking over a small fraction of nodes. The controlled party can launch both passive and offensive attacks. Identifying intrusions into a computer system or network entails constantly monitoring what is going on behind the scenes, analysing data for signs of an assault, and preventing it if required. Automated data gathering from several system and network sources, followed by security defect analysis, is a frequent way for accomplishing this goal.

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Title of the paper : STUDENTS SECURITY SYSTEM USING RFID

Author(s) : Dr. V. AKILANDESWARI

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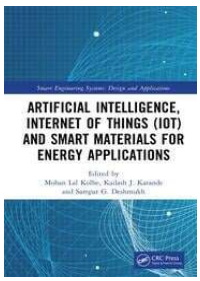

Fuzzy-Inspired Three-Dimensional DWT and GLCM Framework for Pixel Characterization of Hyperspectral Images

By K. Kavitha (/search?contributorName=K. Kavitha&contributorRole=author&redirectFromPDP=true&context=ubx), D. Sharmila Banu (/search?contributorName=D. Sharmila Banu&contributorRole=author&redirectFromPDP=true&context=ubx)

Book Artificial Intelligence, Internet of Things (IoT) and Smart Materials for Energy Applications (https://www.taylorfrancis.com/books/mono/10.1201/9781003220176/artificial-intelligence-internet-things-iot-smart-materials-energy-applications?refId=72779e24-e1bc-42ae-a61b-07a32edd4108&context=ubx)

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ABSTRACT

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Frequency Tunability Inspired Flexible Antenna to Mitigate Deformation Eff

Publisher: IEEE

V. Thambiraja ; T. Sabapathy ; M.N. Osman ; M. I. Jais ; M. Jusoh ; K. Kavitha **All Authors**

Abstract: This paper presents a new approach to mitigating resonant frequency shift for deformed flexib
Deformation or bending adversely affects the antenna resonant fr... **View more**

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Abstract:
This paper presents a new approach to mitigating resonant frequency shift for deformed flexible antenna
or bending adversely affects the antenna resonant frequency and this magnitude of the frequency shift d
on key factors such as the material used and the antenna structure. The frequency reconfiguration conc
with two proof of concept switches to investigate the effectiveness of the proposed method to shift back
to its original resonant. The antenna was first designed to operate at 2.48 GHz frequency. Utilizing the fr
reconfiguration, the antenna can be re-tuned to 2.48 GHz even under bending conditions.

Published in: 2022 IEEE MTT-S International Microwave Workshop Series on Advanced Materials and
RF and THz Applications (IMWS-AMP)

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▸ Funding Agency:

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Contents

In past decade, antenna design has been actively researched specifically using flexible materials. Flexible antenna designs have been developed for various applications such as smart helmet [1], breast cancer detection [2] and body-centric communication [3]. One of the main aspect analyzed in wearable or flexible antenna is deformation analysis [4]–[7].

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Development of a cost effective antenna radiation pattern measurement setup
2016 16th Mediterranean Microwave Symposium (MMS)
Published: 2016

A novel technique for the approximation of 3-D antenna radiation patterns
IEEE Transactions on Antennas and Propagation
Published: 2005

Design of Compact Frequency Reconfigurable Antenna for Sub-6 GHz 5G Application

Publisher: IEEE

K. Karthika ; K. Kavitha ; A. Aparna ; A. Divona Mary ; N. Rithanya **All Authors**

Abstract: The frequency reconfigurable antenna presented in this paper resonates at eight distinct frequ according to the switching state. The designed antenna's size is 26×2... **View more**

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Abstract:

The frequency reconfigurable antenna presented in this paper resonates at eight distinct frequencies ac switching state. The designed antenna's size is 26×28×1.6 mm ^{3} . Multiple resonant is achieved by attac patches of different lengths. To accomplish reconfigurability, the design employs three PIN diodes (S1, S the OFF condition of all the switches, the designed structure resonates at 3.5 GHz. The antenna resona frequencies (2.8 and 5.9 GHz / 2.4 and 3.5 GHz / 3.4 and 4.7 GHz) when any one of the switches S1, S turned ON. The structure resonates at two or three frequencies (2.9 and 5.2 GHz / 2.4, 3.5 and 4.7 GHz 5.9 GHz) if any two switches (S1,S2 / S2,S3 / S1,S3) are turned ON. When all the three switches are tu structure resonates at 2.9, 4.7 and 5.2 GHz. Hence the proposed structure supports different 5G bands, WiMAX applications. The proposed structure offers good return loss in all the resonating frequencies. Fu structure is exhibiting acceptable performance in terms of gain, directivity and VSWR.

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Publisher: IEEE

Conference Location: Coimbatore, India

Contents

Most of the communication that takes on around us requires the use of an antenna. It uses electromagnetic waves for both transmitting and receiving. They are classified into many types based on their function and shape. Each antenna is designed to perform the task according to the application and has its own set of advantages and disadvantages. Microstrip patch antenna is the most used antenna in modern era of wireless communication. These antennas are fabricated using photolithographic techniques on a printed circuit board. This antenna consists of dielectric substrate, patch and ground plane. Mostly used substrates are FR4 glass epoxy [1]–[2], Bakelite, Rogers RT 5880 [3], Taconic TLC etc., Rectangular [4], square and circular are some of the common shapes of patch antenna. These antennas are only capable of operating on one frequency. To achieve multiple bands, slots are introduced in the patch or slotted ground plane is widely used [5]. They are very compact in size. Though such antenna exhibits multiple frequencies through a single radiating structure, they cannot tune / switch their frequency according to the end user demand. This can be accomplished by reconfigurable antenna.

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Frequency Reconfigurable Antenna and its Switching Techniques for Wirel Communication Systems: A Study

Publisher: IEEE

Abstract: In wireless communication, antenna plays a vital role in establishing an effective communicati antennas are needed for various applications. This made the an... **View more**

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Abstract:
In wireless communication, antenna plays a vital role in establishing an effective communication. Numbe are needed for various applications. This made the antenna researchers to contribute towards the desig antennas to perform according to the user's need. These adaptive antennas are also known as reconfig antennas. The reconfigurable antennas have the capacity of dynamically resonating in different frequen its radiation pattern and polarization. This paper explores about the design aspects of frequency reconfi antennas via various switching techniques. Hence this paper will help the antenna researchers to explor research techniques and scopes to design an effective frequency reconfigurable antenna.

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INSPEC Accession Number: 22480928

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Publisher: IEEE

Conference Location: Coimbatore, India

Contents

Development in a wireless communication increases the demand for an antenna. For various uses, antennas are designed to work at a given frequency. For a variety of applications, numerous antennas are required. As the number of antennas rises, cost along with the complexity of the system also increases rapidly. Multiple antennas in communication system are reduced by using reconfigurability in antenna design. A reconfigurable antenna can change its frequency, polarization, and radiation pattern. Switching mechanisms can be used to achieve any type of reconfigurability. Generally, in any sort of reconfigurable antenna, switches are used to attach or detach a part of the antenna to attain desired radiation characteristics.

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Proceedings International Radar Conference
Published: 1995

Low side lobe level synthesis for linear faceted adaptive antenna arrays
2012 Loughborough Antennas & Propagation Conference (LAPC)
Published: 2012

Design of Metamaterial Inspired Antenna Using Machine Learning and Optimization Techniques

Publisher: IEEE

R. Gowri Manohari ; K. Kavitha ; R. Arun All Authors

Abstract: Now-a-days, the antenna design process is facing challenges and it involves compromise betw structure including dimensions and overall performance parameters s... **View more**

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Abstract:

Now-a-days, the antenna design process is facing challenges and it involves compromise between ante including dimensions and overall performance parameters such as Gain, Bandwidth, Return Loss, and V Standing Wave Ratio (VSWR). Most of the antennas are designed by using optimization methods which antenna size reduction, but the overall performance optimization of antenna is not much focused. Becau many different contradictory performance requirements are difficult in antenna optimization. Hence, this the formulation of a better objective function for satisfying different performance requirements of a meta antenna. In this work, an antenna model is developed using Artificial Neural Network (ANN) and optimiz same is done by using suitable objective function for the antenna model. To analyze the right choice of o function four different single objective functions with constraints are formulated and its effectiveness has explored. Further, the popular Evolutionary Algorithm Particle Swarm optimization (PSO) method is emp optimize the ANN based metamaterial antenna parameters. The minimizing objective function with cons better results compared to maximizing objective function. Also, it is inferred that more than one performa requirements can be specified as constraints. This kind of optimization helps to satisfy the overall perfor antenna.

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Plant pathogens are a prominent cause of reduced yields, resulting in decreased crop yields. Scientists develop a mechanism for identifying plant ailments in order to boost farm output. Deep learning algorithm developed for pathogen recognition and prediction in tomato plant leaves. Two different types of disease healthy and sick leaves. A Convolution Neural Network, which is effective for detection and prediction ba to forecast Septoria spot and bacterial spot. A dataset of 4930 images of healthy and damaged leaves fr community is used for the experiments. The model's performance is precisely evaluated, and the conclu accurate. The project makes use of Plant Village images of tomato, potato, and onion leaves. Four differ can each be recognized by the suggested CNNs. In each instance, the trained model achieves accuracy 98.3%, and 97.89%. The classification of leaf disease detection using simulation data shows the potenti of the proposed approach. The algorithm proposed can be applied to categories any additional species to Tamil Nadu. Self Help Groups (SHGs), which are found in each and every village in India, will be utiliz information on how farmers see themselves. The observations and ameliorate both will be communicate SHGs. Because of its high success rate, the model is a good tool for counselling or early warning.

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I. Introduction

Images are the most widely used and practical method of communicating or sharing information. An image is said to represent a variety of phrases. Pictures provide unequivocal and unambiguous insights regarding object positioning, configurations, and interconnectedness. They represent information that we identify as items in geographical data. Because of our innate visual processing capabilities, humans are adept with extracting the information from such image data. Approximately 75% of the information that the human brain gets is in the form of visuals. To maintain rice plant productivity, it is essential to recognize indications of diseases in plants brought on by bacteria, nematodes, fungi, phytoplasma, and viruses1-4. The lack of plant pathologists in many regions of India, however, is really a serious issue. The vast plantation area presents additional difficulties due to logistical difficulties when reaching these locations, making it challenging to obtain pathogen indication. In the Solanaceae family, potatoes are perennial herbaceous plants that are grown for their delectable tubers. A branching stem and alternately positioned leaflets of various sizes and structures define the potato plant. The leaves might be round or oblong and 10-30 cm (4-12 in) long and 5-15 cm (2-6 in) broad. The potato plant produces yellow-green fruit and white or blue blooms. Potato tubers are found in the top 25 cm of the soil, where they grow underground. Depending on the cultivar, the tubers may be red, yellow, or purple in color. Potato plants can grow to be more than 1 m (3.3 ft) tall and are planted as annuals with only one growth season. A Liliaceae herbaceous biennial prized for its delectable bulb is Allium cape. The pseudo stem of the plant is made up of tubular leaves that cross over their sheaths, and its base is a flattened disc. Each plant contains 3–8 erect or oblique leaves. The onion plant's tendrils resist clusters of pink or white flowers. Overlapping leaves that develop just above the plant's flattened stem are what make up the bulbs. The bulb has numerous layers, each of which corresponds to a leaf. They grow in clusters of 3-18 per plant and are normally oval in shape, but this can vary. A membrane that eventually transforms into a paper coat covers the bulb in order to protect it. Onion plants [2] grow to a height of 50 cm (20 in) and are harvested after one season. Onion cultivars include shallots, spring onions (sometimes called scallions), red and purple onions, and shallots.

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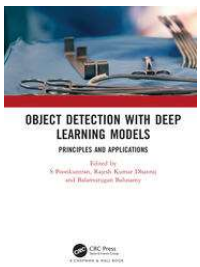

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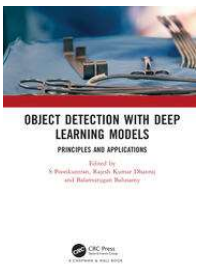

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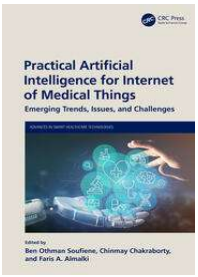

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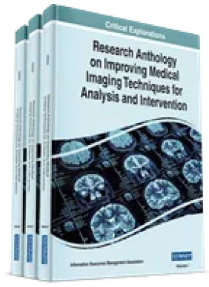

A Comparative Study of Medical Image Retrieval Using Distance, Transform, Texture, and Shape

A. Swarnambiga (/affiliate/a-swarnambiga/331547/), Vasuki S.

Source Title: Research Anthology on Improving Medical Imaging Techniques for Analysis and Intervention (/book/research-anthology-improving-medical-imaging/308672)

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Abstract

Content-based medical image retrieval (CBMIR) is the application of computer vision techniques to the problem of medical image search in large databases. Three main techniques are applied to check the applicability. The first technique implemented is distance metrics-based retrieval. The second technique implemented is transform-based retrieval. The transform which has lesser performance is combined with higher performance, to check the applicability of the results. The third technique implemented is content-based medical image retrieval. Texture and shape-based retrieval techniques are also applied. Shape-based retrieval is processed using canny edge with the Otsu method. The multifeature-based technique is also applied and analyzed. The best retrieval rate is achieved by multifeature-based retrieval with 100/50%. Based on more relevant retrieved images all the three, brain, liver, and knee, images are found to be retrieved more with 100/50%.

Chapter Preview

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Related Work

Although image retrieval have been frequently proposed for use in medical image management, only a few systems have been developed specifically for medical images Manjunath (1996); Shyu (1999); Smelders (2000); Shao Hong (2005); Dimitrovski (2015) and Van kitanovski (2017). Techniques applied for huge image based databases for exact clinical diagnosis with medical justification in this research is provided. A brief survey is given in Table 1.

Table 1. Brief summary of the image feature descriptors used in medical domain

S. No.	Year	Author	Title of the Paper	Comments
1	1999	Comaniciu D	Image guided decision support system for pathology	(a) Representation by color. (b)Using histogram.
2	2003	Gletsos M	A computer aided diagnostic system to characterize CT focal liver lesions: design and optimization of a neural network classifier	(a) Representation by gray scale. (b) Moments based.
3	1999	Shyu C R	ASSERT: A physician in the loop content based image retrieval system for HRCT image databases.	(a) Representation by gray scale (b) Texture Co-occurrence
4	2002	Kwak D.M	Content-based ultrasound image retrieval using a coarse to fine approach	(a) Representation by gray scale (b) Wavelet based
5	2005	Cauvin JM	Computer-assisted diagnosis system in digestive endoscopy	(a) Anatomic location, shape and color are the descriptors used (b) Block based
6	2007	Rahman M	A framework for medical image retrieval using machine learning and statistical similarity matching techniques with relevance feedback.	(a) Using edge histograms (b)By contours/curves
7	2000	Wang J Z	Pathfinder: multiresolution region –based searching for pathology images using IRM.	(a) By region and parts (b) By wavelet based region descriptors
8	2005	Pokrajac D	Applying spatial distribution analysis techniques to classification of 3-D medical images.	(a) By region and parts (b)Spatial distribution of ROI.

9	2007	Toews M	A statistical parts-based model of anatomical variability.	(a) By region and parts (b) By statistical anatomical parts model
10	2005	Qian X N	Optimal embedding for shape indexing in medical image databases.	(a) By point sets (b) By shape spaces

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Automatic Detection of Irritable Bowel Syndrome for 3D Images Using Supervoxel and Graph Cut Algorithm (/chapter/automatic-detection-of-irritable-bowel-syndrome-for-3d-images-using-supervoxel-and-graph-cut-algorithm/315046) (pages 176-189)

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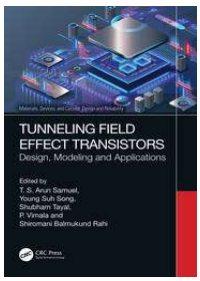

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Improvement of a Conflict Prediction Model on Highways using Deep Lear

Chitaranjan Dalai ; P Manoj ; M. Beulah Viji Christiana ; K. Karthik ; R Sathishkannan ; Vikas Rathi ; A. Rajendra Prasad All Authors

Abstract: Artificial intelligence has 3 high-priority fields of study: language processing, speech, and mac growing need for evolution associated with process autom... **View more**

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Abstract:

Artificial intelligence has 3 high-priority fields of study: language processing, speech, and machine visio need for evolution associated with process automation requires increasingly effective and innovative sol replication capabilities. Artificial vision particularly has the ability to be applied within a wide range of pro its maximum utility in tasks of detection, identification and tracking of objects. The application of solution technology to traffic analysis proposes highly flexible processing tools with a virtually zero degree of intr nature of the process. Reverse engineering procedures and the application of specialized algorithms all development of systems for the study of a problem closely related to the development of cities. Obtainin as the flow of vehicles that circulate on a highway is an essential requirement for the planning or readjus works. Thus, the importance of systems based on artificial vision that allow this type of analysis is denot paper, a vehicle tracking algorithm is developed to determine the trajectory described, tracking time and of the same. In addition, a vehicle counting algorithm is developed to determine the flow of different type captured in the study frames. Also, for validation of operability and repeatability of the developed algorit established. Implement a program based on OpenCV - C++ for the analysis of vehicular traffic in offline

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1. Introduction

In recent years, object detection has become a significant field of computer vision. Computer Vision systems are increasingly present in our daily lives, whether in autonomous vehicles, industrial robots or hospital equipment capable of automatically diagnosing diseases in imaging exams, allowing machines to see the world around us. back, managing to automate and solve several problems [1]–[2]. According to [3], several real-world computer vision applications require accurate detection of objects in images and video. One of these applications is the recognition of traffic signs, in which the algorithms need to deal with natural dynamic environments, thus becoming complex, high precision demands and real time constraints [4]. A conflict prediction model on highways through deep learning involves training a machine learning algorithm to predict the likelihood of conflicts or accidents occurring on a highway based on various inputs such as traffic flow, weather conditions, road layout, and driver behavior. Deep learning is a type of machine learning that uses neural networks with multiple layers to process complex data and extract patterns. Deep learning has been successfully applied to various prediction tasks, including natural language processing, image recognition, and time series analysis [5]–[7]. To develop a conflict prediction model on highways through deep learning, researchers can use historical data on accidents and near-misses to train a neural network. The neural network can be designed to take inputs such as traffic volume, speed, lane changes, braking patterns, and weather conditions, and output a probability of conflict or accident occurring at a given time and location on the highway.

Researchers can use various deep learning architectures, such as convolutional neural networks (CNNs) or recurrent neural networks (RNNs), to build the conflict prediction model. The neural network can be trained using backpropagation and gradient descent algorithms to minimize the prediction error and improve the accuracy of the model. Once the conflict prediction model is trained, it can be deployed in a real-time monitoring system to detect potential conflicts or accidents on the highway. The systemcan generate alerts to drivers, traffic controllers, or emergency services to take appropriate actions to prevent accidents [8]–[9]. Overall, developing a conflict prediction model on highways through deep learning can improve the safety and efficiency of highway systems by providing early warning of potential conflicts or accidents and enabling proactive interventions to prevent them. Highway traffic conflicts are a major concern for road safety, and predicting potential conflicts can help prevent accidents and improve traffic flow. Deep learning techniques have shown promise in predicting traffic conflicts, and several studies have proposed models for conflict prediction on highways. One example is a study that proposed a deep neural network model for predicting lane-changing conflicts on highways [10]. The model used a combination of convolutional and recurrent neural networks to extract features from vehicle trajectories and predict the likelihood of lane-changing conflicts. Another study proposed a recurrent neural network model for predicting rear-end collisions on highways [11]–[12]. The model used a combination of vehicle trajectory data and contextual information, such as weather and traffic conditions, to predict the likelihood of rear-end collisions. Other studies have proposed similar models for predicting other types of conflicts, such as merging conflicts and cut-in attacks. Overall, deep learning techniques have shown promise in predicting highway traffic conflicts, and further research in this area could lead to improved road safety and traffic management [13].

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B Priya Esther ; Madhavarapu Chandan ; Vinjamuri S. N. Ch. Dattu ; M. Sakthivel ; R Rajesh ; Sarishma ; V. Mohanavel All Authors

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IoT (Internet of Things) technology is used here to monitor underground mining locations. Developing se
device is highly challenging and hence accelerometer is used to monitor the deep mining region. Each a
analyzed boundary/qualities/characteristics are then sent to the Micro Controller Unit (MCU). The MCU
to perform a basic analysis. When a critical situation is detected, an alarm will be given and the corresp
will be sent directly to the web server. The collected data are then displayed on the webserver page of th
control centre to present the screen and take quick action to prevent serious damage. Simultaneously, t
handset module is employed in the proposed model to communicate data from the mining section to tak
action and reach the location. Finally, the experimental results show the increase in coal mining safety w
proposed underground coal mine monitoring system.

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Contents

The Internet of Things refers to a network of interconnected objects. Context, ubiquity, and optimization are the three key features of I oT: •

Context refers to the object's ability to interact with an existing environment and immediate response if anything changes.

•
Omnipresence provides location information, physical or atmospheric conditions of an object.

•
Optimization illustrate the facts that today's objects are more than just a connection to the network of human operators at the human-machine interface.

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