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Smart Anti-Theft System

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ABSTRACTThe proposed system is about designing a system that can immediately notify a homeowner if someone breaks into their house. Existing systems can only detect the intruder after the theft has already occurred or cannot distinguish between human and non-human objects. The proposed system uses Wireless Sensors Networks (WSNs), Internet of Things (IoT), and Cognitive Internet of Things to create a smart home anti-theft system that can detect intruders even if they try to hide their face. The system is cost-effective and efficient and can handle large amounts of video data in real-time.

I. INTRODUCTION

A smart anti-theft system is a security solution that uses sensors, cameras, and wireless communication to detect and prevent theft or unauthorized access to valuable property. The system is designed to provide a high level of security for assets like homes, cars, and commercial properties. It uses advanced technology to detect intruders and can send alerts to the owner or authorities to prevent theft or unauthorized access. The smart anti-theft system detects any unusual activity or movement and alerts the owner or authorities. It can also activate alarms or immobilize the asset to prevent theft. The system can monitor in real-time, making it an efficient and effective security solution. The demand for better security solutions and advancements in technology have driven the development of smart anti-theft systems. With the integration of IoT and other smart technologies, these systems have become more intelligent and connected with other systems, making them even more effective at preventing theft. Smart anti-theft systems have become very important for people and businesses as they help protect valuable assets from theft and unauthorized access. Due to the rise in theft incidents and the lack of access to smart security gadgets, researchers have proposed a cost-effective and efficient smart home anti-theft system that can detect intruders and instantly alert homeowners. This system also includes large video data handling in real-time to help implement home security.

II. RELATED WORK

We have found different papers related smart anti-theft detection. Different security systems used for different purposes. S Pandya, H Ghayvat, K Kotecha, M Awais has done demonstrations with a CP-PLUS analog camera, customized hardware with Bluetooth and Wi-Fi, a memory card, and a Samsung Grand mobile device to create a smart home security system. They placed the camera in each room of the house to detect intruders with smart gadgets. When an intruder enters the monitored area, a face detection module captures their movement. The system activates the camera to capture images of the intruder at 15 frames per second. This helps differentiate between human and non-human objects and provides enhanced security to the smart home. The smart home anti-theft system works by capturing the movement of intruders with a camera and face detection module. When an intruder is detected, the camera starts recording at a rate of 15 frames per second and sends the initial frame to the homeowner on a mobile app. The system then continues to record at a rate of 45 frames per second for up to 40 seconds and the video into mp4 format to be sent to the homeowner. This allows the homeowner to quickly decide whether to inform neighbors or the police. The detailed technical properties of the core modules of the system are explained in the following.

- Functioning Module/Processing Module:** Captures the presence of an intruder in the surveillance area as shown in Figure 3 at the rate of 15 frames per second. After detecting an intruder, the functioning module sends the captured frames to the identification module (M) for detection and intruder identification.
- Identification Module:** When an intruder enters the surveillance area, the identification module (M) detects the presence and identifies whether it is human or non-human by assessing various regions of the face of the captured intruder using the eye and face detection module (Me). The identification module (M) has four submodules.
- Storage Module:** This module stores the images of all the captured intruders. The detection and recognition of any unauthorized access in the smart home surveillance area is captured by the smart home anti-theft system in three phases: (a) primary face detection phase; (b) secondary face detection phase; and (c) a final phase where an intruder has partially or fully hidden their face or has been detected in the dark.

III. METHODOLOGY

The proposed smart home anti-theft system will use a range of sensors, cameras, and customized hardware to detect and prevent unauthorized access to the home. The system operates at different levels through a software interface that deploys an intelligent sensing node connected to a central sensing node, which acknowledges the data and sends it to a storage server. Motion sensors are placed around the home to detect any movement, and if they detect any suspicious activity, they can trigger an alarm and send alerts to the owner's smartphone. Additionally, a network of security cameras provides live video feeds of the home that can be accessed remotely using a mobile app and can also send alerts to the owner's smartphone if they detect any motion or suspicious activity. The system is designed to detect and report unsupervised human activity using large data handling techniques in near real-time. The design for the proposed system is shown in figure (a).

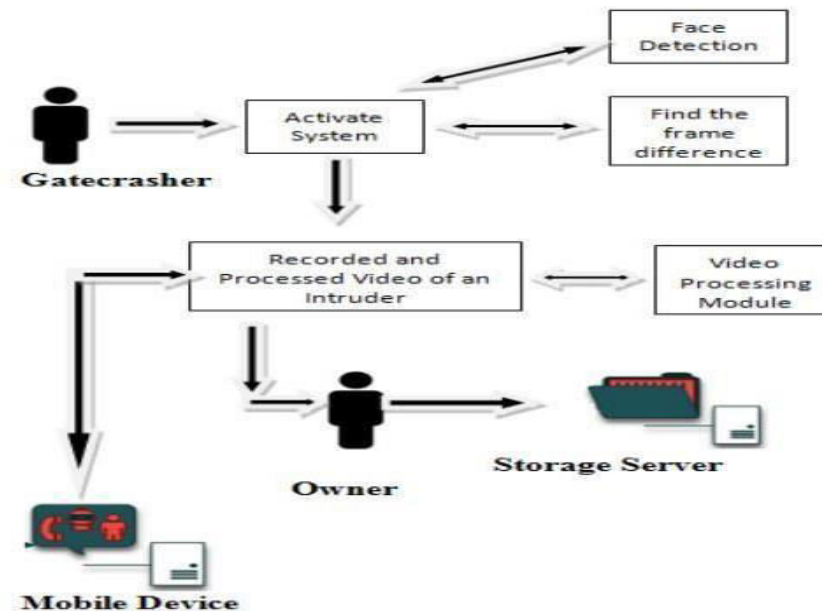


Figure. a Shows the system design of smart anti-theft system



IV. EXPERIMENTAL RESULTS

Figures shows the results of theft Detection by using the LBPH algorithm. Figures. (1), (2), (3), (4), (5) and (6) shows the whole process of theft detection.

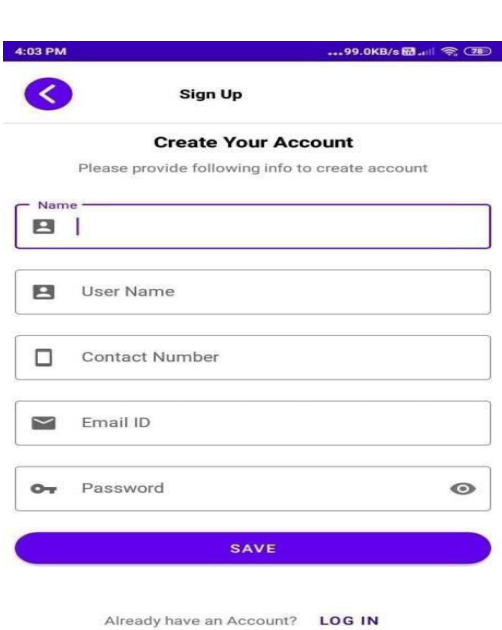


Figure 1:Create account

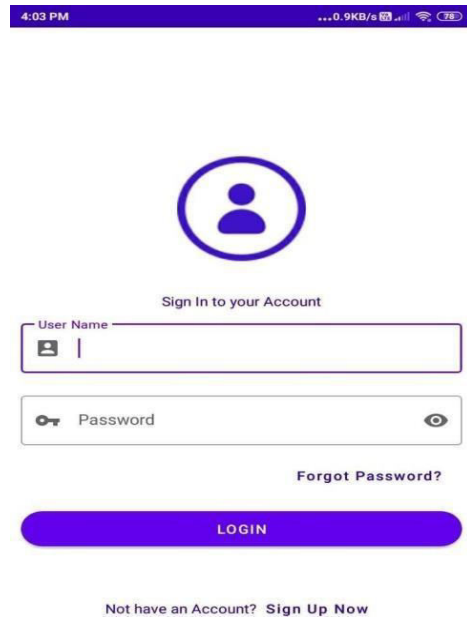


Figure 2:Login account

Figure (a) shows the creating an user account and figure (b) shows how to login into user account.

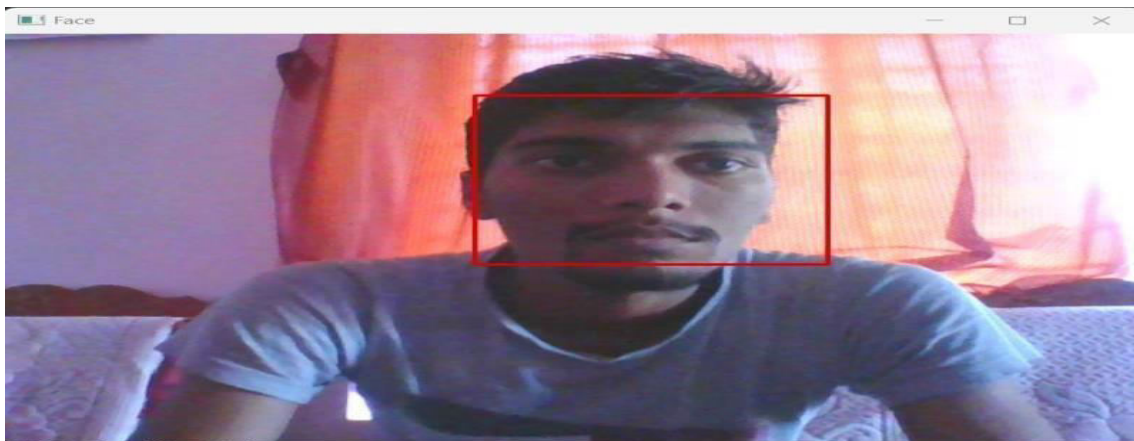


Figure 3: Dataset creator

A dataset creator creates and manages a database. This database stores information about authorized users and their devices, such as their names, contact information, device details, and access credentials. This information can be used to control access to a system or device, ensuring that only authorized users can access it. The dataset creator is responsible for ensuring that the information is accurate and up-to-date, and that it is securely stored and protected from unauthorized access.



Figure4: Image of trainer dataset

A trainer dataset is a collection of input data, along with the corresponding output labels or target values, that is used to train a model. By exposing the model to a diverse range of labelled examples during training, it learns to identify patterns and relationships in the data, and adjust its internal parameters to make better predictions on new, unseen data.

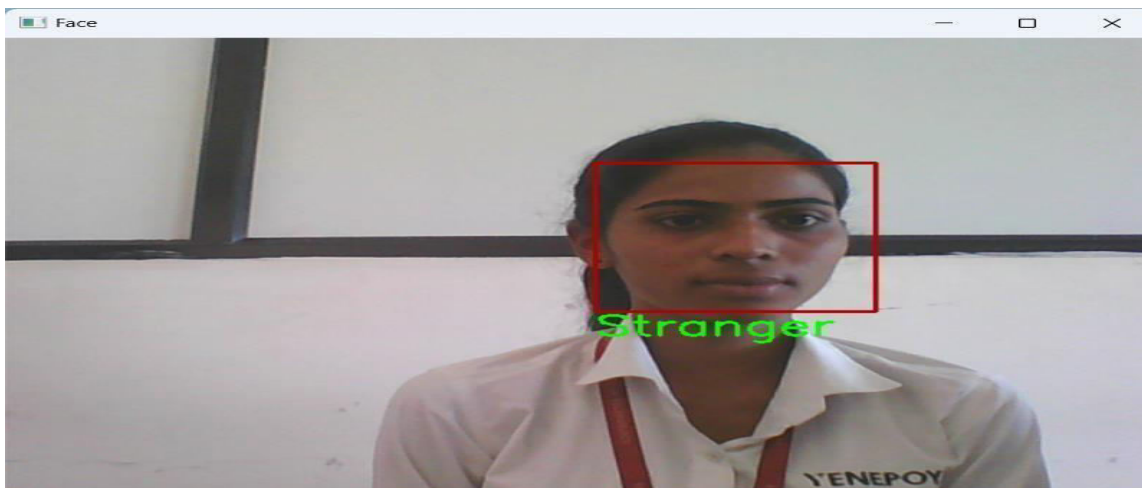


Figure5: Image of detector dataset

The detector dataset is a large collection of images that is used to teach a machine learning model how to recognize faces in new images. Each image in the dataset contains one or more faces, and the data is labeled with information about where each face is located in the image and how big it is. This labeled information is then used to train the machine learning model to accurately detect faces in new images that it has never seen before and Figure (6) shows the message or notification received by the owner.

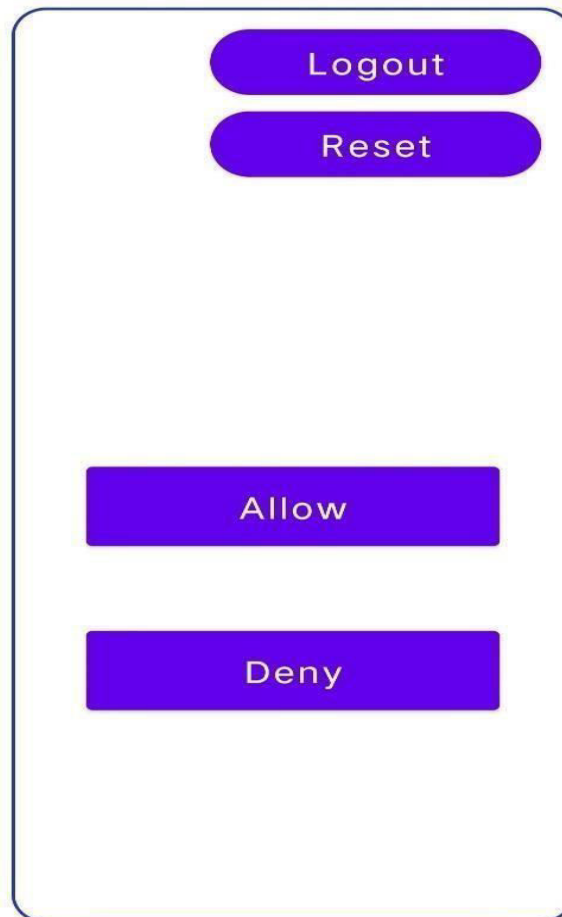


Figure6: Allow\deny option

V. CONCLUSION

The SmartAntitheft system is an advanced security solution that uses various sensors and cameras to provide real-time monitoring and control of your home's security. The system can detect human intruders and prevent false alarms caused by non-human objects. The system is cost-efficient and effective in preventing theft by providing instant notification of intrusion and triggering automatic emergency response actions. However, the system requires internet connectivity to notify the house owner, which may pose some security and privacy concerns. These challenges are expected to be resolved in the future as technology continues to advance.

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