

# Automatic Paddy Leaf Disease Recognition Using Image Processing

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## Abstract

The smart city implies a widespread vision that merges AI, decision-making, big data, information and communication technology (ICT), and the Internet of Things (IoT) to promote sustainable development. The processes described above are related to solving real-life problems. Food is one of the essential requirements of people. However, with time elapsing, plants are impacted by different sorts of illnesses, which cause great harm to agricultural plant production. Other than that, many nations' economies extraordinarily rely upon farming and it is likewise a requirement for a country to achieve agrarian efficiency of the fundamental horticultural item for individuals of that specific country. Rural efficiency is something on which the economy profoundly depends. Infection in plants assumes a significant part in the agribusiness field, as it is very normal to have diseases in plants. Plant infections influence people directly or by implication in well-being and monetarily. Identification of plant diseases is a very vital process to avoid losses in both quality and quantity of crops in the agricultural production system. Traditionally, plant diseases are checked through physical visualization, but this method is less effective, time-consuming, and requires expectorates involvement in detecting the diseases. In these regards, this project is developed to identify plant diseases by using image processing techniques for the detection and identification. The developed system can detect and diagnose four types of diseases namely brown sport, leaf blast, Hippa, and the health of paddy leaf. The prediction result achieved 99.7%. It is believed that this project is able to be a solution for rural farmers in detecting plant diseases.

**Keyword:** Plant disease, IoT, Image Processing, Disease Detection.

# Smart Timetable System Powered by Blockchain Technology

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## Abstract

Time scheduling is a well-known issue, faced by many organizations. Manual time scheduling consumes considerable time and effort, and creates results that are most complex and error likely. A lot of restraints were hiked when preparing a timetable. In Nilai University, timetable scheduling is still carried out using a manual method because there is a lack of an automated system which is not able to resolve the constraints. Allocating a time slot for all lectures, labs, and tutorials within a limited number of permitted timeslots, often violates the specified hard constraints. Here, we suggest that the introduced methods are genetic algorithms and execution in the blockchain-based database technology which are implemented in the system. The blockchain-based database is an integration of traditional databases and distributed databases where data is carried out and recorded through the database interface backed by multiple layers of blockchains. Blockchain technology is one of the prominent technologies, which is revolutionizing the world with its unique characteristic hashing encryption. In this system, scalable blockchain based database which is offering decentralization, immutability and Ethereum which is the community-run technology empowering the cryptocurrency Ethereum (ETH) and decentralized applications were implemented to bring the better solution. Implementing a genetic algorithm and blockchain-based database in the system gives 370562ms response overall. In this overall response, 107ms is recorded on queries. Web3 authentication is implemented through the Ethereum network via Metamask wallet for increasing the user authentication security to a high standard.

**Keywords:** Genetic algorithm, Blockchain-based Database, Ethereum, Immutability, Integrity.

# Deepfake Detection in Highly Compressed Video Using Enhanced Super-Resolution Generative Adversarial Network (ESRGAN)

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## Abstract

In recent years, there was an emergence of cutting-edge technology that can manipulate pictures and video in a matter of minutes instead of a day by using traditional video editing software such as Adobe After Effects. This type of technology uses deep learning to fabricate the person's face and swap it into someone else's face. During its emergence, it can easily be detected by the naked eye because of the anomaly around the facial region of the subject (different color contrast, pixelated, and harsh tilting around the facial region). But recently, due to extensive training for the neural network, the most fabricated video can't be distinguished using the naked eye. This can bring disruption in terms of safety and security for society as well as damage their reputations. The project aims to detect a compressed deepfake video due to multiple uploads and downloads in social media using a combination of two methods, Spatial/Temporal Analysis and Enhanced Super-Resolution Generative Adversarial Network (ESRGAN). For Spatial/Temporal Analysis, a Convolutional Neural Network (CNN) is used for its deep learning architecture. CNN is a Neural Network that uses multilayer perception and is a type of Feedforward Neural Network (FNN), information that moves in a forward direction from input nodes. This type of network does not loop as it goes from input nodes to hidden nodes and finally, to the output nodes. To further improve the detection accuracy for a video that is compressed, ESRGAN has been implemented inside the current system algorithm. ESRGAN is a type of video upscaling that is used to improve low compressed or pixelated video that uses Generative Adversarial Networks (GANs) as its deep learning algorithm. The project was developed using Python in Jupyterlab and can detect deepfake videos with more than 30% accuracy compared to the current system after the compressed video was enhanced by ESRGAN.

**Keywords:** Spatial/Temporal Analysis, Convolutional Neural Network, Feedforward Neural Network (FNN)

# Automatic Vehicle Number Plate Detection System Using YOLOv4

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## Abstract

Over the past few years, the number of vehicles has increased sharply which has led to mismanagement and various security issues. It has also become difficult to detect and recognize the number plate of several moving vehicles and drudgery to manually check the vehicle records. Therefore, to address this issue, there is a need for an Automatic Vehicle Number Plate Detection System (AVNDP) which is proposed in this project. AVNDP is the system that recognizes the vehicle number plate along with its character and provides the desired output. AVNDP includes the detection of the Vehicle from the captured image. The captured number plate of the vehicle is then detected based on a feature like boundaries and character presence. Character detection and segmentation are done where the alphanumeric character is extracted from the number plate and then the character recognition is done. Vehicle and vehicle number plate detection is done using the YOLOV4 algorithm based on the single Convolution and Neural Network (CNN). Different image pre-processing technique is applied for better detection. The Tesseract OCR character recognition is done which uses the Last Short-Term Memory (LSTM) mechanism and character segmentation are used for the proper recognition of the character in the vehicle plate. The proposed system is based on the python and Django framework and it is trained using the Common Object in Context (COCO) dataset. The character that has been recognized by the system checks the database of the vehicle, retrieves the data, and provides the required information about the vehicle. The proposed system has been able to gain accuracy of 92% to detect the number plate and the 81% to recognize the character of the number plate. AVNDP system helps to detect the vehicle number plate with a high character recognition rate helping to manage and control the vehicle in a proper and systematic way.

**Keywords:** Character detection, segmentation, LSTM, Python

# Bus Location Tracking and Fare Generator Using Map Matching Algorithm

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## Abstract

Since finding and understanding bus route information is extremely challenging when traveling a long distance by bus, this outdated approach discourages people from arriving at their destination on time. In addition, this traditional method has the problem of unfair bus fares. Numerous systems have been created to address this problem, however, the bulk of them miss the mark of resolving the core issue that arises when using public transit. Passengers still have to deal with traffic jams during peak travel times due to the incompatibility of the system, which was unable to solve the issue. Therefore, to address all the problems and solve the issue, a Bus location tracking and fare generator system is developed which allows the passenger to learn about bus fare for the total distance traveled and also receive an update on bus location using a tracking system. This system is based on Map Matching Algorithm and developed using python and MySQL. The system links edges in an existing street graph to records of serial position points obtained, for example, via GPS. Different methods are used to match the data to the road network after it has been recorded. The algorithm uses real-time bus location to calculate the route information and generate an optimal route, distance, and route fare for the passenger. By implementing the developed system, there will be more transparency in the public transportation system. The public transportation system can operate via a variety of libraries and techniques, that will significantly transform the community by empowering and informing its individuals. Additionally, this approach will help with the majority of issues like reduced traffic, reduced pollution, time savings, and penny war. In the end, the passenger can benefit from accurate distance calculations and real-time bus location tracking, which will assist individuals to manage their daily bus travel schedules and financial management.

**Keywords:** Street graph, Location tracking, Route fare, Python

# Artificial Intelligence Virtual Mouse Using Hand Gesture and Fingertip Detection

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## Abstract

There is a current emerging trend to improve the interactivity of our devices and find ways to operate them virtually. Recently, the leap motion technology that allows users to interact with laptops and computers using gesture controls has become very popular. Users can control some of the functionalities of their computers or laptops by waving their hands in front of it. This project proposed an artificial intelligence virtual mouse using hand gestures and fingertip detection. Although this device is beneficial to all users, it is especially advantageous to the paralyzed or elderly who have difficulty using a physical mouse. This project proposed to implement using computer vision to allow users to navigate the mouse-controlling system. Different hand gestures will be used to perform tasks such as clicking and dragging objects. Users can perform all mouse operations by showing a different number of fingers. As an input device, the suggested system will require a webcam. and be implemented using Python and OpenCV alongside other tools. The camera's output will be presented on the system's screen so that the user can further calibrate it. It is expected that the accuracy of the proposed virtual mouse system will be more than 96% compared to the previous system.

**Keywords:** Virtual Mouse, Hand Gesture, Fingertip Detection, Computer Vision, OpenCV

# Smart Home Theft Detection System by Using Deep Learning

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## Abstract

The Smart Home Theft Detection System is a home security technology that alerts the owner of the residence in the event of a robbery. In this modern era, everyone is focused on their careers to live better lives. With busy lives, it is impossible to monitor home safety and the surveillance camera 24 hours a day, seven days a week. This system is a smart CCTV camera that can detect any suspicious people's activity based on the tool they carry along to use for robbery. The system can capture images of those tools and make decisions on whether they are normal or dangerous. There are two dangerous tools categories which include sharpen tools like a switchblade, machete, and swords, and other hardware tools like hammers, pliers, spanners, and so on. This system is developed using the AI (artificial intelligence) Image processing technique, which begins with using a dataset of weapons to detect suspicious activity images. Then, using YOLO, a model is created on the dataset to detect any weapons used during the robbery. The YOLO model keeps track of suspicious activity based on harmful tools by robbers. It captures the robber's dangerous tools and classifies them as harmful or non-harmful. This model is fed into the camera, if it is an intrusion without any tools it just alerts the owner by sending a message to the owner, and if the person tries to enter the home with dangerous tools, it will send an alert message to the owner and to the police with the evidence like location, time, and along with the captured images. Datasets were collected from the Kaggle data warehouse, and some were collected from YouTube CCTV cameras that captured videos and images to feed to the designed latest version of the YOLO V7 model to identify the robbery by detecting the harmful tools carried by individuals at the scene. This technology is being enhanced to detect individuals who show suspicious face gestures, such as wearing masks that cover parts of their faces.

**Keywords:** Harmful tools detection (weapons), Image processing, AI (artificial intelligence), You only look once (YOLO), Alert message, Alarm owner / Police

# Early Fire Detection System by using Deep Learning and Open CV

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## Abstract

Fire can cause disasters for living things and non-living things. A fire detection system is important to detect and prevent damages that can be caused by the fire such as loss of life, loss of properties and belongings. To solve this problem, several fire detection systems have been created to prevent fire occurrence. However, these traditional fire detection systems have some disadvantages such as if the fire detection is functioned by smoke detection that the fire alarm will trigger when detected the smoke. It will cause a delay in the time that actual time for the fire starts that will give a wrong alert. Besides that, Sensor-based and Colour Based Flame detection systems have a high false rate and low accuracy. To reduce the limitations and the delay of the alert from the alarm, an early fire detection system using Deep Learning and Open CV is proposed. The coding is written in python language using the open CV library for image processing. The theoretical parts emphasize more on image processing, color modeling, and the working algorithm to detect fire. Furthermore, the detection is done through a webcam that is a volume sensor that covers a wide range by the method of deep learning and produces warning alarms when a fire is detected. The outcome of the proposed system will make a more efficient fire detection system compared to the traditional fire detection systems.

**Keywords:** Deep Learning, Early Fire Detection, Open CV.



# AI Based Anti-Cheating Examination Proctoring System with Facial Recognition

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## Abstract

The world has gone digital in the wake of the global pandemic. With the evolution of technology, the educational field has taken a step forward in migrating from physical to online examination. This results in universities relying on the proctoring system for assistance. Students still find creative routes to cheat. A habit of prioritizing good results over learning makes the students cheat. While delivering a severe blow on the purpose of exams, students tend to have less focus and undertake the short path to guarantee them a good grade. Controlling students in such a situation might be a challenge for examiners particularly in effectively identifying the perpetrator. Currently, the existing systems need to give attention to improving accuracy while providing flexibility. The purpose of this research is to create an online proctoring system that can be used in preventing student cheating while gaining the trust of the university administration team. The proposed system is to be developed using the image processing method. The image data on students seating examinations online will be collected and segmented individually. The segmented data will be pre-processed, where a few points on students' faces will be identified and used as a rule in determining suspicious behaviour. Then, the image is supplied to a classifier for identifying suspicious behaviour. The proposed research project is expected to contribute to online examination implementation by using face recognition techniques that aim to maintain the integrity of the student and also education organizations. This will become a vital element in the educational field in the future.

**Keywords:** Artificial intelligence, online proctor system, image processing, academic integrity

# Mitigate Ransomware attack on PC using Supervised Learning

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## Abstract

Ransomware is considered a significant threat to home users and enterprises. In corporate scenarios, users' computers usually store only system and program files, while all the documents are accessed from shared servers. In these scenarios, one ransomware-infected host can lock access to all shared files it has access to, which can be the full set of files from a workgroup of users. In this project, a program to detect and block ransomware activity based on file-sharing traffic analysis will be developed using the Machine Learning technique. The program monitors the traffic exchanged between the clients and the file servers and using machine learning techniques it searches for patterns in the traffic that betray ransomware actions while reading and overwriting files. Features from network traffic that describe the activity of opening, closing, and modifying files will be extracted. These features allow the differentiation between ransomware activity and high activity from benign applications. The type of machine learning used in this project is supervised learning. In this type, machine learning algorithms are trained on labelled data. Although the data needs to be accurately labelled for this method to work, supervised learning is extremely powerful when used in the right circumstances and the circumstances are to analyse ransomware attacks.

**Keywords:** Ransomware, Machine Learning, Supervised Learning