



Vasantdada Patil Pratishthan's College of Engineering and Visual Arts



DEPARTMENT OF INFORMATION TECHNOLOGY ITSA
In Association With ITSA



स्वातंत्र्याचा अमृत महोत्सव



INSTITUTION'S
INNOVATION
COUNCIL
Ministry of HRD, India



भारत 2023 INDIA

IT SYNERGY

2022-2023



Vasantdada Patil Pratishthan's College of Engineering and Visual Arts

College Vision

- To provide an environment to educate, encourage and explore students by facilitating innovative research, entrepreneurship, opportunities and employability to achieve social and professional goals.

College Mission

- To foster entrepreneurship & strengthen industry institute interaction to enhance career opportunities for the employability of students.
- To encourage collaborations with industries and academic institutes in terms of projects & internships by creating area for Research and Development.
- To build up appropriate moral and ethical skills and to promote holistic development of students through various academic, technical, social and cultural activities.

Department Vision

- To impart quality education in the field of Information Technology to meet the challenging needs of the society and industry.

Department Mission

- To provide quality education to students by including Problem Solving, Teamwork and Leadership Skills to achieve their goals in the field of Information Technology.
- To educate students for global development including entrepreneurship, employability and the ability to apply technology to real life problems.
- To develop skilled IT professionals with moral principles and empower them in lifelong learning.

PRINCIPAL'S DESK



Dr. Alam N. Shaikh
Principal, VPPCOE & VA

The VPPCOE & VA is an engineering college that aims to foster personality development and knowledge in students. With advanced courses in Artificial Intelligence, Data Science, Law, Fine Arts (Applied Art and Painting), and Interior Design, the college aims to make it a world-class institution and shape students into excellent citizens. Established in 1990, the institute has attracted students from across the nation and established connections with national and international business communities. With over three decades of experience, the college offers exceptional engineering education, focusing on holistic development and innovation.

The dedicated faculty prepares students for a dynamic and competitive world, equipping graduates with top-notch education and practical skills to excel in today's rapidly evolving landscape. The institute is dedicated to nurturing genuine capabilities and profound knowledge in its students, welcoming those who strive for more than just success and aspire to become knowledge leaders. The institute acknowledges the hard work of its staff members in achieving these goals and takes pride in being recognized as one of the country's premier engineering colleges.

HOD'S DESK

Information Technology is one of the fastest growing engineering fields all over the world. Our Information Technology Program at VPPCOE & VA started in the academic year 1999-2000 with a vision to develop high quality Information Technology professionals through Quality Education and dedicated faculty seeks to combine excellence in education and research, provide students with a balance of intellectual and practical experiences that enable them to serve a variety of societal needs.

Our students are nurtured to become world-class software professionals as 'Project Managers', 'System Analysts' or 'Team Leaders' in industry or become 'Entrepreneurs' by nurturing their own creativity and innovation.

Department has the competent Faculty and dedicated Staff do work hard to groom the technical and overall personality of students through meticulously planned, outcome based curriculum delivery with co-curricular and extra-curricular enjoyable learning activities.



Dr. Pradip S. Mane
HOD of IT, VPP

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Dear Readers

Welcome to the latest edition of IT Synergy, your gateway to the ever-evolving world of technology. As the editorial board of this magazine, we are thrilled to embark on this journey with you, exploring the frontiers of innovation, discovery, and knowledge.

IT Synergy is our collective passion for the remarkable advancements that shape our modern lives. In today's fast-paced landscape, staying informed about the latest trends and breakthroughs is not just an option—it's a necessity. Our mission is to bring you authoritative, engaging, and accessible content that empowers you to navigate the intricate realm of technology.

The members of our editorial board, each a seasoned expert in their respective fields, are committed to curating a diverse range of topics that span from various domains of Information Technology. Our aim is to not only provide you with insights into the forefront of technology but also to inspire discussions that drive meaningful progress.

As we embark on this journey together, we invite you to explore, learn, and be inspired. Thank you for being part of the IT Synergy family. Here's to the discoveries that await us and the boundless possibilities of the future.

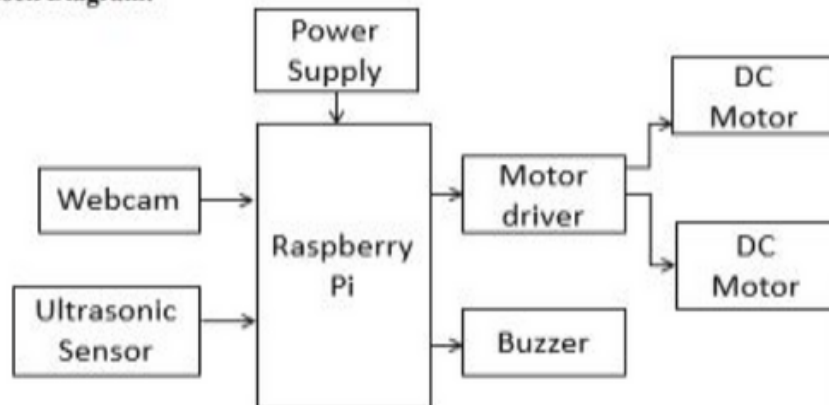
SR	Topic	Page
1	Utilizing Plastic Waste for the Detection and Repair of Potholes	1
2	Converging Points: Exploring Football Strategy and Insight through Data Analytics	2
3	Unveiling Breast Cancer Prognosis and Insights through Diverse Machine Learning Models	3
4	Reuniting Loved Ones: Developing an Innovative Missing Person Identification System	4
5	Navigating Roads Virtually: Building a Driving Simulator with OpenCV	5
6	AI-enhanced cameras auto-focus on vital details	6
7	Enhanced Voting Solution	7
8	Shipping Cost Comparator Platform	8
9	Enhancing Navigation for the Visually Impaired with Computer Vision-Based Obstacle Detection	9
10	Crowdfunding Leveraging Blockchain Technology	10
11	Predictive Crime Analytics: Harnessing Machine Learning for Crime Analysis and Forecasting	11
12	Revolutionizing Lung Cancer Diagnosis: Advanced Detection System	12
13	Advancing Disease Detection in Solanum Tuberosum Leaves through Deep Learning Techniques	13
14	Advanced Fabric Anomaly Identification	14
15	Fire Image Detection Using Cnn	15
16	Indian Cash Detection	16
17	Implementing Personality Prediction Using Machine Learning	17
18	Fruit Grading System	18
19	Smart Disease Prediction	19
20	BARC's visitor monitoring and surveillance system.	20

SR	Topic	Page
21	Facial Recognition for Monitoring Student Attendance	21
22	AI Voice Assistant Enhanced by Natural Language Processing (NLP)	22
23	To Build an OCR System Using YOLO	23
24	AR Shopping App	24
25	Fitness Hub	25
26	Utilizing Machine Learning for Criminal Face Detection System	26
27	The Realm of Cryptocurrencies	27
28	A Certificate System Reinvented Through Blockchain Technology	27
29	Forecasting Stock Market Trends through Long Short-Term Memory (LSTM) Analysis	28
30	Optimizing Timetables with Genetic Algorithm-based Timetable Generator	29
31	Evaluating an LSTM-CNN Model for Toxic Comment Detection using Machine Learning Techniques	30
32	BARC's visitor monitoring and surveillance system.	31
33	Utilizing OpenCV for Virtual Mouse and Keyboard Implementation	32
34	Emotion and Stress Detection via Machine Learning from Facial Expressions	33
35	Advancing Forensic Face Sketch Construction and Recognition	33

UTILIZING PLASTIC WASTE FOR THE DETECTION AND REPAIR OF POTHOLES

*Dr. Pradip Mane*1, Hrushikesh Gaware*2, Digvijay Phutane*3, Sheetal Munde*4, Shritej Todankar*5*

Block Diagram:

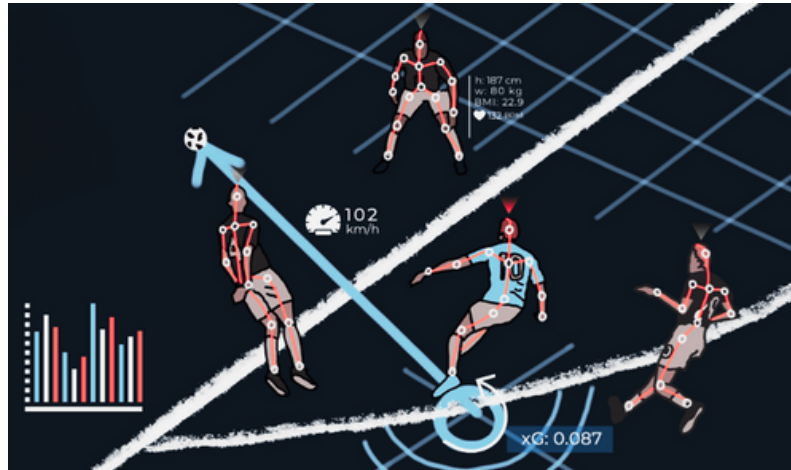


Addressing Road Safety Through Automated Pothole Detection and Repair. Road safety is an ongoing concern highlighted frequently in media due to the prevalence of accidents. Among the various contributing factors, potholes emerge as a significant hazard on roads. Particularly during rainy seasons, roads become marred by potholes, posing substantial risks to drivers and potentially resulting in accidents and even fatalities. The root causes of potholes can be traced back to heavy-load vehicle usage and the utilization of subpar cement during road construction. These factors contribute to road degradation and subsequently, pothole formation. The diversity in pothole sizes and shapes further complicates the issue, making evasion difficult for drivers.

To tackle this challenge, an innovative solution has been devised for efficient pothole detection and repair. The centerpiece of this initiative is a robotic system designed to autonomously identify and address potholes. By eliminating the necessity for human intervention in locating these hazards, the process becomes streamlined and responsive.

CONVERGING POINTS: EXPLORING FOOTBALL STRATEGY AND INSIGHT THROUGH DATA ANALYTICS

*Dr. Seema Ladhe*1, Swaraj Kadam*2, Nishank Rangari*3, Gauri Patil*4, Himanshu Sagar*5*



Football, a universally cherished sport played among two teams composed of 11 players each, has attained remarkable popularity worldwide. This captivating game unfolds on a rectangular field referred to as a pitch, boasting goals at opposing ends. The primary objective involves scoring more goals than the rival team by propelling the ball across the goal line within a typical time span of 90 minutes or more.

In recent times, the sphere of team sports data analysis has experienced an explosive surge in both scholarly research and practical applications. Within this domain, soccer stands out as one of the most extensively engaged team sports. Sporting analysis has embraced a diverse array of techniques and strategies, encompassing heat maps, correlation studies, players' trajectories, pattern recognition, and dynamic match animations.

Integral to this analytical landscape is the examination of a player's historical performance, often deemed a pivotal determinant for forthcoming matches. Presently, the synthesis of analysis typically pivots on either visualizations or comprehensive video evaluations. To traverse this analytical divide, we have conceived a solution that seamlessly merges these functionalities. This innovative approach promises to empower sports club managers in enhancing player performance, while concurrently gauging historical match tactics and outcomes.

UNVEILING BREAST CANCER PROGNOSIS AND INSIGHTS THROUGH DIVERSE MACHINE LEARNING MODELS

*Dr. Seema Ladhe*1, Bhakti Deulkar*2, Abhishek Tiwari*3,
Samruddhi Patil*4, Rutu Kadam*5*

In India, breast cancer constitutes 14% of total cancer cases and stands as the leading cause of female mortality on a global scale. A staggering 2.3 million women were diagnosed with breast cancer in 2020, resulting in 685,000 fatalities, thereby cementing breast cancer's position as a paramount cause of female mortality. This malignancy holds the unfortunate distinction of being the most prevalent cancer among women, with an estimated 270,000 new cases diagnosed in 2019. To mitigate its devastating impact, the need for robust detection software has become paramount.

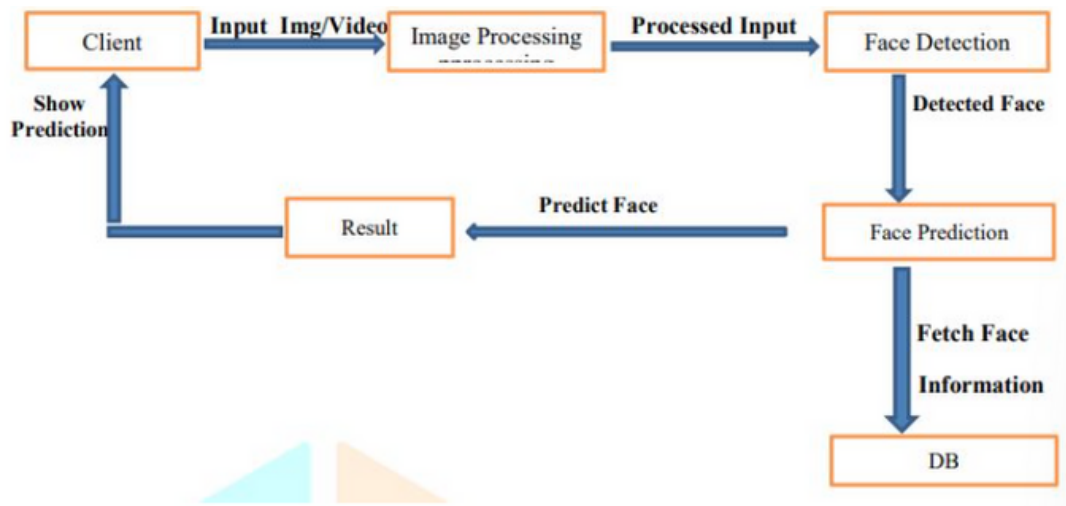
Machine learning algorithms emerge as a potent tool in this battle against breast cancer. By leveraging these algorithms, we can develop software capable of detecting this perilous cancer at an early stage, enabling timely treatment interventions to avert fatality. Notably, breast cancer ranks as the most frequent cancer among Indian women, with a survival rate of 50%. Consequently, there is an urgent requirement for sophisticated detection methods that can enhance these survival rates.

This paper presents a comprehensive exploration of machine learning algorithms designed for breast cancer prediction, utilizing the Wisconsin Breast Cancer dataset. Within this dataset comprising 569 entries, the classes are categorized as Malignant (Cancerous) and Benign (Non-cancerous). A series of well-established algorithms, including Support Vector Machines (SVM), Logistic Regression (LR), K-Nearest Neighbors (KNN), and Classification and Regression Trees (CART), are harnessed to predict breast cancer outcomes.

The performance of these algorithms is meticulously evaluated across various metrics, such as accuracy, precision, and f1-score. Employing the cross-validation methodology augments the reliability of performance metric values. Among these algorithms, SVM and Logistic Regression exhibit notable promise, yielding accuracy rates ranging from 93% to 98%. KNN and CART, while slightly trailing, still demonstrate commendable accuracies spanning from 90% to 96%.

REUNITING LOVED ONES: DEVELOPING AN INNOVATIVE MISSING PERSON IDENTIFICATION SYSTEM

Dr. Neeraj Sharma*1 Jatin Natekar*2, Zaid Khan*3, Sahil Thakare*4, Ashwin Late*5



In our society, every single day witnesses the unsettling occurrence of individuals going missing - children, youth, young women, the mentally challenged, and even the elderly grappling with dementia. Tragically, the effort to locate them can often prove exceedingly challenging, with traditional methods involving police intervention and extensive investigations. This process is time-intensive, demanding significant resources and dedication. In response to this pressing issue, we present a visionary project titled "Leveraging Facial Recognition for Missing Persons Identification". This innovative endeavor aims to streamline and amplify the search process, capitalizing on cutting-edge technology to facilitate the identification and reunification of missing individuals with their loved ones. Central to this project is the development of a comprehensive web application, designed to efficiently collect and store critical information about missing persons within a secure database.

This online platform enables individuals to report a missing person's details, circumventing the need for arduous physical visits to police stations. Additionally, the platform integrates facial recognition algorithms, allowing for potential sightings of missing persons captured on CCTV footage to be matched against the database. Upon a successful facial recognition match, the system instantly generates tailored alerts and pinpointed locations. The "Using Face Recognition to Identify Missing Persons" project serves as a beacon of hope, harnessing technology's prowess to alleviate the distressing ordeal faced by families and communities impacted by missing persons cases. By fostering an interconnected network and empowering individuals with advanced tools, we aspire to bring solace, closure, and the safe return of loved ones.

NAVIGATING ROADS VIRTUALLY: BUILDING A DRIVING SIMULATOR WITH OPENCV

*Prof. Sachin Barahate*1, Manav Shete*2, Omkar Mhaske*3 Mayank Parshetye*4, Ved Bhosle*5*

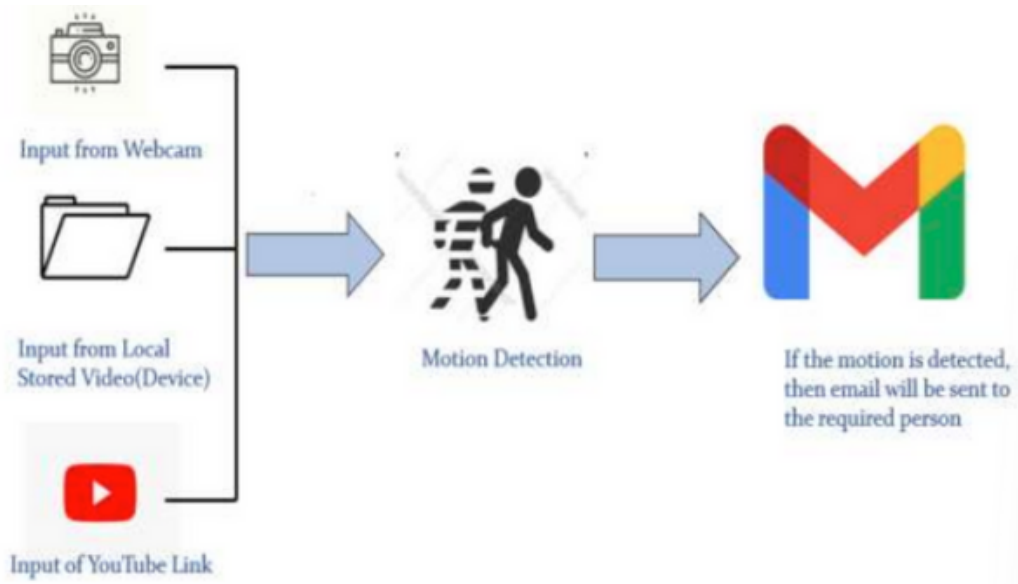


The Diving Simulator Car stands as a pioneering project that transcends various domains, showcasing real-time car development at its core. This groundbreaking initiative harnesses the potential of cutting-edge technologies to simulate a genuine driving experience. Leveraging OpenCV technology, this project redefines how we interact with video games, offering a dynamic and immersive encounter that parallels real-world driving. The driving simulation landscape has been revolutionized through the integration of OpenCV technology, elevating the authenticity of the experience. Take, for instance, the driving setup reminiscent of car racing games. However, traditional setups often come with exorbitant costs, rendering them inaccessible to many enthusiasts. At the heart of this endeavor lies the concept of a driving simulator anchored in the realm of digital twins. These digital twins serve as virtual representations of real-world entities, making them indispensable in the development of self-driving vehicles. Yet, crafting a simulation program that mirrors reality down to the smallest detail is a formidable task, one that often incurs substantial costs and complexity due to the multitude of components that need replication.

In this paper, we introduce an innovative approach that harnesses the online game GTA5 as a foundational platform for autonomous vehicle simulation. By leveraging the rich virtual environment and intricate driving scenarios present within the game, we pave the way for a cost-effective and comprehensive simulation methodology. The Diving Simulator Car project aims to revolutionize driving simulations by combining OpenCV technology with video games, creating a realistic experience for enthusiasts, researchers, and engineers.

AI-ENHANCED CAMERAS AUTO-FOCUS ON VITAL DETAILS

*Prof. Kiran Deshmukh*1, Ankush Dingankar*2, Himanshu Khond*3,
Payal Singh*4, Pratham Jadhav* 5*



Intelligent video surveillance involves monitoring scenes for inappropriate actions or potential threats in various settings; common uses include public spaces, transportation hubs, and secure installations. The process entails identifying concerns, suitable cameras, and security trends, aided by schedule analysis. Multiscale shadowing captures comprehensive object information, overcoming limitations of traditional on/off systems, enhancing surveillance efficacy and crime detection.

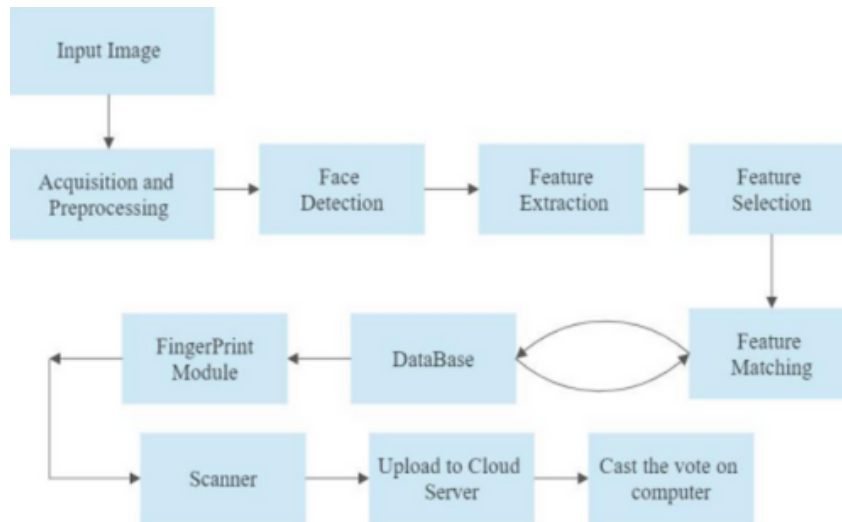
Advanced video systems offer many such advantages such as moving target tracking, Automatic audiovisual detection, alerting homeowners and businesses to potential risks, High-definition imaging, night vision, and triggered recording for efficient monitoring, Alerts, notifications, and cautions, Camera tampering and license plate recognition, Enhanced event search for rapid review.

Integration with smartphone-controlled home security systems for remote access.

Yet, a challenge lies in system operation without continuous human oversight. The solution is multi-camera technology, enabling autonomous functionality and overcoming human limitations. This technology holds promise for addressing security challenges efficiently. An innovative approach employs YOLO (You Only Look Once) algorithm for real-time fall, vehicle crash, and social distancing detection from CCTV cameras, aiding in security optimization.

ENHANCED VOTING SOLUTION

*Dr. Pradip S. Mane*1, Jabbar Shaikh*2, Pranay Patil*3,Tabbasum Khan*4,
Pallavi Mhaske*5*



The electoral system has experienced many efficient changes within the past few decades. India being a majority rule government, the world's biggest, still directs its races utilizing either Secret Ballot Voting (SBV) or Electronic Voting Machines (EVM), the two of which include significant expenses, physical work and are wasteful. In the existing system, it verified only identification proof, which made more chances for fake voting. This research work proposes a fingerprint sensor and face recognition enabled electronic voting system. The entire online framework empowers individuals to protect their votes from any place on the planet. Utilizing the ID of appearances lessens the shot at copying a vote and the individuals who are enlisted advance to the political race and are perceived by the framework will be permitted to cast a ballot. Accordingly, the methodology makes the framework the most ideal approach to make the choice. In our approach we have three levels of security in the voting process. The first level is the verification of unique id number (UID), second level is the verification of election id number (EID) and third level is face recognition or face matching. The security level of our system is greatly improved by the new application method for each voter. By using the Voter identity number and fingerprint, numerous duplicate registrations can be stopped and this will lead to a high rate of actual success during voting.

SHIPPING COST COMPARATOR PLATFORM

*Prof. Medha Kulkarni*1, Rahil Shaikh*2, Sanket Pachpute*3,
Riyaz Khan*4, Manjiri Panchal*5*



I. CONTEXT: Amidst the era of e-commerce and digital transactions, the indispensable role of courier services has surged. Individuals and small enterprises frequently dispatch packages, spurring the exponential growth of the courier sector. Yet, the burgeoning variety of courier companies has introduced complexity in comparing pricing and services, often leaving users dissatisfied with the value they receive.

II. SOLUTION: The solution to the problem is to create an online platform that allows users to easily compare and evaluate different courier providers in their area. Users would input information about their package, and the platform would provide a list of local courier options along with pricing, ratings, and services offered.

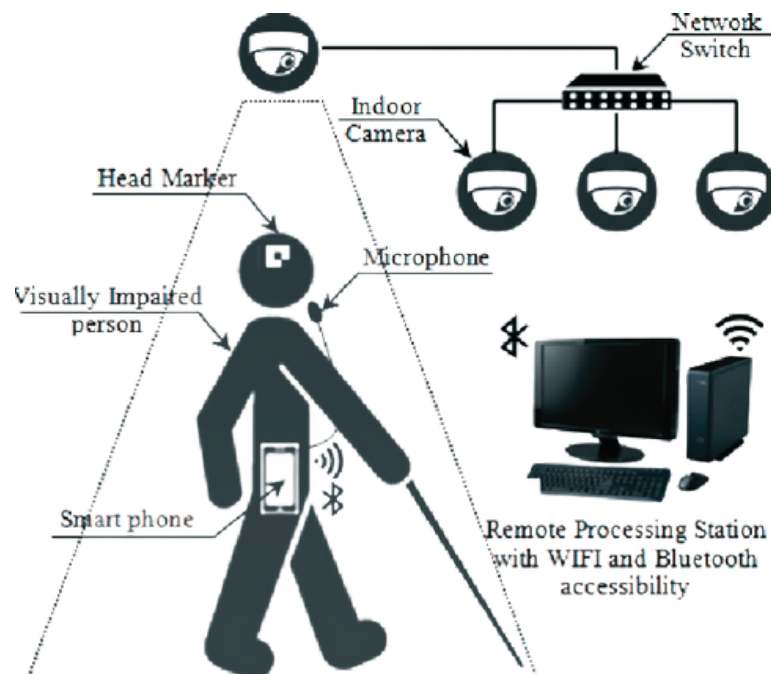
III. AUGMENTED FUNCTIONALITIES: Enhancements to the platform could include features like real-time tracking, parcel insurance, and genuine user reviews. Real-time tracking would give users the ability to monitor their parcels' progress, increasing their confidence. Parcel insurance would provide protection against potential losses or damages, building trust with customers. Additionally, access to genuine customer reviews would enable users to make informed decisions based on real-life experiences.

IV. BENEFITS: The platform is especially advantageous for small businesses that deal with parcel deliveries. It helps alleviate the difficulties of negotiating with different courier services and provides transparent information, which can greatly reduce courier expenses for these businesses.

V. RESEARCH OBJECTIVE: The purpose of this research is to find a solution for the difficulties that new and small businesses face when it comes to parcel deliveries. The aim is to create a system that makes it easier for users to compare courier services and make informed decisions to get the best value.

ENHANCING NAVIGATION FOR THE VISUALLY IMPAIRED WITH COMPUTER VISION-BASED OBSTACLE DETECTION

*Prof. Vedika Avhad*1, Pratik Kharat*2, Tushar Kumar*3, Rushil Sawant*4, Rutuja Sirsika*5*



Visual impairment remains a significant global challenge, affecting millions. The World Health Organization (WHO) reports that approximately 285 million people experience visual impairment, comprising 39 million blind and 246 million with low vision. Notably, 90% of the visually impaired reside in low-income contexts, with 82% of blindness cases among individuals aged 50 and above. Independent mobility, particularly near-field environment perception, poses notable challenges for the visually impaired, necessitating innovative solutions. Recent strides in technology offer promise for addressing these challenges.

Emerging from the need to enhance mobility and environmental awareness for the visually impaired, diverse assistive devices have emerged. A comprehensive review of over 140 products, systems, and assistive devices highlights 21 commercially available solutions. However, many of these heavily rely on the Global Positioning System (GPS), limiting their indoor functionality. To surmount this limitation, our proposed project addresses indoor and outdoor mobility for the visually impaired. Leveraging computer vision and LiDAR technology, our device gauges object-person distance, issuing sensory alerts. This innovation holds potential to transform lives, fostering mobility and autonomy for the visually impaired.

CROWDFUNDING LEVERAGING BLOCKCHAIN TECHNOLOGY

*Prof. Medha Kulkarni*1, Pratik Tayade*2, Gaurav Patil*3, Ashutosh Yadav*4, Vivek Lone*5*



In the current landscape, numerous avenues exist for startups to gather funds through crowdfunding, allowing backers to contribute in exchange for potential rewards based on the project's success. However, this conventional crowdfunding model presents certain drawbacks. Creators retain excessive control over funds, posing risks of potential fraud or mismanagement, and the high failure rate of startups can lead to investor losses.

To overcome these challenges, blockchain technology offers a solution by introducing a more trustworthy, transparent, secure, and decentralized crowdfunding platform. By implementing a smart contract, capital allocation can be regulated, and backers can direct contributions to a smart contract on the Polygon blockchain instead of directly to the creator. The smart contract can facilitate staggered fund releases tied to project milestones, necessitating proof of progress before subsequent funding tranches are unlocked. This mechanism mitigates fraud, fosters transparency, and establishes trust between creators and backers. Moreover, as blockchain operates in a decentralized manner, a blockchain-based crowdfunding platform eliminates intermediaries and reduces the costs inherent in traditional fundraising approaches.

PREDICTIVE CRIME ANALYTICS: HARNESSING MACHINE LEARNING FOR CRIME ANALYSIS AND FORECASTING

*Prof. Kiran Deshmukh*1, Tahir Shaikh*2, Imran Ahmed*3, Amaan Firdosi*4, Prakash Maurya*5*

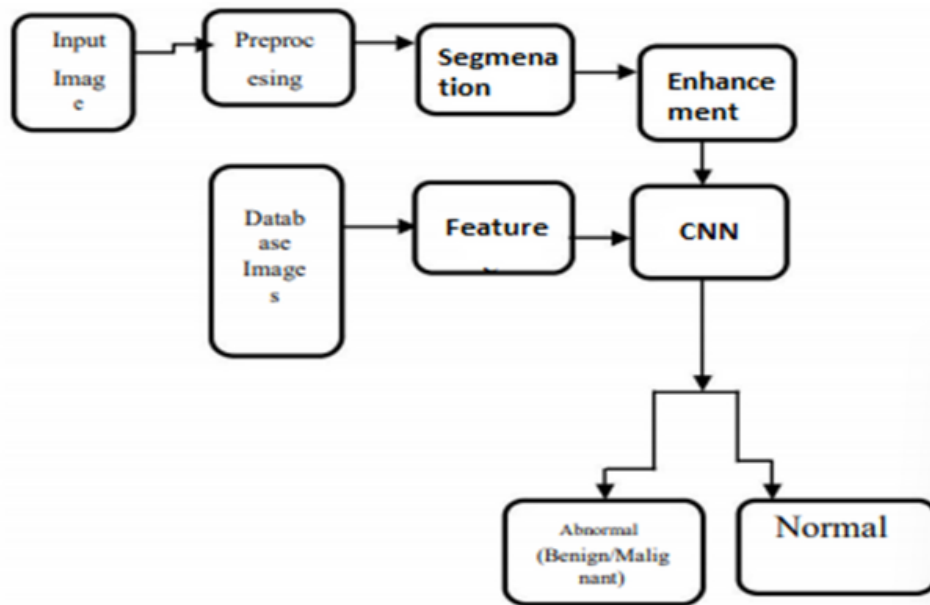


This study aims to create a robust machine learning-driven application capable of comprehensively analyzing crime data across diverse districts in India. The primary objective is to categorize these districts into high, moderate, or low crime zones based on crime frequency. By delving into the specific occurrences of crimes within each district, the application further provides valuable insights for devising preventive measures and precautions, especially when considering visits to crime hotspots.

The research methodology involves employing a Logistic Regression model for precise crime categorization, followed by K-Means clustering to effectively group districts according to their distinct crime rates. The study's findings highlight the machine learning model's accuracy in classifying crimes, thereby showcasing its potential in enhancing crime analysis. A notable contribution of this research lies in the development of an application that empowers users with comprehensive crime rate insights across different districts.

REVOLUTIONIZING LUNG CANCER DIAGNOSIS: ADVANCED DETECTION SYSTEM

*Prof. Vinod Sapkal*1, Pooja Shukla*2, Pranay More*3, Ritesh Jaiswal*4, Mohini Varpe*5*

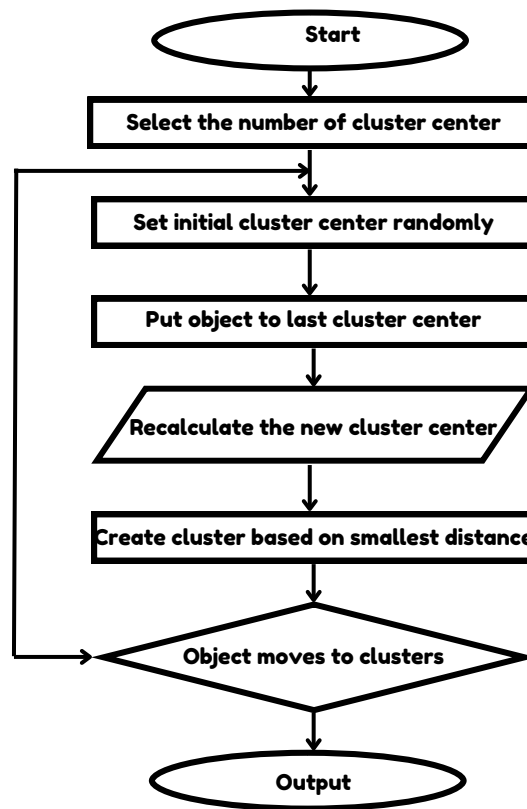


Lung cancer remains a significant global health concern, with substantial mortality rates reported by the World Health Organization. This research addresses the pressing need for timely detection and diagnosis by harnessing the potential of advanced technologies. Computed Tomography (CT) imaging, a powerful diagnostic tool, forms the cornerstone of this study. The primary goal is to identify cancerous lung nodules and classify the severity of lung cancer through a comprehensive approach.

In this work, innovative Deep Learning methods are employed to precisely locate cancerous lung nodules within CT scans. Acquired lung images from diverse healthcare facilities provide the basis for analysis. Employing a multi-step process, image processing techniques including pre-processing and segmentation, notably utilizing the watershed algorithm, contribute to isolating the area of interest. Integral to the analysis are various feature extraction methodologies encompassing texture, geometric, volumetric, and intensity attributes. The final step entails the application of Convolutional Neural Networks (CNN) for the classification of extracted features. By leveraging this intricate system, the research strives to enhance the accuracy of lung cancer diagnosis, contributing to improved patient outcomes and survivability rates. This study serves as a testament to the potential of integrating deep learning and CT imaging in revolutionizing lung cancer detection and care.

ADVANCING DISEASE DETECTION IN SOLANUM TUBEROSUM LEAVES THROUGH DEEP LEARNING TECHNIQUES

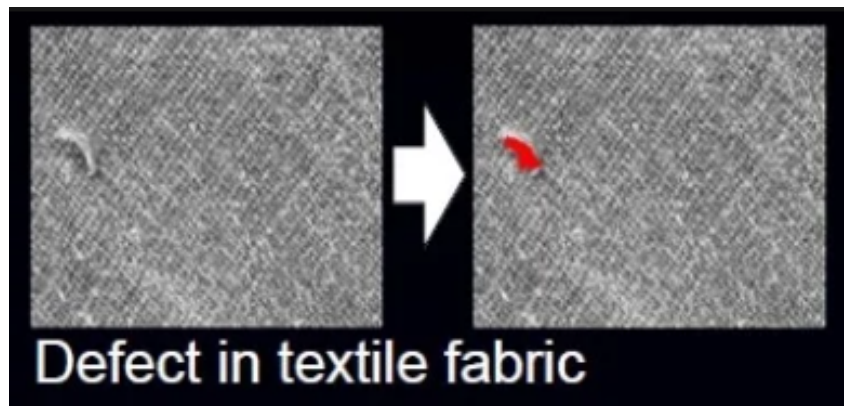
*Prof. Vinod Sapkal*1, Aadarsh Dubey*2, Atharva Rajadhyaksha*3
, Divesh Jain*4, Gaurav Tiwari*5*



In the realm of modern agriculture, the integration of artificial intelligence to diagnose plant diseases emerges as a critical pillar for sustainable development. Diseases such as early blight and late blight exert profound impacts on potato quality and quantity. Manual assessment of these leaf diseases proves arduous and time-consuming, demanding a high level of expertise. Timely and automated disease detection during the initial growth stages holds the potential to enhance potato crop production. Prior attempts have showcased models addressing diverse plant diseases. This paper introduces a novel approach that employs pre-trained models like VGG19 for fine-tuning (transfer learning) to extract relevant features from the dataset. Subsequently, leveraging multiple classifiers, the results highlight logistic regression as a superior performer, boasting an impressive classification accuracy of 97.8% over the test dataset. This research contribution underscores the pivotal role of artificial intelligence in driving efficient and effective disease detection, ultimately fostering agricultural sustainability.

ADVANCED FABRIC ANOMALY IDENTIFICATION

*Prof. Nita Ingale*1, Atika Ansari*2, Surabhi Yerunkar*3, Siddhi Thakur*4, Sadik Sayyed*5*

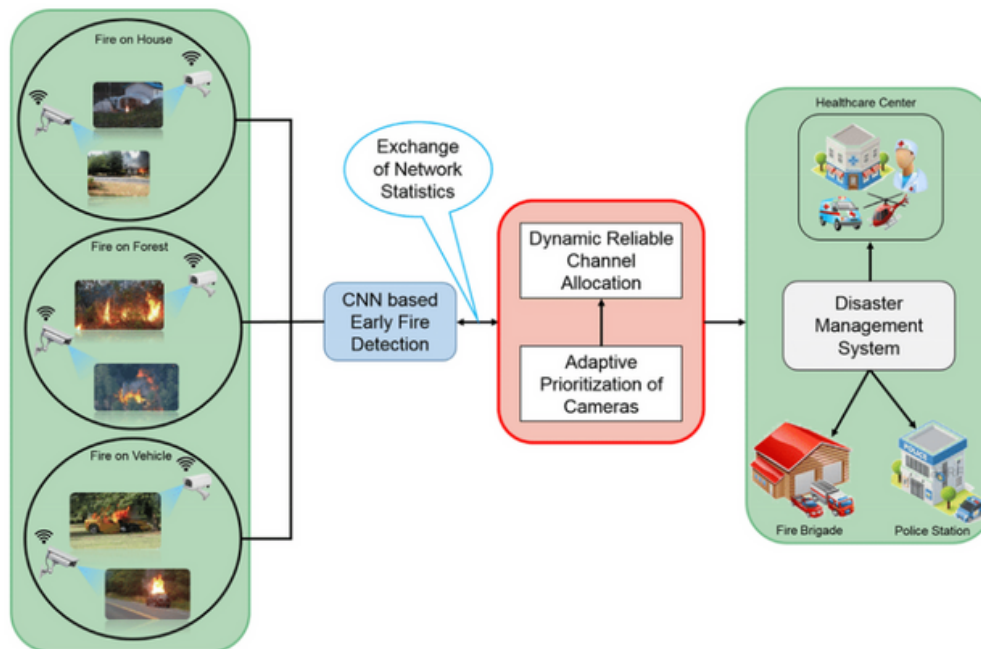


In diverse applied fields and automated production processes, computer vision and digital image processing find various applications. In the textile industry, the automated identification of defects is of utmost importance, directly influencing the quality and value of textile products. Traditionally, identifying defects in fabric production relied on manual human assessment—a method plagued by issues such as reduced concentration, human fatigue, and time inefficiency.

The emergence of computer vision and digital image processing applications has addressed these challenges. In the past two decades, a plethora of research articles have introduced computer vision-based approaches to overcome these limitations. This review article discusses the various computer vision techniques used in the textile industry to detect defects in fabric. The analysis covers different approaches such as histogram-based techniques, color-based methods, image segmentation, frequency domain operations, texture-based defect detection, sparse feature-based methods, image morphology operations, and advancements in deep learning. The review also explores the criteria used to evaluate the performance of automatic fabric defect detection methods. This review discusses computer vision and digital image processing techniques for detecting fabric defects, highlighting limitations and disadvantages, and suggesting future directions for research. It provides valuable insights into the field.

FIRE IMAGE DETECTION USING CNN

*Prof. Vedika Avhad*1, Nishant Govekar*2, Samruddhi Chavan*3, Fahad Ansari*4,
Nilesh Tanna*5*

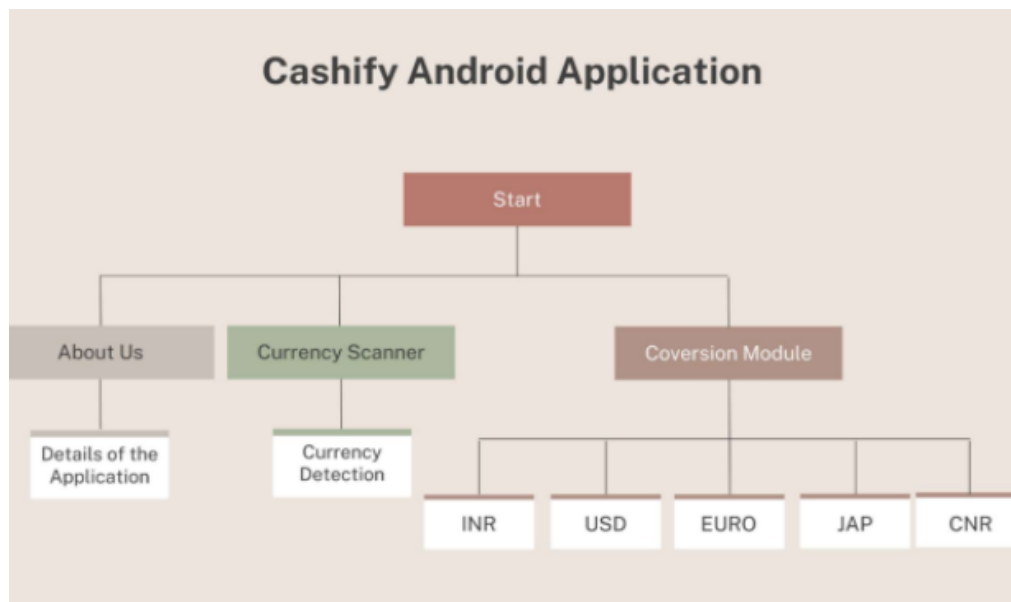


This project focuses on advancing fire detection using Convolutional Neural Networks (CNNs) in conjunction with image processing technology, with the primary objective of providing early alerts for fire incidents. Despite the availability of various automatic fire alarm systems, such as those utilizing sensor-based methods, they often have limitations related to their ability to detect fires solely based on smoke and their coverage area. To overcome these limitations and harness the potential of emerging technology, this project is proposed.

The implementation of this project involves employing a central processing unit and integrating a webcam as the hardware component. The webcam serves as the input source, capturing real-time video feeds from the surroundings. The project is developed using the Python programming language, with a focus on utilizing the open-source OpenCV library for effective image processing.

INDIAN CASH DETECTION

*Prof. Nita Ingale*1, Shreyas Jadhav*2, Tanmayi Indukuri*3, Shrutika Ugale*4, Hasib Shaikh*5*

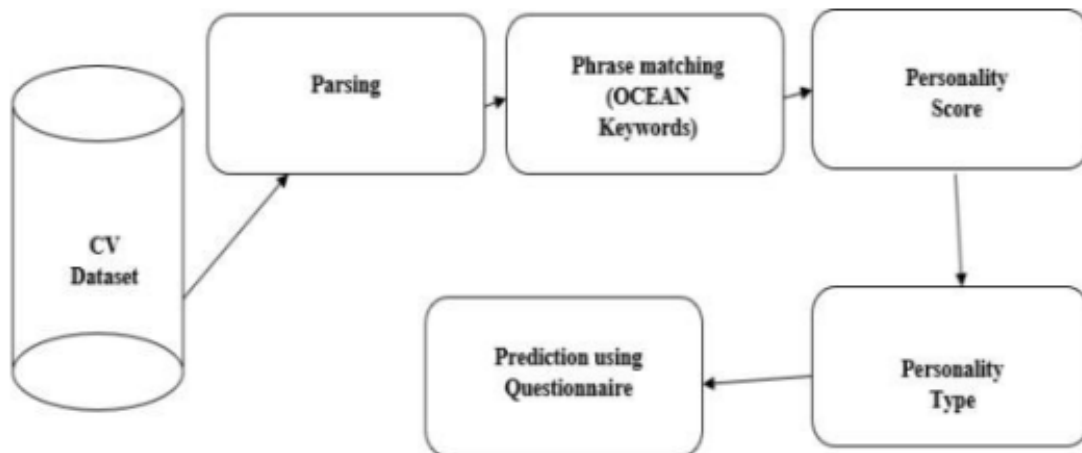


In the modern trajectory of our lives, the role of currency holds paramount importance. Deciphering the denominations of currency notes can sometimes pose as a nuanced challenge. Given our immersion in the digital realm, the convergence of technology and currency denotation has opened up new avenues. Recent times have witnessed a compelling exploration into object detection within images, facilitated by various advanced techniques rooted in deep learning. This framework is devised to achieve the recognition and association of currency denominations by leveraging the potential of machine learning, specifically Convolutional Neural Networks (CNNs).

In our pursuit, we engage with a repertoire of six distinct denominations of Indian currency. These denominations, captured across a spectrum of lighting conditions and angles, constitute both the training and testing datasets. The crux of our approach involves the meticulous application of a Convolutional Neural Network model to extract pertinent features. This, in turn, facilitates accurate identification of currency notes.

IMPLEMENTING PERSONALITY PREDICTION USING MACHINE LEARNING

*Prof Sonali Pakhmode*1, Shahista Khan*2, Samra Shaikh*3,
Ayan Shaikh*4*



This study embarks on an exploration of diverse machine learning methodologies aimed at effectively forecasting personality traits through the analysis of curriculum vitae (CV) data. The contemporary landscape reveals a staggering surge in individuals seeking employment opportunities, juxtaposed with a dwindling availability of jobs. This discrepancy necessitates an alternative to the conventional, labor-intensive approach of manually sifting through CVs to identify the most compatible candidates for specific roles.

In response, this research seeks to implement real-time applications that not only streamline CV assessment but also unveil insights into the individual's personality traits.

Amidst this endeavor, the paramount objective is to alleviate the challenges faced by recruiters and hiring managers in making optimal candidate selections. By leveraging cutting-edge machine learning techniques, this system scrutinizes CVs and discerns the underlying personality attributes of applicants. Personality prediction, historically a pivotal domain within psychology, finds a novel dimension in computer science as it intersects with the realm of user profiling. This paper embarks on a comprehensive review of the prevailing research in personality prediction, facilitating an in-depth understanding of its evolution.

FRUIT GRADING SYSTEM

*Prof. Swapnil Desai*1, Anubhav Shukla*2, Harsh Narula*3, Karan Tak*4, Sagar Sunka*5*



The significance of fruit grading systems lies at the heart of maintaining excellence, uniformity, and operational efficiency within the realm of fruit production and distribution. These sophisticated systems harness cutting-edge technologies, most notably computer vision and automation, to execute precise identification and categorization of fruits, leveraging various quality attributes including dimensions, color, and imperfections.

The integration of automated grading systems into this landscape ushers in a transformative era that diminishes reliance on manual labor, augments processing capacity, and bolsters accuracy by curtailing human inaccuracies. The outcome is a swifter and more streamlined grading procedure adept at managing substantial fruit volumes expeditiously and with consistent precision, thereby driving down both time and expenses entailed in the grading process.

SMART DISEASE PREDICTION

*Prof. Jayshree Pawar*1 Nishant Walunj *2 Sanskruti Sonwal *3 Sachita Dodke *4
Habib Matloob Khan*5*



"Smart Disease Prediction" likely refers to a technological solution that employs advanced data analysis and artificial intelligence (AI) techniques to predict the likelihood of various diseases in individuals based on their health data and other relevant factors. The goal is to provide early warnings and insights to both individuals and healthcare professionals, allowing for proactive intervention and better management of health conditions. Here's how a "Smart Disease Prediction" system might work:

AI Analysis Advanced AI algorithms, such as machine learning and deep learning, would be employed to analyze the collected data. These algorithms perform **Feature Selection**: The system would identify the most relevant features (variables) that have a strong influence on disease prediction. These could include factors like age, gender, medical history, genetic markers, lifestyle habits, and more.

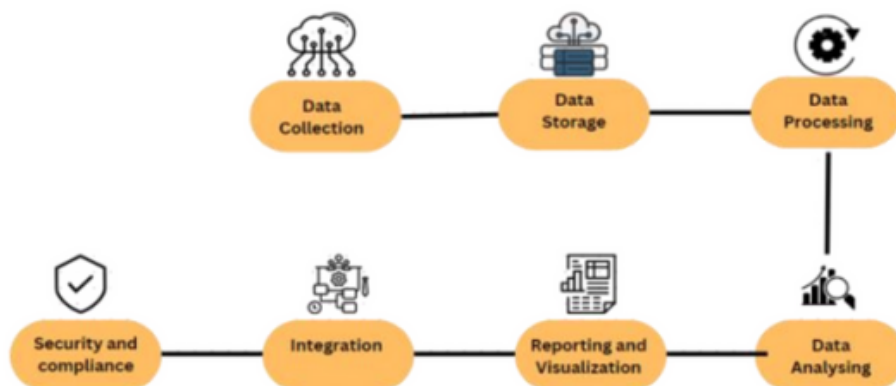
Feedback and Improvement As more data is collected and more predictions are made, the system continues to learn and improve its accuracy. Continuous feedback loops help refine the models over time.

Alerts and Recommendations If an individual is identified as having a high risk for a specific disease, the system can generate alerts for both the individual and their healthcare provider.

Additionally, the system might provide personalized recommendations to reduce risk factors and promote better health. "Smart Disease Prediction" has the potential to revolutionize healthcare by enabling earlier detection and intervention, leading to better patient outcomes and reduced healthcare costs. However, it also comes with challenges related to data quality, privacy concerns, ethical considerations, and the need for continuous validation and improvement of prediction models.

BARC'S VISITOR MONITORING AND SURVEILLANCE SYSTEM.

*Prof. Jayshree Pawar*1, Srushti Jaykar*2, Janhavi Gupta*3,
Vinayak Chavan*4*



This report primarily delves into the conceptualization, design, and development of a Visitor Tracking and Monitoring Web Portal tailored for the security needs of BARC (Bhabha Atomic Research Centre). This application harnesses the capabilities of smart ID cards within the BARC campus, catering to both employees and visitors. The central focus of this initiative is to establish a cost-effective Visitor Management System (VMS) for BARC, with the core objective of enhancing the existing visitor registration and information management processes.

The VMS system serves as a comprehensive replacement for the manual documentation of visitor details during registration. Instead, it leverages visitor ID cards issued by a government organization. Through the integration of this Web Portal, visitor information can be easily retrieved from the software database. Upon registration, visitors are furnished with badges that serve as visual indicators of their identity.

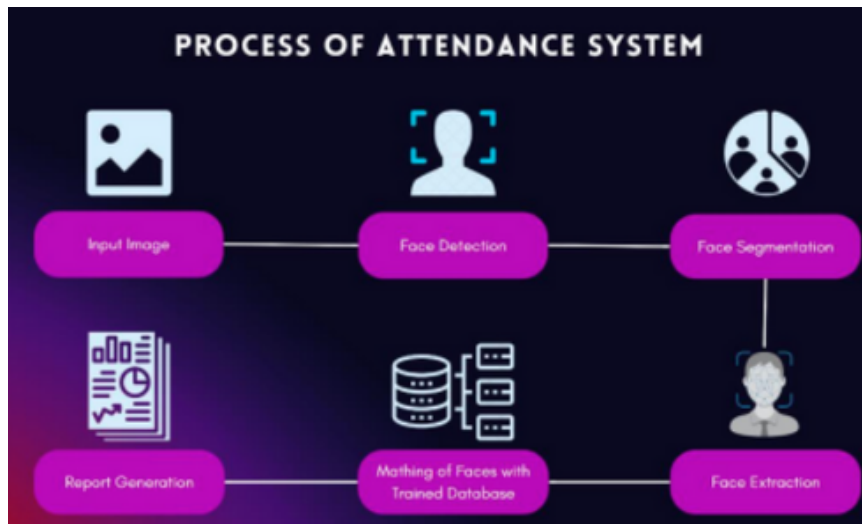
The study indicates noteworthy improvements brought about by the adoption of VMS. Specifically, it highlights a substantial increase in efficiency for new visitors—ranging from 26% to 54%—when compared to the traditional manual recording approach. Moreover, for existing visitors, the VMS demonstrates a remarkable advancement with improvements ranging from 86% to 91%.

The research explores potential enhancements, including biometric verification, face recognition, smart card upgrades, and an integrated notification system for visitor arrival alerts. These advancements aim to enhance security and expedite reading speed.

In essence, this report outlines the journey toward a technologically fortified Visitor Tracking and Monitoring Web Portal, poised to significantly enhance security and efficiency within BARC's premises.

FACIAL RECOGNITION FOR MONITORING STUDENT ATTENDANCE

*Prof. Viki Patil*1, Muzamil Shaikh*2, Anushka Khopade*3, Nirwaan Malik*4, Karan Mestry*5*



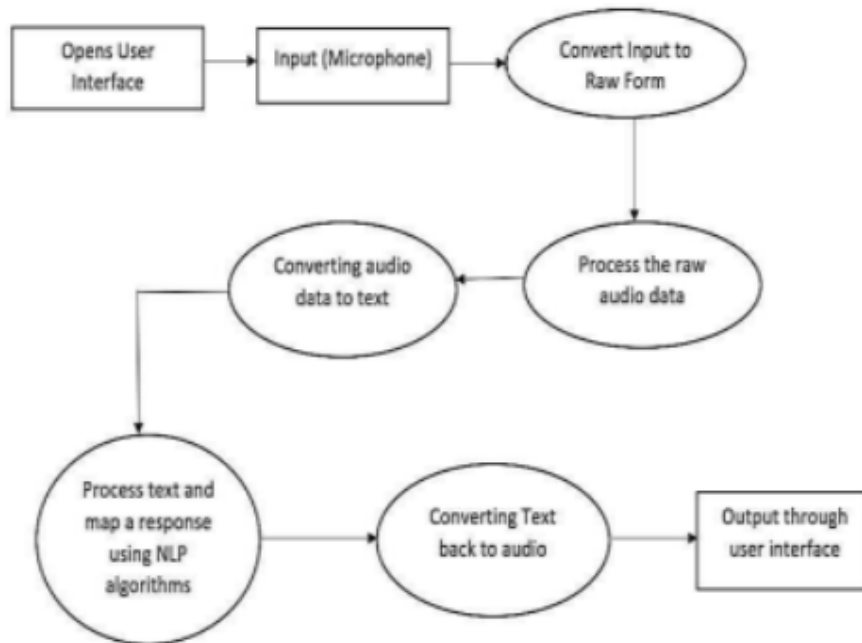
One of the notable advancements within the realm of computer vision is the exploration of facial recognition technology. This technology has found practical implementation in diverse areas, including the creation of a facial recognition-based attendance system. Several attendance systems exist, such as biometric-based, radio frequency card-based, face recognition-based, and paper-based systems. Among these alternatives, a Face Recognition Based Attendance System stands out due to its enhanced security and efficiency.

We have conceptualized the development of an "Automated Attendance System Utilizing Facial Recognition" as our proposed innovation. The core functionality entails the recognition of faces, leading to efficient time management. Notably, this system operates exclusively through software, positioning it as an environmentally conscious solution by reducing paper consumption. This makes it suitable for deployment in contexts where attendance tracking holds significant importance.

The underlying algorithm of this system hinges on image comparison, based on decoded facial features from the database, with real-time images captured by the system. This method ensures accuracy in attendance tracking while streamlining processes.

AI VOICE ASSISTANT ENHANCED BY NATURAL LANGUAGE PROCESSING (NLP)

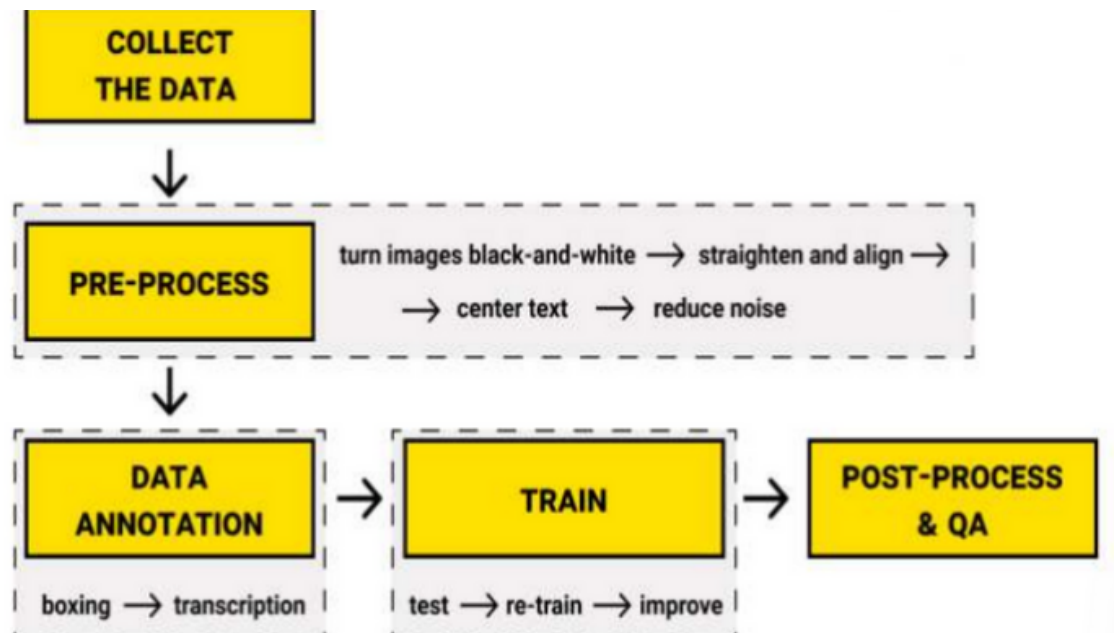
*Prof. Sonali Pakhmode*1, Vishranth Poojary*2, Pratik Bhore*3, Kushal Thakur*4, Vishal Dethe*5*



In the imminent future, electronic devices are poised to operate seamlessly through the assistance of a remote companion, accessible with ease yet reliant on a certain degree of responsiveness. This configuration empowers users to interact with the system via voice commands. Through such interactions, users can instruct the assistant to perform a wide spectrum of tasks within the system's capabilities—ranging from playing music, launching specific applications, and opening tabs to accessing websites and more. These voice associates, proficiently engineered by programming experts, are designed to comprehend human speech and respond articulately using meticulously crafted voices. Our voice assistant's principal objective centers on both educating users and swiftly delivering well-calculated outcomes. Utilizing wired and Bluetooth microphones, the voice assistant captures voice inputs and transmutes them into comprehensible English, allowing for the provision of necessary solutions and responses. By establishing an internet connection, this assistant accesses a repository of answers to address user inquiries. This synergy is enabled by a natural language processing algorithm, which empowers computer systems to engage in multifaceted communication utilizing various forms of naturally occurring human language.

TO BUILD AN OCR SYSTEM USING YOLO

*Prof Darshana Gajbhiye*1, Veena Namilla*2, Balasubramanian*3,
Sneha Gaikwad*4, Mohd Thofiq*5*



The central objective of this undertaking is the creation of a robust Optical Character Recognition (OCR) software, capable of seamlessly processing both online and offline handwritten text. OCR, or Optical Character Recognition, represents a pivotal technology that transmutes images of handwritten or typewritten text, often obtained through scanning, into machine-readable and editable textual content. Positioned at the nexus of pattern recognition, artificial intelligence, and machine vision, OCR is a dynamic research domain that holds immense potential. Within this context, the primary focus is directed towards the recognition of handwritten content, which denotes the capacity of a computer to convert human-scripted text into electronic text formats. The project delves into the intricate territory of image processing techniques and employs a gamut of text detection mechanisms to ascertain the optimal approach for customized OCR of identity documents.

AR SHOPPING APP

Dr. Pravin Shinde*1, Saurav Bisht*2, Mustufa Khan*3,
Prajakta Shelar*4, Saloney Pandit*5

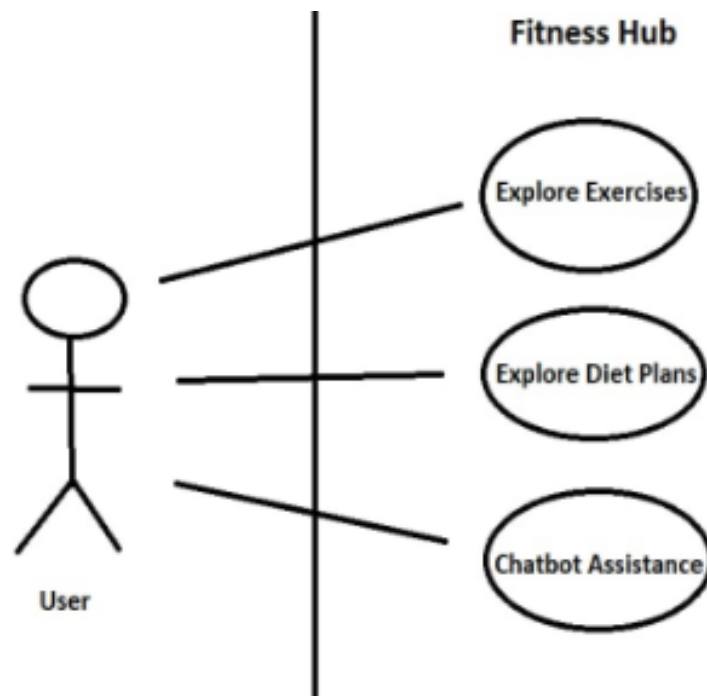


As the frontiers of science expand and information technology evolves, the significance of E-commerce has grown remarkably in the lives of people. Yet, the online shopping landscape often leaves consumers with a sense of detachment, as they interact merely with virtual representations of products through images and text. This digital experience lacks the tactile and perceptual elements inherent to physical shopping. In response, the advent of Mobile Augmented Reality (AR) technology, an emergent information paradigm, has garnered substantial attention in recent times. Notably, AR is positioned as a transformative force, poised to reshape the future of shopping.

In this pursuit, an innovative application is proposed, one that harmonizes E-commerce with Augmented Reality technology to amplify consumer engagement, enrich product perception, and intensify purchasing intent. This paper delineates the essence and foundational principles of Augmented Reality technology, scrutinizing its viability and potential application in the realm of mobile E-commerce within India.

FITNESS HUB

*Dr. Pravin Shinde*1, Saurav Bisht*2, Mustufa Khan*3, Prajakta Shelar*4,
Saloney Pandit*5*

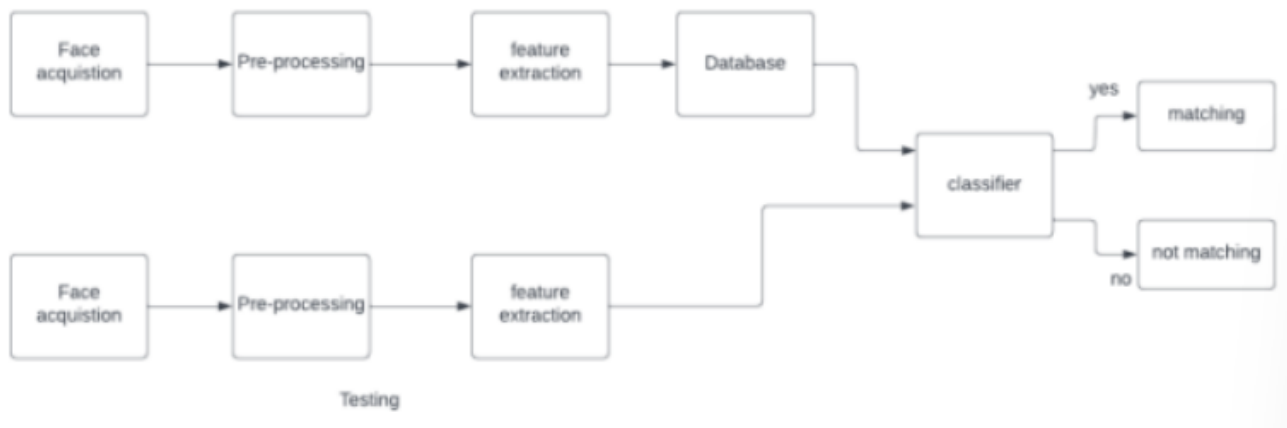


In recent times, the landscape of technological advancements has ushered in a surge of studies seeking to comprehend consumer behavior in relation to sports applications. This paper's focal point is to conduct a meticulous systematic review, delving into the body of literature that scrutinizes consumer intent toward utilizing mobile applications (Apps) tailored for fitness and physical activity.

Within this dynamic backdrop, "Fitness Hub" emerges as a React Application, poised to revolutionize personal exercise management. It caters to individuals from all walks of life, providing a user-friendly platform to monitor their daily workouts and wellness routines. This innovative platform seamlessly facilitates the selection of exercise categories and specific muscle groups. With an extensive repository of exercises exceeding a hundred, the application offers practical examples and intricate exercise details. Moreover, it showcases informative video tutorials sourced from YouTube, thereby creating a comprehensive resource hub for exercise enthusiasts

UTILIZING MACHINE LEARNING FOR CRIMINAL FACE DETECTION SYSTEM

*Prof Vijaya Sagvekar*1, Shubham chaudhary*2, Vinayak Trimukhe*3,
Siddhesh Shitole*4, Prathamesh Mhatre*5*



The aim is to create an advanced system employing machine learning for precise real-time recognition and identification of criminal faces. This innovative technology assists law enforcement agencies in swiftly identifying and apprehending criminals, all while maintaining a strong focus on privacy, accuracy, and fairness. The process involves gathering substantial crime-related data and employing the LBPH (Local Binary Pattern Histogram) algorithm to isolate relevant facial features, thereby training classification models to proficiently identify and categorize criminal faces. The methodology encompasses the refinement of the identification process through techniques like Haar cascades to enhance accuracy. The performance of the experimental model is rigorously evaluated, including comparisons with existing systems and assessments of lighting and exposure effects.

The LBPH algorithm is a robust face recognition technique for fault detection, effectively filtering out non-relevant features and training models for recognizing illicit individuals. It is suitable for smaller datasets and adapts to varying lighting conditions and facial orientations. Including descriptive features like Haar digits boosts model accuracy and mitigates false positives. The algorithm outperforms other facial recognition methods, making it an ideal choice for law enforcement applications. Fairness and equity are stressed, demonstrating the potential for reliable and precise outcomes when thoughtfully implemented and assessed.

THE REALM OF CRYPTOCURRENCIES

*Prof Vijaya Sagvekar*1, Sanket Jadhav*2, Tejas Gawade*3, Jainish Sancheti*4, Ved Gandhi* 5*

Cryptocurrencies have gained interest since 2009, with investors seeking algorithm-based trading strategies to outperform market trends. Although daily returns in cryptocurrencies do not exhibit long-range dependence, inherent volatility in major cryptocurrencies persists. This paper introduces a dynamic verbal decision-making approach that constructs decision models to assist cryptocurrency investors in making buy/hold/sell decisions. The approach demonstrates computational efficiency and is effective in identifying underperforming cryptocurrency actions that are not captured through conventional econometric methodologies. The findings reveal arbitrage opportunities that surpass buy-and-hold and random strategies, indicating the potential for the proposed approach to enhance decision-making and capitalize on advantageous trading scenarios in the dynamic cryptocurrency landscape.

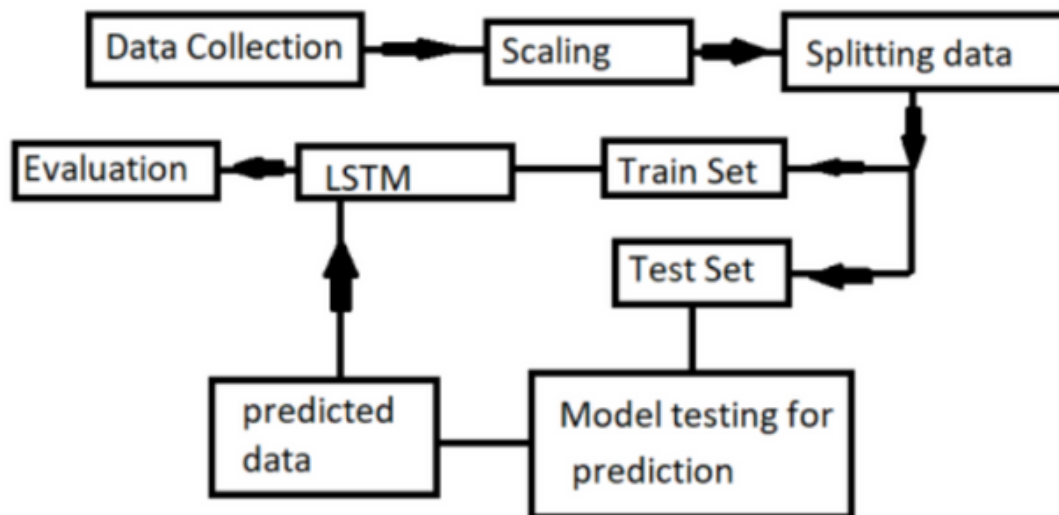
A CERTIFICATE SYSTEM REINVENTED THROUGH BLOCKCHAIN TECHNOLOGY

*Prof. Archana Salaskar*1, Chirag Meher*2, Deepali Magare*3, Pratik Tiwari*4, Umang Kambli*5*

Blockchain technology enables an impervious ledger for certification issuance and verification, ensuring authenticity and mitigating fraud, tampering, and loss risks. This scalable system is applicable across various industries, including education, healthcare, and finance. It provides a transparent record of certification issuance and validation, reducing the need for intermediaries and enhancing efficiency. The system also includes robust safeguards for data privacy and security, safeguarding user information from unauthorized access. Governed by comprehensive regulations, the system maintains the sanctity of the certification process. In an era of digital transactions, blockchain-based certification systems uphold the authenticity of certifications, paving the way for a new standard in managing and verifying credentials.

FORECASTING STOCK MARKET TRENDS THROUGH LONG SHORT-TERM MEMORY (LSTM) ANALYSIS

*Prof. Pravin Patil*1, Deepak Gupta*2, Durgesh Sahani*3,
Nikhil Khandare*4, Kamalesh Nadar*5*

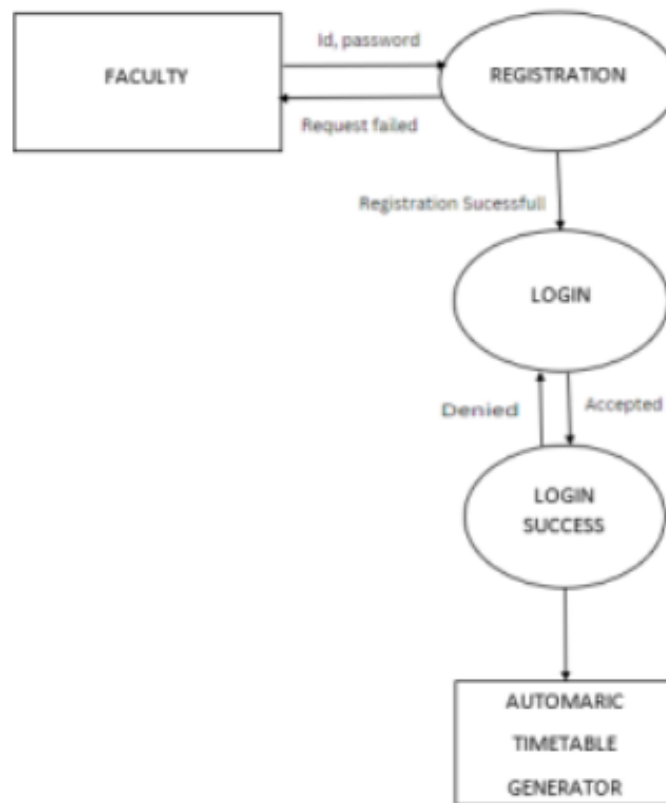


Navigating the complexities of asset investment has historically proven to be a challenging endeavor. The inherent volatility of financial markets defies straightforward prediction models, making the task of forecasting future asset values with high accuracy a formidable one. Amidst this backdrop, the surge of machine learning, which entails enabling computers to perform tasks that conventionally require human intelligence, has emerged as a dominant force in scientific research.

This article focuses on the construction of a predictive stock market model, employing a recurrent neural network (RNN), with particular emphasis on the Long-Short Term Memory (LSTM) variant. This specialized model is harnessed to forecast forthcoming stock price values. The central objective of this study is to ascertain the extent to which a machine learning algorithm can achieve precision in predictions, and to explore how iteratively refining the model through epochs (iterations) can enhance its predictive capabilities.

OPTIMIZING TIMETABLES WITH GENETIC ALGORITHM-BASED TIMETABLE GENERATOR

*Prof Archana Salaskar*1, Rupesh Malla*2, Anurag Singh*3,
Parmatma Sahani*4, Mohammad Khorajjiya*5*



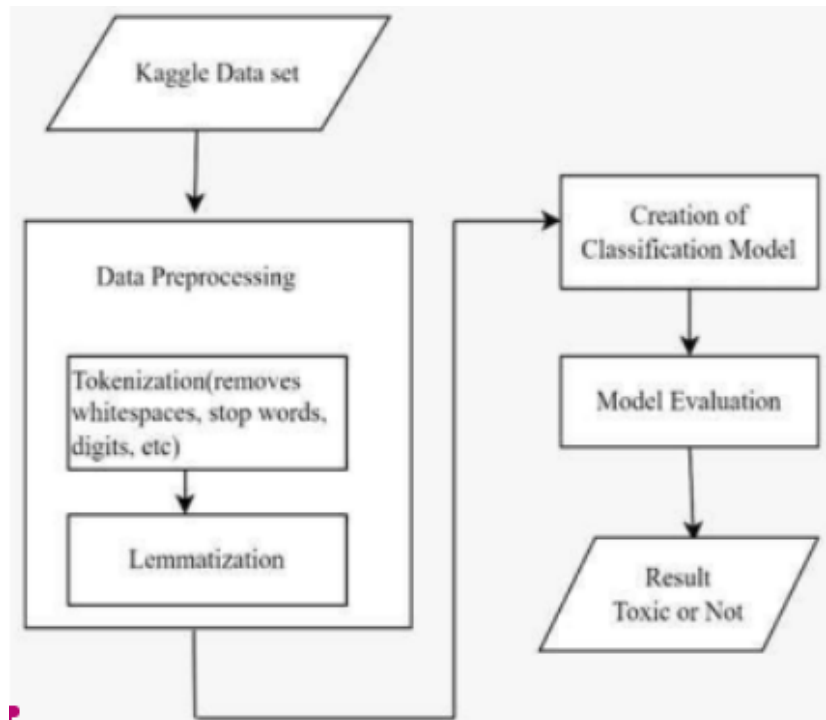
The solution at hand introduces an automated timetable generation system, leveraging the effectiveness of a genetic algorithm methodology. The primary goal is to streamline the labor-intensive and time-consuming process of timetable creation. This innovative system is designed to facilitate accurate and error-free timetable generation for educational institutions.

By soliciting various inputs such as subject count, teacher availability, teacher workloads, semester divisions, classroom assignments, and lab resources, the system constructs meticulously crafted timetables. The genetic algorithm approach, implemented within this solution, draws upon a diverse array of strategies to ensure the optimal precision and reliability of the generated timetables.

In essence, the proposed solution endeavors to alleviate the complexities surrounding timetable creation by employing the power of genetic algorithms, ultimately reducing the burden on resources, both in terms of time and manpower, within educational institutions.

EVALUATING AN LSTM-CNN MODEL FOR TOXIC COMMENT DETECTION USING MACHINE LEARNING TECHNIQUES

*Prof. Pravin Patil*1, Ravindra Singh*2, Nikhil Mondkar*3,
Ammar Khan*4, Nikhil Parab*5*



The core objective of this study was to gauge the efficacy of a sophisticated deep-learning system in discerning the degree of toxicity present in online comments. This methodology was benchmarked against existing models, notably the Long Short-Term Memory (LSTM) and the combined Long Short-Term Memory - Convolutional Neural Network (LSTM-CNN). These models harness short-term memory patterns for analysis.

The procedural framework involved passing the comments through tokenization or vectorization processes to create word lists and embedded matrices. Subsequently, a classification model was employed for accurate labeling. The study's findings showcased that the proposed deep learning model exhibited commendable accuracy in categorizing internet comments based on their toxicity levels.

This pioneering approach holds substantial promise in effectively identifying and sifting out offensive comments within online forums and social media platforms. By doing so, it fosters a more secure and respectful online environment for all users. Beyond the immediate findings, the incorporation of this deep learning technique contributes to the evolution of natural language processing, advocates for digital ethics, and elevates the overall quality of online discourse.

UTILIZING MACHINE LEARNING FOR FOOTBALL MATCH OUTCOME PREDICTION

*Dr. Gayatri Bachav*1, Abhisheek Kate*2, Madhavi Gujar*3,
Kaustubh Wavare*4, Shubham Patil*5*



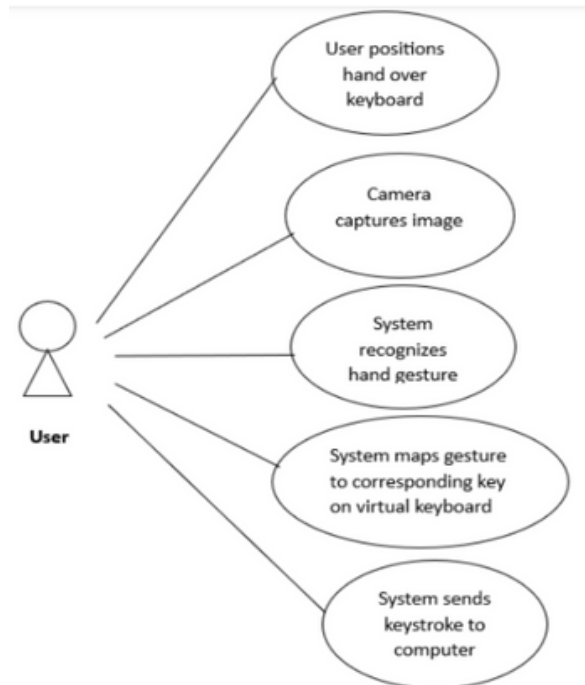
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UTILIZING OPENCV FOR VIRTUAL MOUSE AND KEYBOARD IMPLEMENTATION

*Prof. Viki Patil*1, Nikhil Digole*2, Abhishek Pandey*3, Shyam Mishra*4*



In the current era, computing has transcended traditional boundaries and extended to handheld devices such as smartphones and tablets. Despite this evolution, the input method—the QWERTY keyboard—has remained largely unchanged for decades. The emergence of virtual keyboards leverages sensor technology, enabling users to transform any surface into a functional keyboard. This paper introduces an innovative application rooted in image processing, visualizing a computer keyboard.

Our application aims to enhance accessibility and usability. By utilizing camera imagery, the virtual keyboard materializes and functions seamlessly. Hand gestures mimic the traditional keyboard typing experience, with finger movements being captured by the camera to facilitate on-screen typing. This inventive approach presents a futuristic perspective on keyboard interaction.

Additionally, the paper introduces a vision-based virtual mouse that employs hand coordinates as input. The mouse responds to finger movements, creating an intuitive and personalized experience. In sum, this paper advances the concept of a virtual keyboard and a vision-based virtual mouse, bridging traditional input methods with cutting-edge technology.

EMOTION AND STRESS DETECTION VIA MACHINE LEARNING FROM FACIAL EXPRESSIONS

*Prof. Manisha Patil*1,Uday Jadhav*2,Tanaya Hulavane*3,
Abhishek Shinde*4,Shraddha Mundhe*5*

Image processing serves as a transformative technique that digitizes images, enabling diverse operations for enhancement and information extraction. Among nonverbal communication, facial expressions stand out, encompassing eight universal emotions: neutral, happiness, sadness, anger, contempt, disgust, fear, and surprise. Detecting these emotions on faces holds substantial significance.

A technology-driven solution revolves around an elder monitoring system, harnessing video analysis to discern emotions from video imagery. Our proposed framework integrates video analysis, enabling real-time monitoring of seniors' well-being. In situations of urgency, the system promptly notifies family members and children through messaging.

In essence, this technology amalgamates image processing and emotion recognition, spotlighting the potential to revolutionize elder care through proactive monitoring and timely alerts.

ADVANCING FORENSIC FACE SKETCH CONSTRUCTION AND RECOGNITION

*-Prof.Nilesh Mali*1, Rutvik Shinde*2,Ketan Vane*3,Sahil Gaikwad*4*

Numerous techniques have been devised to automatically decipher topics in sketches based on eyewitness descriptions, yet they often underperform when applied to real forensic sketches and larger mugshot-like galleries used by law enforcement. While deep learning has shown effectiveness in diverse domains, its application to face photo-sketch recognition has been hindered by the scarcity of sketch images for extensive network training. Addressing these challenges, this study introduces several pivotal contributions: 1) Employing transfer learning, a state-of-the-art face photo recognition model is fine-tuned for face photo-sketch recognition, 2) Leveraging a three-dimensional morphable model to generate novel images artificially, expanding training data, preventing overfitting, and enhancing feature learning, 3) Augmenting testing phase performance with numerous synthetic sketches, and 4) Demonstrating improved results when combined with an advanced algorithm. The proposed framework substantially diminishes mean retrieval ranks for actual forensic sketches by 32.5%, and reduces error rates for familiar sketches by 80.7%, surpassing a leading method's performance.

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