

# FACE RECOGNITION BASED SECURED LOCKER CONTROL AND GESTURE BASED HOME APPLIANCE CONTROL SYSTEM FOR DISABLED PEOPLE WITHOUT USING INTERNET WITH AUTO ROBBERY ALERT

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## ABSTRACT

Automation is the fundamental requirement for the current world. Artificial Intelligence can be a potential application which offers help to everyone to customize Home automation. Motion acknowledgment alludes to perceiving the movement of the human parts. In this proposed work we will be using artificial intelligence which recognizes human gestures without the use of any kind of sensors with the help of a camera and also an additional security is provided using face recognition and if the registered human is successfully detected then the locker is unlocked along with the gesture recognition. If an unauthorized person attempts to unlock the locker an alert is sent to the user's mobile application. In case of general home appliances only the human gestures are recognized to effectively operate the. Thus, our project aims at discovering an automation system without the use of sensors or a mobile app with the help of artificial intelligence.

**Keyword:** Multi task system, Home Automation, etc

## 1. INTRODUCTION

Smart Home Systems are the subset of ordinary processing which incorporates keen innovation, security and energy optimization. Internet of things that contain various sensors can identify temperature, light, stable, distance which go about as various places of information sources. Since there is an immense measure of information, including Machine learning can be applied to the current Home automation frameworks to cause it to perform extraordinarily all around based on the clients requirement. In this paper we characterize an improved Home automation

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utilizing various AI calculations that can identify human looks and change the appliances conditions likewise [1].

## 2. LITERATURE REVIEW

Andre's et al [4] This characteristic advantage draws in the assessment of the hands as per alternate points of view: restricting hands and their parts inside the photographs; understanding what activities and exercises the hands are connected with; and making human-PC interfaces that depend close by developments. In this blueprint, we study the forming that spins around the hands utilizing egocentric vision, requesting the current methodologies into: control; understanding and application

Qiang Ni et al [5] , uses gesture based Human activity, They work based upon bio-compelled skeleton model which imposes 1) bone lengths and 2) advancement cutoff points of joints. Considering the bio-obliged model, a reasonable technique is proposed for skeleton recuperation. Ning Xu et al[6], proposed a multi-area and perform multiple tasks learning system to (1) separate space invariant data for multi-see and multi-specific activity portrayal and (2) investigate the relatedness among various development orders.

## 3. WORKING PRINCIPLE OF PROPOSED SYSTEM

In this proposed work we will utilize man-made reasoning which perceives human motions without the utilization of any sort of sensors with the assistance of a camera and furthermore an extra security is given utilizing face acknowledgment and that the enlisted human is effectively distinguished, the locker is opened on acknowledgment. In the event that an unapproved individual endeavors to open the locker an alert is sent to the client's portable application. If there should arise an occurrence of general home appliances just the human motions are perceived adequately. Consequently, our task targets finding a automation framework without the utilization of sensors or a versatile application with the assistance of man-made consciousness.

## 4. ADVANTAGES OF PROPOSED SYSTEM

- Face recognition based locker control
- Hand gesture auto appliance control
- More reliable
- No sensors required
- No internet connectivity needed
- Suitable for physically challenged people

## 5. MODULES DESCRIPTION:

### 5.1. Dataset Collection Module:

A dataset collection is a combination of data. It's undeniably by a wide edge the best performing strategy for machine related tasks. These learning machines that have been functioning admirably need fuel loads of fuel; that fuel is information. The more marked information we have, the better our model performs. The possibility of more information prompting better execution has even been investigated at an enormous scope by Google with a dataset of 300 Million pictures! While conveying a Deep Learning model in a certifiable application, information should be continually taken care to keep improving its exhibition. There are three stages of gathering information

## 5.2. Face Detection Module

Facial acknowledgment innovation is generally applied in security checking, observation, human-PC communication, amusement, and so on. Identifying human in advanced pictures is the initial phase in facial acknowledgment, and an ideal face discovery model can be assessed by how rapidly and precisely it performs. It tends to be utilized in low-power registering gadgets, for example, ARM for continuous basic scene faces.

## 5.3. Face Recognition Module

For perceiving the face we utilize versatile facenet which is a more precise in arranging face. MobileFaceNet is a neural organization and acquires exactness upto 99.28 percent on marked appearances in the wild (LFW) dataset, and a 93.05 percent precision on perceiving faces in the AgeDB dataset. The organization utilized around 1,000,000 boundaries taking just 24 milliseconds to run and create results on a Qualcomm Snapdragon processor. We can contrast this presentation with correctnesses of 98.70 percent and 89.27 percent for ShuffleNet, which has a lot more boundaries and takes somewhat more to execute on the CPU.

## 5.4. Hand Segmentation:

Since, effective hand following and division is the key of progress towards any motion acknowledgment, because of difficulties of vision based techniques, like fluctuating lighting condition, complex foundation and skin shading discovery; variety in human skin shading appearance required the powerful improvement of calculation for normal interface. Shading is exceptionally incredible descriptor for object recognition. So for the division reason shading data was utilized, which is invariant to turn and mathematical variety of the hand. Here, three strategies were presented utilizing diverse shading spaces for hearty hand identification and division (HTS) procedure utilizing HSV shading space is recognized for the preprocessing of HGR framework

## 5.5. Training with gesture net:

The first pictures utilized for hand signal acknowledgment in the work are illustrated. These pictures are caught with a typical camera. These hand pictures are taken under a similar condition. The foundation of these pictures is indistinguishable. Thus, it is simple and successful to recognize the hand district from the first picture utilizing gesture technique. The skin tone can be utilized to segregate the hand from the other moving things. The shade of the skin is estimated with the HSV model. The HSV (tone, immersion, and worth) worth of the skin tone is 315, 94, and 37, individually. The picture of the distinguished hand is resized to make the motion acknowledgment invariant to picture scale. The yield of the hand location is a twofold picture where the white pixels are the individuals from the hand area, while the dark pixels have a place with the foundation. An illustration of the hand recognition. At that point, the accompanying method is carried out on the double hand picture to portion the fingers and palm. The palm point is characterized as the middle place of the palm. It is found by the strategy for distance change. Distance change additionally called distance map is a portrayal of a picture. Somewhere out there change picture, every pixel records its distance and the closest limit pixel. An illustration of distance change is shown is a twofold picture and is the distance change picture. As is appeared in the figure, the middle mark of the twofold picture is with the biggest distance. Accordingly, somewhere far off change picture of the double hand picture, the pixel with biggest distance is picked as the palm point. The discovered palm point is set apart with the mark of the green tone. In this, we present another calculation.

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It's named as gesturenent. using this algorithm with different gestures are trained with high accuracy. Whenever, the input is given ,video streams that will be recognize the model automatically.



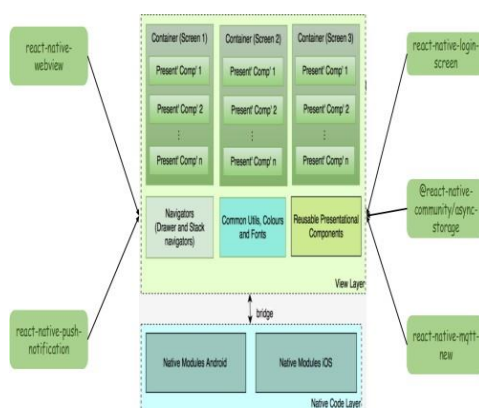
**Figure 1** Hand Gesturenent diagram

## 5.6. Compare the gestures and switch the devices ON and OFF:

Combination of motions to control the fan and light ON and OFF. Without net association the motions can handle the fan and light ON and OFF. Approaching signals is constantly observed and kind of motions which will be utilized to turn the apparatuses ON and OFF. Consequently, this undertaking helps in programmed control of machines utilizing computerized reasoning.

## 5.7. Mobile App Development:

React Native is a system that forms a pecking order of UI parts to fabricate the JavaScript code. It has a bunch of parts for the two iOS and Android stages to assemble a portable application with a local look and feel. Portable advancement has seen extraordinary development. As indicated by statistical, versatile applications will produce an expected 188 billion U.S. dollars in income by means of application stores, publicizing and in-application buys constantly 2020. Single and business clients require elevated expectation applications with faultless execution, various screens, simple route and great plan. On the opposite side, high-performing, great quality local applications are extremely tedious to create contrasted with cross-stage applications that give quicker turn of events however bargain on execution and backing. React Native is by all accounts a practical answer for building excellent applications in a brief timeframe with a similar presentation and client experience principles that local applications give.



**Figure 2** Mobile App Development

The methodology of React Native aids us in organizing a venture for a multi-stage portable application, keeping the rationale of the business in a reusable and kept up sub-module. In

certain ventures, we can see that the holders could be essential to be in the center module however that relies upon the applications. Respond Native uses various instruments to make a productive, steady and reusable visual personality for the applications.

### 5.8. V.Result and Discussion

A mobile application using react native is developed as an interface to the user notifying him/her when an unauthorized person tries to operate the locker. The below image shows the login page to the mobile application:



Figure 3 Login page

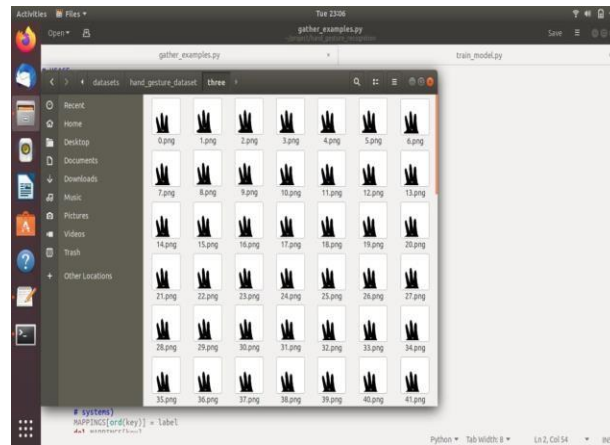
On successful login to the mobile application, the below image shows the screenshot of the mobile application home page:



Figure 4 Home page

To develop the system for hand gesture recognition, the first step will be dataset collection which can be collected using real time video streaming. that can be seen in the following figure.

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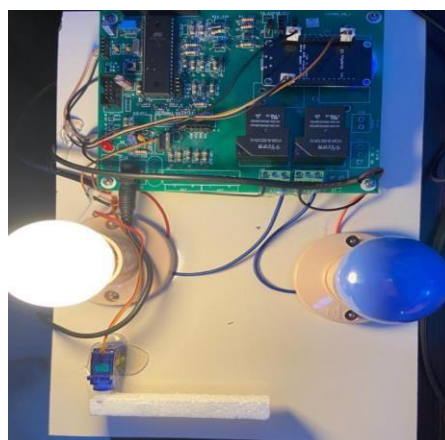
**Figure 5** Hand gesture three

Similar to the device 1 the hand gesture three is used to switch ON the device 2 and zero is used to switch OFF the device 2. The below image shows the hand gesture three to switch ON the device 2:



**Figure 6** Switching ON device 2 in hardware setup

The below image shows the device 2 being switched on:



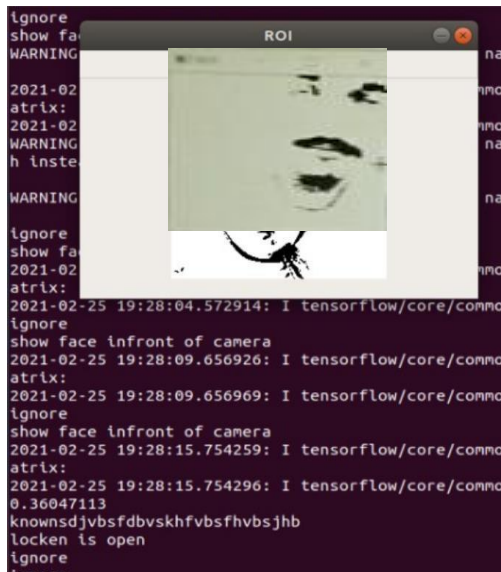
**Figure 7** Device 2 switched ON

In order to access the locker hand gesture three is required to be given as input. The below image shows the hand gesture 3 given for accessing the locker:



**Figure 8** Accessing the locker with hand gesture 3

On accessing the locker face recognition is enabled to confirm that the user is an authorized person. The below image shows the face recognition initiation:



**Figure 9** Authorized face recognition

If an unauthorized face is detected then theft is detected. The below image shows the unauthorized face detection:

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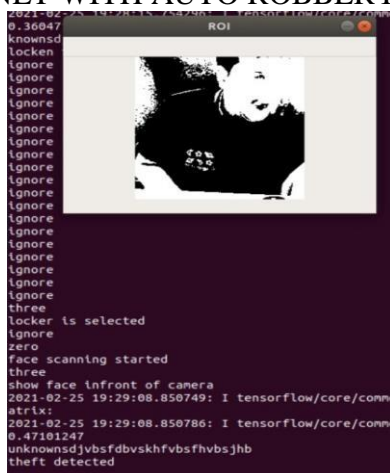


Figure 10 Theft detection

If the person trying to access the locker is an unauthorized person then an alert is sent to the mobile application of the user. The below image shows the alert received at the mobile application of the user when the unauthorized person tries accessing the locker:

## 6. CONCLUSION

In this paper , we have incorporated artificial intelligence which recognizes human gestures without the use of any kind of sensors with the help of a camera and acts accordingly to control any kind of home appliance. By this project physically challenged people can easily switch off the lights and fan or any home appliance. So, we reduce the time required for manual work.

## 7. FUTURE WORK

In the coming future, we review the application of the hand gesture technology in the automation technology field and it can promote for all type of home appliances with more accuracy. In this field one have more chance to develop or convert this project in many ways. It can be helpful in discovering an automation system without the use of sensors or a mobile app. This is achieved using artificial intelligence technology.

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