PORTABLE SECURITY SYSTEM

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ABSTRACT

In an era where security is paramount, traditional surveillance systems have often fallen short of providing advanced identification capabilities. The proposed work describes a portable security system designed for indoor use, featuring an EZ-p31 CCTV camera and a WIFI module for data transmission. The system continuously records video and captures photos every second, which are uploaded to a website. The website uses a face recognition algorithm to detect and store human faces, automatically deleting other screenshots. Upon user login, personal data and photos are uploaded to the backend. The backend compares incoming screenshots with stored photos, displaying detailed information if a match is found. This system provides a detailed userfriendly interface for real-time monitoring and security management.

Keyword: *Face Recognition, Image Processing, Human Face Detection*

1. INTRODUCTION

In the contemporary landscape where security stands as a paramount concern, conventional surveillance systems often prove inadequate in providing advanced identification capabilities. In response to this challenge, this project presents a cutting-edge solution in the form of a portable security system tailored for indoor use. Leveraging the EZ-p31 CCTV camera in tandem with a Wi-Fi module for seamless data transmission, this system pioneers a new era of surveillance technology. Continuously recording video footage and capturing photos at a rapid rate, ensures comprehensive coverage of the monitored area. The captured data is then transmitted to a dedicated website where a sophisticated face recognition algorithm takes center stage. This algorithm adeptly discerns and stores human faces, promptly discarding extraneous photos. Upon user authentication, personal data and photos are securely uploaded to the system's backend. Here, the magic unfolds as the backend meticulously compares incoming screenshots with the repository of stored images, promptly flagging matches and furnishing detailed information as required. The culmination of these components manifests in a user-friendly interface, empowering real-time monitoring and seamless security management. This project heralds a paradigm shift in indoor security, promising heightened efficacy and precision in identification capabilities.

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2. LITERATURE REVIEW

"Image Quality Assessment for Face Recognition" in IEEE Transactions on Image Processing: This survey delves into methods and metrics for assessing the quality of images used in face recognition systems. It may cover various image preprocessing techniques to enhance image quality and improve the performance of face recognition algorithms. The focus is on ensuring that the images processed in face recognition systems are of sufficient quality to yield accurate and reliable results [1]."Facial Recognition Using Eigen-faces in Computer Vision and Pattern Recognition": This survey explores the eigenfaces method, which is a dimensionality reduction technique used in facial recognition. It discusses the advantages of eigenfaces, such as its ability to represent facial features effectively and its resistance to variations in lighting and expression. Drawbacks may also be discussed, including sensitivity to pose variations and the need for a large training dataset [2]."Smart Door Lock Control System Using Raspberry Pi": This literature survey likely focuses on a system that employs Raspberry Pi for creating a smart door lock control system. It may detail the architecture of the system, the components involved (like Raspberry Pi, sensors, and locks), and how it can be used for home automation and security. The survey could discuss the advantages of using Raspberry Pi, such as its flexibility and wide range of connectivity options [3]. "Cloud-Based Surveillance Using ESP32 CAM": This survey explores a surveillance system that utilizes ESP32 CAM devices for capturing and transmitting video data to the cloud. It may discuss how cloud services are used for data storage, remote access, and analysis of surveillance footage. The survey might highlight the benefits of this approach, such as remote monitoring capabilities, but also address challenges like potential latency due to cloud-based processing and the reliance on internet connectivity [4].

3. PROPOSED SYSTEM

3.1 Block Diagram:

Wi-Fi Camera: This is the starting point where the camera is connected to the network. Capture Image: The camera captures images and sends them to the database. User Interface: The captured image can be accessed or managed through a user interface. Website: The image can also be uploaded to a website. Database: A central database that stores the image data. Image without a human face: If the image does not contain a human face, it can be deleted otherwise saved in a secondary database (Database(2)).User Registration: If the image contains a human face, it can be used for user registration with the photo being stored in an information database (Database(3)). Face Recognition: The system performs face recognition on the image. If the face matches, details are shown. If the face does not match, details are not shown. This block diagram outlines a facial recognition system that uses a Wi-Fi camera to capture images, which are then processed for face detection and user registration. The system can store images and user information in databases that capture images upon detecting a human face, and these images are then uploaded for processing and storage and to display details based on face recognition results.

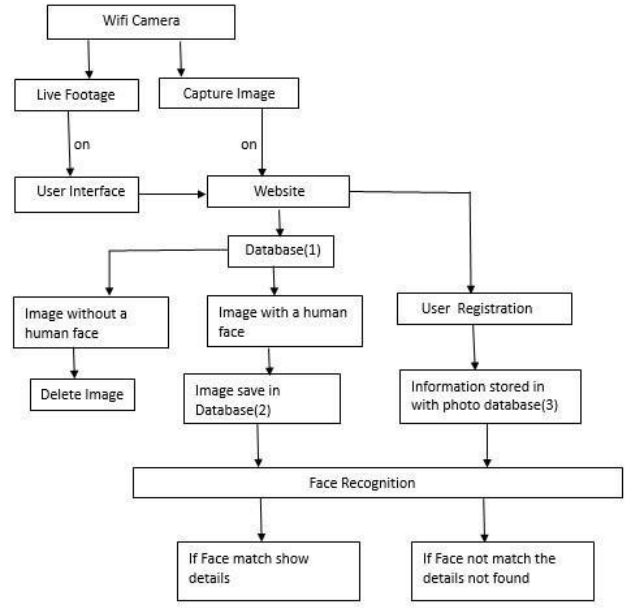
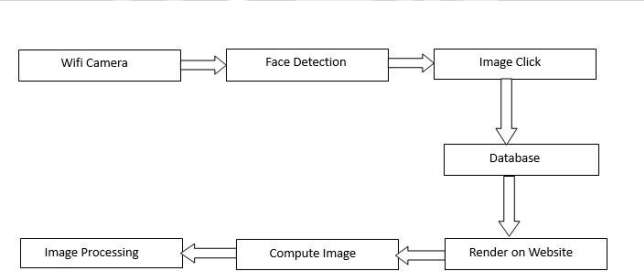


Fig -1: Block Diagram

3.2 Flow Chart

Wi-Fi Camera: This is the starting point where the camera is connected to the network. Face Detection: The system detects faces using the camera. Image Click: The camera captures the image once a face is detected. Database: The captured image data is stored in a database. Render on Website: Finally, the processed image is displayed or rendered on a website. Compute Image: The system computes or analyzes the image as part of the processing. Image Processing: This step involves processing the captured image. The flow chart outlines a process where a Wi-Fi camera captures images upon detecting a face, and these images are then processed and displayed on a website.



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4. WORKING

Setting up the Video Streaming Server: The algorithm utilizes Flask to create an HTTP server.
This server is responsible for streaming video captured from a WiFi camera.Facial Recognition for Identifying Unknown Individuals: The core of the identification process relies on the "face_recognition" library. This library compares each frame of the streaming video with the images stored in the "data" folder. Within the "data" folder, there are images of both known and unknown individuals. If a face in the frame matches one of the known faces, the algorithm identifies the person.Server handling using php server for database Storage: The utilization of a PHP server for database storage has been instrumental in creating a robust and dynamic system capable of efficiently handling data. By leveraging PHP's serverside scripting capabilities, we've established a reliable framework for storing and managing data, ensuring scalability, security, and accessibility.Handling Unknown Persons: When the camera detects an unknown person, the algorithm saves the image in the "data" folder.Subsequently, it updates the database with relevant information about the detected unknown individual.Management of Known Person Images: Known person images are added to the system via a web interface during the registration process. These images are then stored in the "data" folder for future reference and comparison.

5. RESULTS

1)Face Matching Output

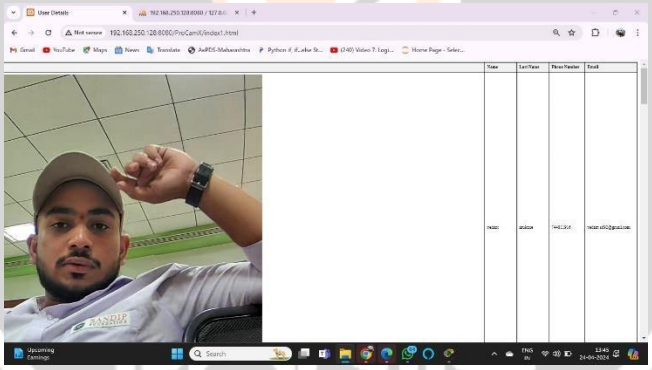

Fig-3 Face Matching Output

2)Face Not Match Output

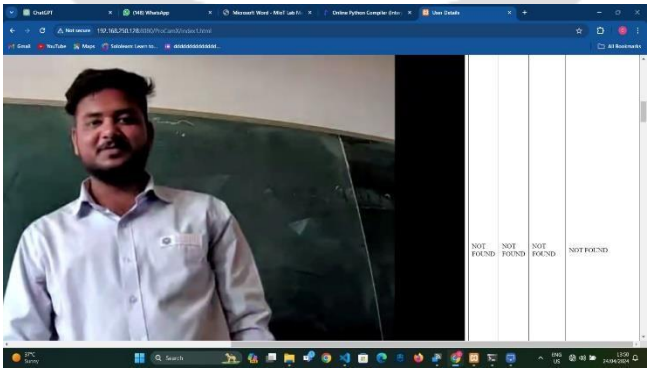

Fig. Face Not Match Output

5.1 Website Link: http://192.168.101.128:8080/ProCamX/index1.html

4. CONCLUSIONS

In conclusion, this IoT-based project offers an innovative solution to prioritize emergency vehicles in traffic by dynamically adjusting traffic signals based on vehicle density. By utilizing IR sensors and a web-controlled interface, the system effectively manages traffic flow, allocating shorter green signal durations for low-density lanes and longer durations for high-density lanes. Furthermore, the manual override feature ensures swift passage for emergency vehicles when detected, enhancing overall traffic efficiency and emergency response effectiveness. This project demonstrates the potential of IoT technology in optimizing urban traffic management systems for improved safety and responsiveness.

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