# SAFETY PATROLLLING ROBOT WITH FACE DETECTION

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## ABSTRACT

Security is always a major criterion in today's society. Many houses and huge sized apartments are being theft even in the presence of cc cameras and security guards. It is not always possible for a watch man to secure the premises all the time. In this scenario having the best security system in our house makes life safer and more comfortable.

In this system we use camera and sound sensors mounted on robotic vehicle for securing the premises of houses or apartments. The robotic vehicle will keep on detecting the sound and if any sound is detected it move towards the sound. It then takes pictures of the area using web camera to find whether the detected object is human or not and transmits the images of that area to the assigned Gmail ID and also send message to the house owners using GSM module. Here we give a Gmail for receiving transmitted images and displaying them to user with an alert message.

*Keywords: Raspberry Pi, MCP3208 ADC Module, GSM Module, L293D Motor Driver, Web Camera, Sound Sensor*

## 1. INTRODUCTION

Robot is a system that contains sensors, control systems, manipulators, power supplies and software all working together to perform a task. Designing, building, programming and testing a robot is a combination of physics, mechanical engineering, electrical engineering, structural engineering, mathematics and computing. In some cases, biology, medicine, chemistry might also be involved. A study of robotics means that students are actively engaged with all of these disciplines in a deeply problem-posing problem-solving environment.

In this system we use camera and sound sensors mounted on robotic vehicle for securing the premises of houses or apartments. The robotic vehicle will keep on detecting the sound and if any sound is detected it move towards the sound. It then takes pictures of the area using web camera to find whether the detected object is human or not and transmits the images of that area to the assigned Gmail ID and also send message to the house owners using GSM module. Here we give a Gmail for receiving transmitted images and displaying them to user with an alert message. Thus, we put forward a fully autonomous security robot that operates tirelessly and patrols on its own to secure the facility. It also acts as a surveillance system which reduces the human work.

## 2. LITERATURE REVIEW

The problem of the surveillance and the security of indoor environments is addressed through the development of an autonomous surveillance vehicle (ASV). The ASV has been designed to perform, in addition to the classical robotic tasks (e.g., navigation and obstacle avoiding), the tracking of objects (e.g., persons) moving in indoor environment we introduce a new security mechanism to safeguard women during abnormal activities.[1]. In another approach, New security mechanism has been proposed based on the patrolling robot using the Raspberry Pi. Here night vision camera can be used for securing any premises. To improve the accuracy of the classifier, various machine learning models are used [2]. In alternate approach, the use of data mining techniques, clustering and classification for effective investigation of crimes. Further the paper aims to identify suspects by analyzing existing evidences in situations where any witness or forensic clues are not present [3].

In another approach we study uses regression as well as visualization for analyzing the crime patterns over the previously mentioned years and helps predict the possible age group to target with the awareness drives, the frequency of different crimes in different states and thus, evaluate the effectiveness of the current security measures in all the states of the country. The knowledge gained from these then can be given to the police and the various crime agencies to help them take better decisions regarding prevention of crimes against women in India [4].

In alternate approach, one can introduce a new safety mechanism to shield women for the duration of strange activities. New protection mechanism has been proposed primarily based on the patrolling robot the usage of the raspberry pi. Here night time vision digicam may be used for securing any premises. To enhance the accuracy of the classifier, various system getting to know fashions are used. On this undertaking one can are designing the robot vehicle which moves at unique route and is equipped with digicam and sound sensors. It stops at unique factors and actions to subsequent points if sound is detected. The machine makes use of ir based totally path following gadget for patrolling assigned place. It monitors each section to detect any trouble the usage of combination of 2 hd cameras. It has the ability to reveal sound inside the premises. Robot hears any sound after area is quite and it starts off evolved transferring toward the sound on its redefined path. It then scans the area using its camera to come across any human faces detected. It captures and starts off evolved transmitting the images of the situation right now to the IOT internet site [5]. We develop an Automatic Face Analysis (AFA) system to analyze facial expressions based on both permanent facial features (brows, eyes, mouth) and transient facial features (deepening of facial furrows) in a nearly frontal-view face image sequence. The AFA system recognizes fine-grained changes in facial expression into action units (AUs) of the Facial Action Coding System (FACS), instead of a few prototypic expressions. Multistate face and facial component models are proposed for tracking and modeling the various facial features, including lips, eyes, brows, cheeks, and furrows. During tracking, detailed parametric descriptions of the facial features are extracted. With these parameters as the inputs, a group of action units (neutral expression, six upper face AUs and 10 lower face AUs) are recognized whether they occur alone or in combinations. The system has achieved average recognition rates of 96.4 percent (95.4 percent if neutral expressions are excluded) for upper face AUs and 96.7 percent (95.6 percent with neutral expressions excluded) for lower face AUs [6].

## 3. EXISTING SYSTEM

- Existing method is an application-based prototype. It is interfaced with GPS, GSM and a spy camera. The user must register the emergency numbers. This is an android app.

- Since it is a mobile phone if the phone is lost or thrown away by the opposite person, we cannot provide security and the problem is not solved.

- There are CC cameras in apartments and large sized houses. But there should be a person to constantly monitor the cameras.

**DISADVANTAGES OF EXISTING SYSTEM:**

- Constant human involvement

- Phone might get lost or app data can be deleted.


## 4. PROPOSED SYSTEM

In this paper we are using web camera, GSM with raspberry pi. The robot will moves based on sound detection and it will detect the faces using camera. We will store the faces of known persons in the memory. If the face matched nothing will happen and it will move based on sound. If the person face is not in the data base then it will capture the image and will send to mail of the authorized person. Message alerts will be given using GSM.
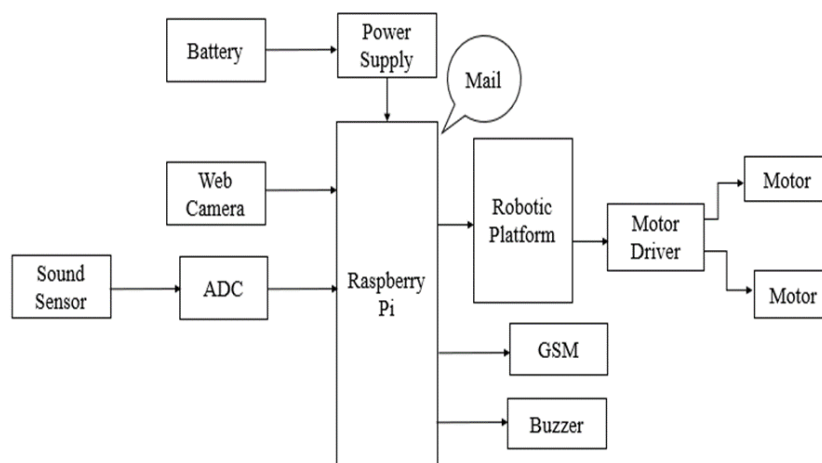


**Fig 4.1 Block Diagram of Proposed System**

**ADVANTAGES OF PROPOSED SYSTEM:**

- Not necessary of human involvement.

- Not required to store the data as it instantly sends the photo to respective email ID

- The core of the robot will be safe and if any damage occurs that damaged parts can be restored easily.

- It can be further upgraded with high quality cameras and sound sensors for more efficient working.


## 5. METHODS OR TECHNIQUES USED

Here we use Raspberry Pi as central processor that controls the whole process. For coding the Raspberry pi

microcontroller, we use python programming language. To connect Raspberry pi to our local system and internet we use Advanced IP Scanner and VNC Viewer. First the sound sensor detects the sound and send it to ADC module where the analog signal is converted to digital signal and send it to raspberry pi. Then the camera captures the unknown image of the person and send it to email and alerts with a message using GSM.
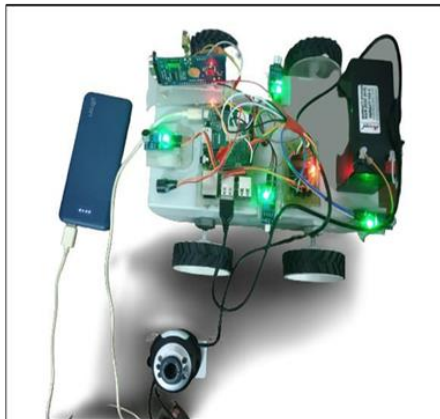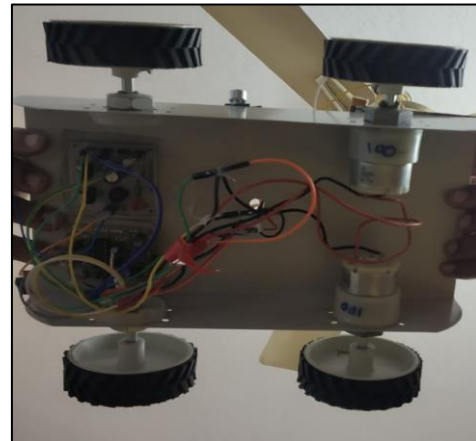
## 6. RESULT



**Fig. 6.1 Top side view of Robot**
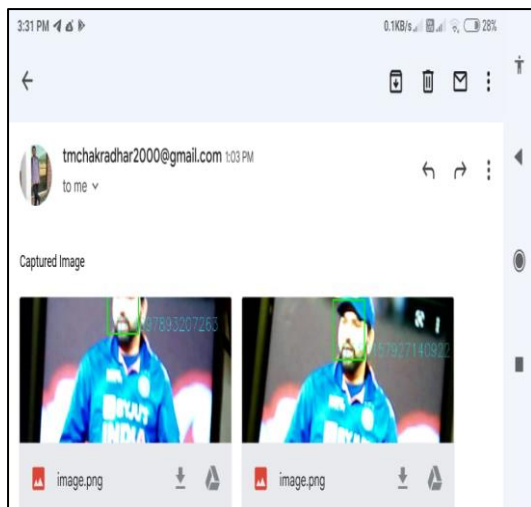


**Fig. 6.2 Bottom view of Robot**



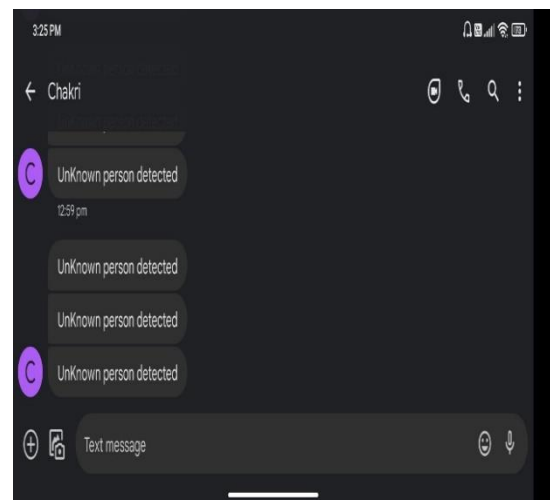**Fig. 6.3 Email with the captured image**



**Fig.6.4 Message to the owner**

Unknown image is captured by the camera and a message is sent to the owner or any person whose phone number is provided in the GSM module as shown in the above results. As shown in the above results, an email is sent to the corresponding person of the authority in the house with the image of the intruder or any other unknown person.

## 7.  CONCLUSION

In this paper, we designed a solution represented in the form of a robot which detects un- known persons and alert the owners of the house with email and messages. By using this robot, we can avoid thefts and robberies to

some extent. We would like to conclude that the proposed system completed successfully. As stated earlier in our problem statement, the previous one is less informative and need constant human observation are overcome and successfully implemented with the help of a robot which can patrol and detect unknown persons.

## 8. FUTURE SCOPE

Future work will be focused on enhancing the performance of the system by adding powerful versions of Raspberry Pi and other powerful micro controllers. We can use sound sensors with filters and amplifiers so that noises can detected more accurately and robot can move in that direction correctly. We can create a full pledged robot with more powerful motor drivers so that it can move more efficiently and fast, then it can detect the unknown person before he tries to escape.

## 9. REFERENCES

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