



IOT BASED REAL-TIME FACE RECOGNITION AND WEAPON DETECTION DOOR LOCK SYSTEM USING NEURAL NETWORK

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Abstract: Approximately, there are 2.5 million burglaries a year, out of which 66% of those are home break ins. There is at least one burglary every 13 seconds. Smart door lock security systems have become indispensable in daily life. Security systems prevent robbery in highly secure areas such as home environments with lesser power consumption and also more reliable standalone security devices for door lock systems as well as Intruder detection. Also nowadays, privacy and security has become an important issue in our day to day life. Burglary and global attacks continue to escalate, so it is exigent to find different solutions to ensure the safety of individuals. And, to ensure that in our daily life we are secure, a lot of research is going on in the field of IoT. Security matters to this day and that's why we are up with this project of Face recognition and weapon detection systems. We are developing this approach using Raspberry-pi, where a person is allowed to enter the house only if his/her face is recognized by the system and he does not carry any weapon with him. This proposed system is more reliable and effective through the point of view of security.

Keywords -Internet of Things(IoT), Neural Network, Raspberry Pi, Face Recognition, Weapon Detection

I. INTRODUCTION

In this modern era, technology is constantly changing the world. The emerging need of smart devices has boosted the concept of connecting everyday objects with existing networks. The Internet has a huge influence in people's life and thus a lot of new technologies are emerging rapidly. 'Internet of Things' allows us to connect and monitor real world objects with the help of the internet, which helps for exchanging data between the objects. People nowadays prefer automatic systems rather than manual systems. Home Automation systems are apt for modern lifestyle. When it comes to security and safety of homes this concept can be incorporated. The proposed system focuses on building a Smart Door Lock System by interfacing the components with Raspberry pi which will send alert messages to the authorized user in case any trespassers would try to enter the house. Thus this system provides security from illegal entry. The system has magnetic sensors installed at the entry point of the door to detect weapons, if someone tries to barge inside. In case any burglar tries to break inside the house, then the siren is activated and alert messages will be sent to the owner and the police. The primary objective of developing this project is to implement a working model of a door lock system which can recognize familiar faces whose data had already been stored in the database of the proposed system. [6] Also the system allows for fast and reliable processing of high quality data and it will also react to the presence of weaponries. This model is allowing people to add more functionality to the traditional door lock system. Also the proposed system consumes less power and provides more security from intruder detection and weapons.

II. BLOCK DIAGRAM AND DESCRIPTION

i)Face Recognition: It is a system capable of identifying and verifying a person from the stored database. It is typically used in security systems. The database of the system consists of the images of the people who are permitted in the house. This database verifies and provides access to the authorized users. If the face is not recognized by the system then an alert message is sent to the authorized user informing the detection of intruder.

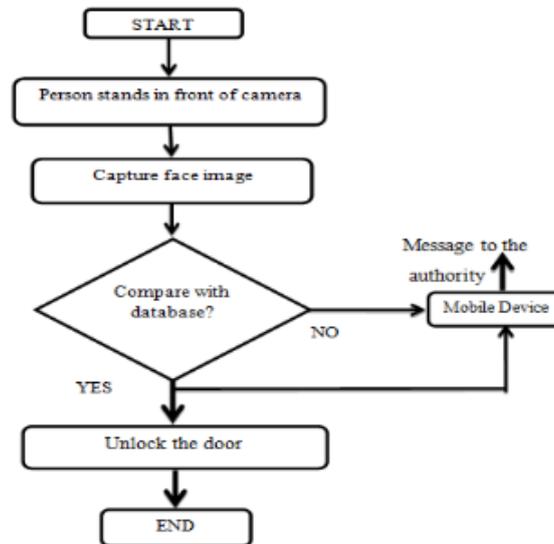


Fig.1 face detection system

ii) Weapon Detection: It is a system which is capable of detecting objects or weapons underneath a person's cloth. This system is developed for the purpose of security. Weapon detection is the backbone of industrial applications also. The system must have the sensors to identify the attributes of the weapons so it could easily identify it. In the proposed system if any kind of weapon is detected then an alert message is sent to the authorized user as well as the police.

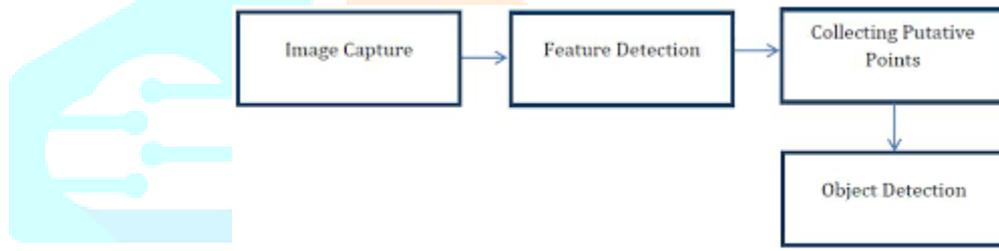


Fig.2 Weapon Detection System

III. THEORETICAL FRAMEWORK

Internet of Things: IoT refers to devices like Bluetooth connected headsets, utility meters, temperature readers, thermostat, sensors, actuators etc. which can sense some parameters. These "things" are connected together in IoT to generate some meaningful results. These "things" have independent identities and are connected over a network for data sharing. IoT is an emerging technology used to convert the traditional systems into smart systems. IoT is basically networking of physical objects which is used to communicate and sense interaction with respect to the external environment. IoT is Self-Configurable. Most of the small IoT devices such as actuators, sensors etc. once deployed have very less direct user interaction. Due to this property of IoT many devices are capable of fetching the latest software updates, setup basic networking and status check themselves or with very less intervention. Devices work together to generate results.

Neural Network: Neural Networks are also called Artificial Neural Network. These are artificial systems inspired by biological neural networks. It is a virtual abstraction of neuron cells. They imitate the way neurons are activated in the brain and solve computational problems. Such systems perform tasks in the presence of various datasets. They work without any task specific rules. Without being programmed, these systems can generate the characteristics from the passed data. Neural networks are divided into several categories, one of which is Convolutional Neural Network. Convolutional Neural Networks are also called ConvNets or CNNs and they are highly effective in areas of image recognition, classification, identification of objects and faces. They are used to analyze visual imagery. They usually work behind the scenes in image classification. It works by extracting features from images. Thus, these networks eliminate the need of manual feature extraction. These networks are fast and are very efficient.

IV. CONCLUSION

In this proposed system we considered the problem and drawbacks of traditional door lock systems and tried to eliminate them by making a smart system. IoT will help control and monitor the system remotely. The use of face recognition is used for the purpose of access control and can detect the intruders. Also it helps detecting the weapons concealed under the clothes of the intruder. Face recognition is done by Neural Networks. Once the face is recognized Raspberry Pi helps in controlling the door access. The sensors used here are capable of performing instant alerts.

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