



## **IOT based Smart Home Automation for Car Theft Prevention using Image Processing**

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### **ABSTRACT**

This paper introduces car theft prevention using Face recognition in IoT base Home automation. Internet of things is of connecting of all the devices such as sensors actuators and other embedded devices through communication protocol. Iot is used in Home Automation for controlling Home appliances such as controlling home door, getting information about room temperature gas leakage and fire alarm notification in home from anywhere in the world. Nowadays car theft prevention is important to keep our Car secure and safe in Home this paper uses automatic gate open lock system to secure the car in home using controllers and RFID Transmitter and Receiver. Face Recognition System is used to get the accuracy in images of a person check the person entering in home and the person trying to drive a car is authorized or unauthorized.

**Keywords:** Home Automation, car theft Face recognition, controllers, sensors, RFID

### **INTRODUCTION**

Home Automation is one of the automation systems used for controlling Home Appliances automatically. It is used for controlling Indoor, outdoor, lights, air conditioning in the house, to lock or open the doors and

gates to control electrical and electronic appliances using various control system with appropriate sensor

### **Advantages of Home Automation**

- Security
- Energy Efficiency
- Convenience, Comfort
- Peace of mind

### **Car Theft Prevention**

Keeping Vehicle safe and secure at all the times should be of Prime importance because none of us obviously ever want to face the situation of our car being stolen it is important to secure and safeguard vehicle effectively. This paper introduces automatic gate lock and unlocks system in home to prevent the car from theft.

Face recognition system is used to check whether the person trying to take the car is authorized or unauthorized by using face detection, Transformation and classification methods

### **SYSTEM OVERVIEW**

Home automation is important to reduce the human stress and save the times by controlling the home using internet of things here the PIR sensors, Temperature

sensors, Gas leakage sensors, fire alarms are used in home to detect all the changes and send notification to the user using Internet Of things one can also control the home appliances from anywhere. There are different sensors used in home automation which senses the variation in temperature, gas leakage and sends notification to the user.

### Types of Sensors

- **Temperature sensor:** to detect the variations in room temperature
- **Gas sensor:** To identify the gas leakage
- **Fire alarm:** Fire alarm triggered when something out of ordinary happens in home
- **PIR sensor:** measure the infrared light radiating from objects

Arduino microcontroller compatible with many physical devices ESP8266 Wi-fi module is used which is connected with various sensors .if the sensor sensing any changes in home it will send notification to the user and user can control the home appliances from anywhere in the world by webserver page connected via internet to the controller placed in the home.

### CAR THEFT PREVENTION

Today era it the use of vehicle is much must important for everyone. Sometime the ratio of vehicle theft increasing day rapidly. Hence it is important to detect and prevent the car theft in home.

Here there exists face recognition system which is used to compare the pictures with the images stored in the database .once the person enters into their car and tries to drive the car the camera fixed inside the car takes the photo of his/her face and compares it with the pictures stored in the database to check whether he/she is an authorized or unauthorized person using face recognition.

If he/she is an unauthorized person the arduino microcontroller and Relay circuit disconnects the electrical connectivity to which is used to start the car. Therefore electrical connections are not activated he/she cannot able to start the car.

If unauthorized person tries to take the car the RFID transmitter immediately sends message to the RFID receiver kept on the gate which is connected to the arduino microcontroller and relay circuit which controls the Gate motors to automatically lock and open.

If the person trying to take the car is authorized then the gates will automatically opened .if he/she is an unauthorized person the gate cannot be opened .hence unauthorized person cannot be able to drive the car.

### FACE RECOGNITION

This paper face recognition is commonly used for home automation and car theft prevention. Face recognition is important to identifying and verify a person from a digital image or video frame or from a video source. This paper face recognition is used in home automation and car theft prevention security purposes whether the person entering the home and car is authorized person or unauthorized person.

The following steps are used in face recognition

- Face detection
- Feature Extraction
- Classification techniques

This paper LDTrP Local Derivative Tetra Pattern and convolutional neural network system is used.

LDTrP algorithm is used to alleviate the face recognition rate under real-time challenges LDTrP encodes the relationship between the reference pixel and its neighbors in both vertical and horizontal directions. It matches the most relevant images from the databases. The method considers only 900 because human face is vertically symmetrical.

Therefore LDTrP histogram feature extraction from the local region  $R_i$  .the region do not have any fixed shape. if the region selected is circle, then Spatial histogram .therefore LDTrP combines higher order directional feature from both LDP and LTrP. Using this algorithm in face recognition gives higher accuracy rate.

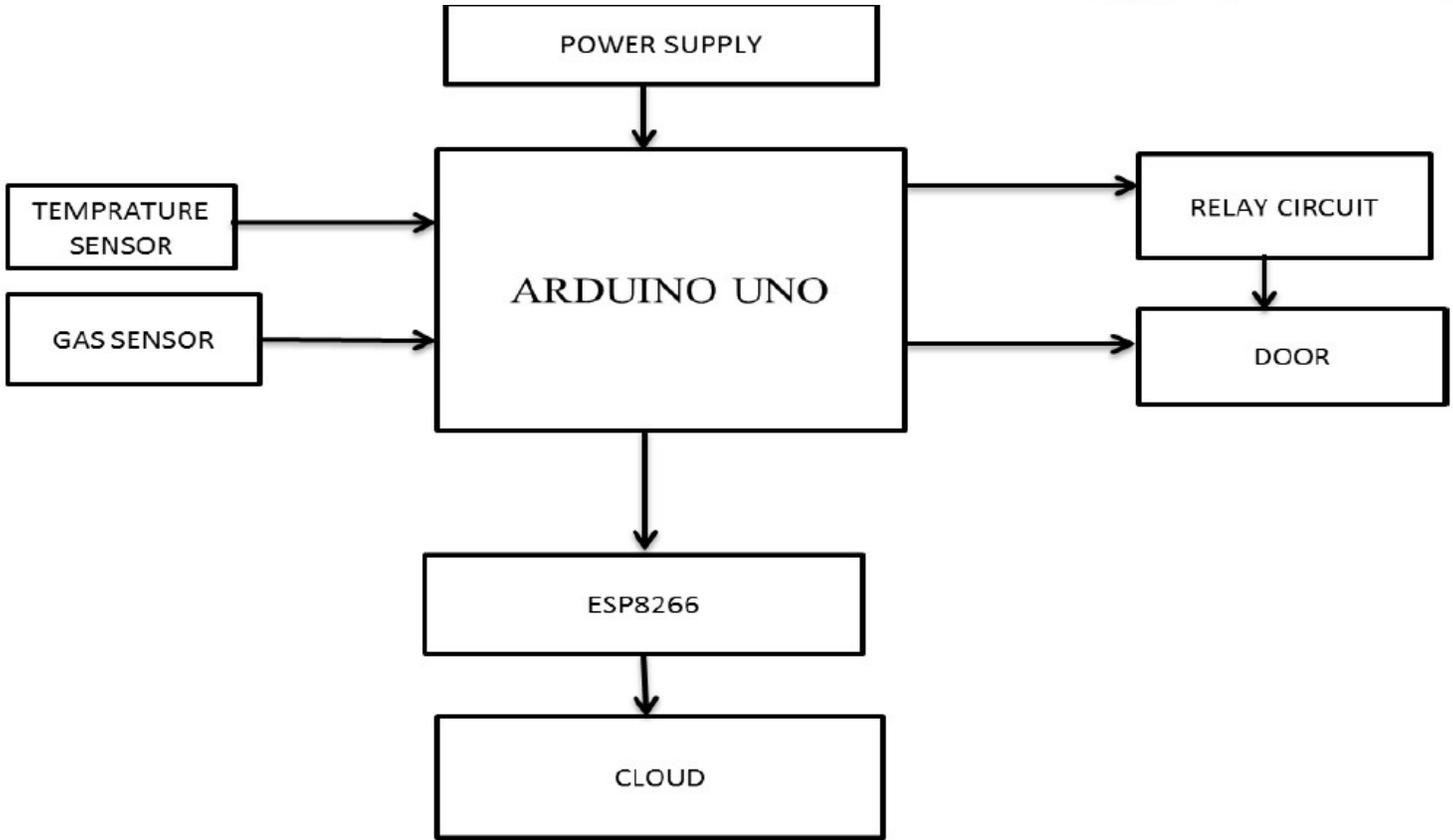
CNN convolutional neural network is used in face recognition. It is trained to detect and recognize face images. Applying feature extraction using convolutional neural network to normalized data causes the system to cope with faces subject to pose and lighting variations.

Convolutional neural network is a feed forward neural network with ability of extracting topological properties from the input image. CNN extracts features from the raw image and then a classifier classifies extracted features. The features are invariance to distortions and simple geometric transformations like translation, scaling, rotation and squeezing.

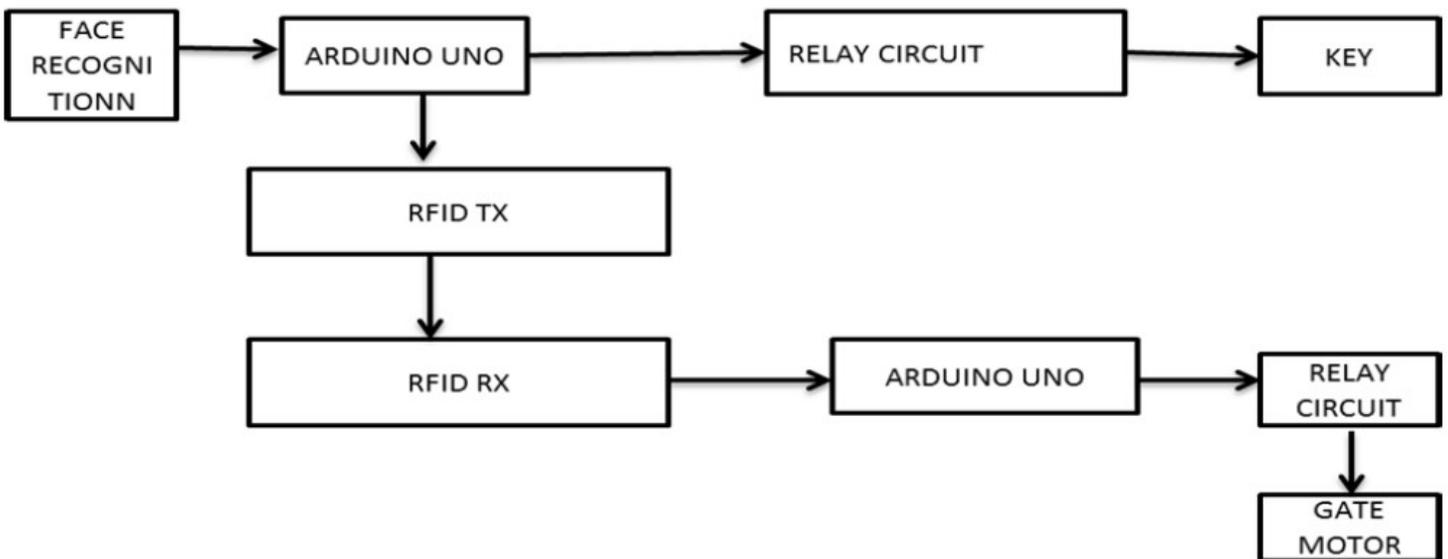
Therefore convolutional neural network combines three architectural ideas to ensure some degree of shift, scale, and distortion invariance. The network is usually trained like a standard neural network by back propagation.

It is used in face recognition it has a wide range of applications such as face detection and recognition, gender recognition, object recognition, character recognition and texture recognit

**HOME AUTOMATION**

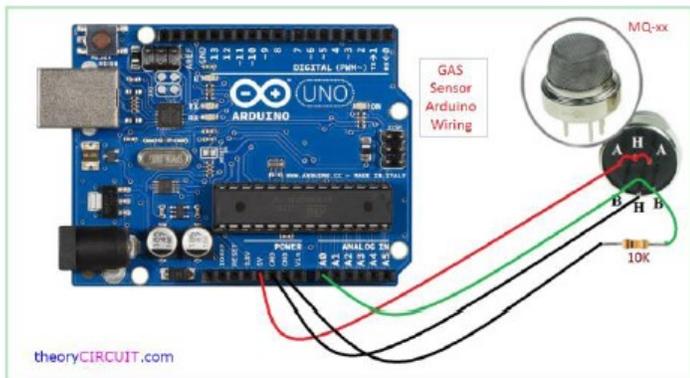


**CAR THEFT PREVENTION**



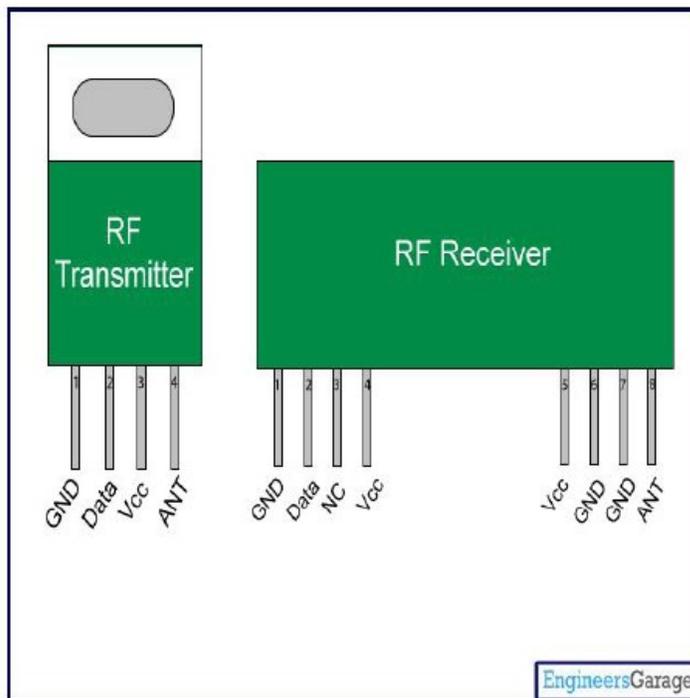
## IMPLEMENTATION

In this paper for home automation we use various sensors which is connected to temperature sensor, gas sensor and various sensors. ESP8266 is used which is connected to the cloud and user can control the home appliances from anywhere.



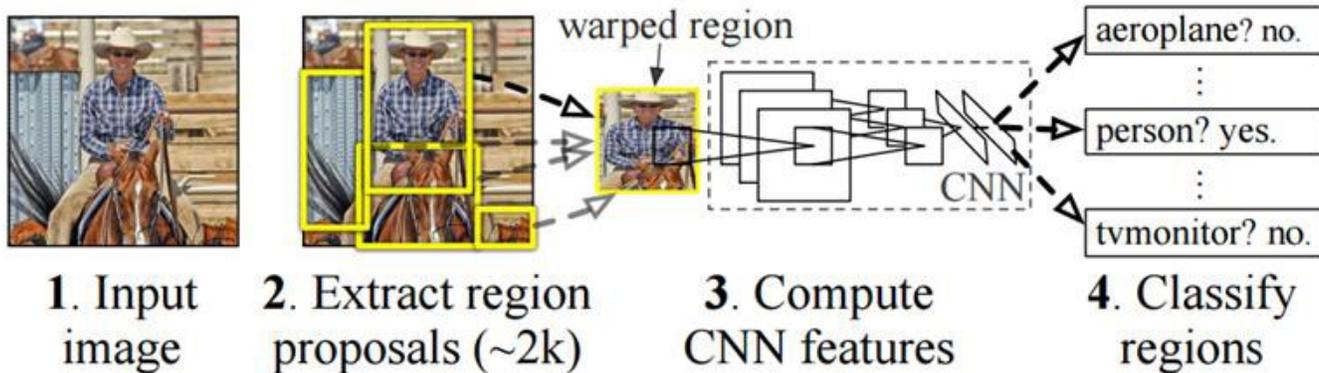
Car theft prevention uses Arduino UNO with ESP8266 connected to gate motor for the purpose of automatic gate and open

The person entering the car is unauthorized RFID transmitter sends the message to the RFID receiver kept in a gate motor.



Local Derivative tetra pattern and convolutional neural network is used .to get more accuracy and to get a better performance

## R-CNN: Regions with CNN features



R-CNN workflow

## RESULTS

In this paper home automation using and by various sensors such as gas sensor and temperature sensors are used and using arduino Uno and ESP8266 user can control home appliances from anywhere. Car theft prevention is made using RIFD transmitter and RIFD receiver which transmits and receives the data .by receiving the data if the person is unauthorized controller controls the gate automatically. face

recognition is used both in home automation and cartheft prevention.

## CONCLUSION

By using IoT in home automation is very useful for elderly peoples and disabled peoples in home to control the home appliances without direct human intreption car theft prevention is more helpful and useful to safeguard our cars in home. Face recognition using LDTrP and CNN networks where used .further

enhancing the algorithms in future work gives more accuracy.

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