

# **Automated Surveillance Through Smartphone for old and Differently-abled People**

**B.Tech. (Computer Science & Engg.) Project, GGSIP University**  
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## **INTRODUCTION AND BRIEF SUMMARY OF THE PROJECT**

The strength in the structure of the society can be gauged by its ability to support the vulnerable sections of the society. Therefore, our step moves a step further with the surveillance systems and makes use of smart handheld devices to provide security to these people. A lot of research and development has been done for providing security to the old and differently-abled people by the use of cameras for surveillance. However, these systems are incapable of helping those who have any type of visual impairment. Also, these systems do not provide any control mechanism to take any action in case of an emergency being detected. Hence we have developed a system that overcome these two shortcomings of the system. Our system has overcome the above specified shortcomings by keeping the human interface requirement minimum in the threat detection phase as well as alert generation phase. The human interface requirement has been reduced in the threat detection phase by introducing a novel hardware that has been designed to detect the presence of an intruder within the premises of the user. Also, the process of alert generation has been automated to ensure that even differently -abled people and the people with special needs can also use the system.

The system proposed has the following section: The hardware module, The user application, the server and the Guardian Application. The hardware module consists of a PIR sensor (Passive Infrared), Arduino microcontroller and the GSM module. Once, the PIR sensor receives the reading, the arduino enables the pin that is connected to the GSM module. The GSM module is responsible for sending the SMS to the user application. The user application receives the messages and extracts the keywords and phrases from the text. The server collects the location of all the guardian via guardian application. The server runs the novel algorithm for the detection of the nearest guardian by calculating the distance between the location of the user and the corresponding guardians. The server responds back to the query initiated by the user application by providing the contact number of the guardian who is nearest to the user. As we mentioned earlier that the current surveillance systems do not provide any control mechanism to the user, therefore our systems provide the opportunity to the user to decide whether he

wants the call to be generated or not. Since the user has now received the contact of the nearest guardian, the SOS call to the guardian can be generated by just tapping the phone screen.

Since the system has successfully overcome the two major shortcomings of the existing surveillance, it is safe to say that the system will revolutionize the way we provide security to our elderly and differently challenged people. It will provide independence to those who have led a dependent life and without any threat being posed to their well-being. Since the system has been designed to be used by the old as well as the differently-abled people, the applicability of the system is vast and it will improve the quality of life of a large chunk of the society.

### **KEY FEATURES OF THE PROJECT (SYSTEM DEVELOPED)**

The developed system has the following Key Features: The system finds its applicability in the domain of Ambient Assisted Living (AAL) devices. They are the class of systems which makes the life of people smarter and also aids the lives of those who need continuous monitoring and assessment.

The system has the applicability in ensuring the safety of the dependent people by eliminating the need of continuous human monitoring. The application ensures the continuous monitoring of the premises of the dependent people by the user of the novel hardware that has been deployed at the premises of the user. The system also ensures the automatic generation of the call to the nearest guardian by locating the location of the nearest guardian through GPS. The generation of call is being regulated by the user upon the determination of threat on tapping the phone screen. This feature makes the application easy to use even by those who are differently-abled.

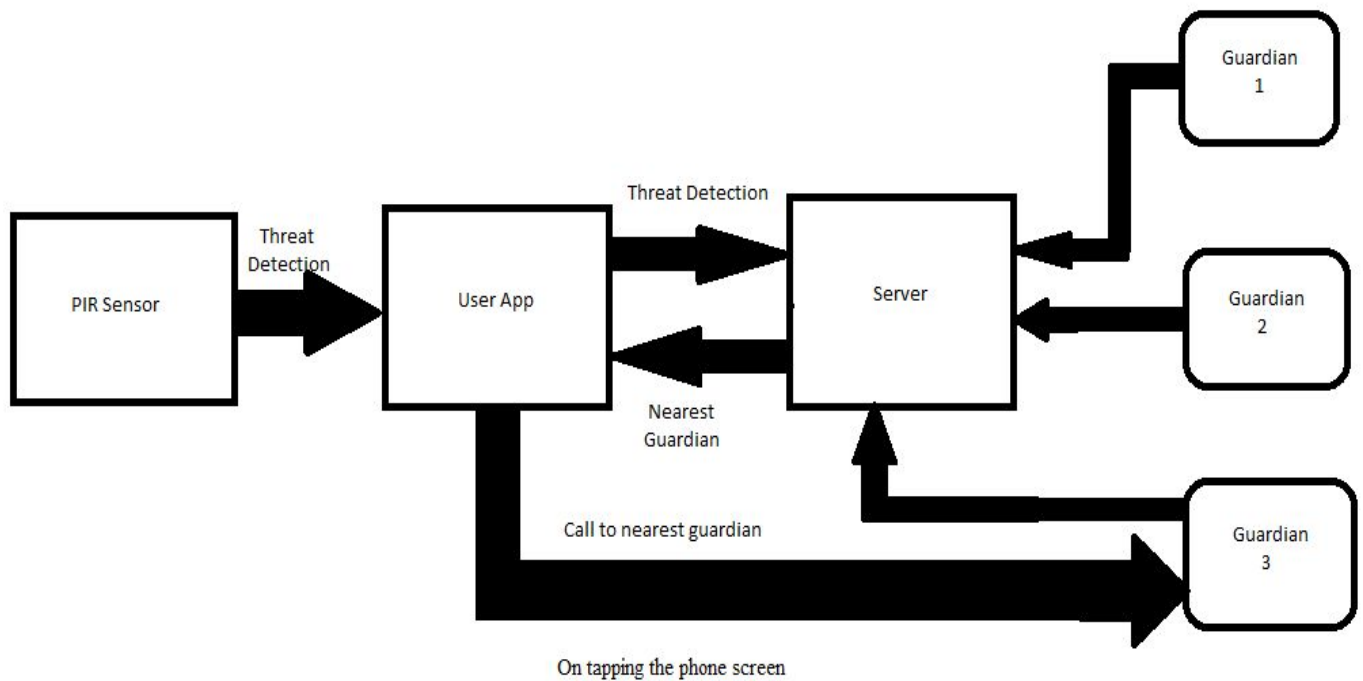


Figure 1: The block diagram of the system

The various blocks of the block diagram has been elucidated below:

#### A. THE USER APPLICATION

The user application receives and evaluates the message from the hardware module for the determination of threat. If threat message is received, the alarm is generated. If the user decides to generate a call, the user taps the phone screen. The call is automatically generated from the user application to the nearest guardian.

#### B. THE GUARDIAN APPLICATION

The guardian application performs the vital functionality of sending the location of the guardian to the server.

#### C. THE SERVER

The algorithm at the server calculates the distance between the user location and the guardian location and determines the minimum of them. The contact of the guardian with minimum distance is responded back to the user.

#### D. HARDWARE MODULE

The hardware module consists of a PIR sensor (Passive Infrared), Arduino microcontroller and the GSM module. The system becomes active when there is a positive output at the PIR sensor

that is when the presence of a human intruder has been detected near the premises of the user. Once, the PIR sensor receives the reading, the arduino enables the pin that is connected to the GSM module. The GSM module is responsible for sending the SMS to the user application.

## **RESULT AND THEIR ENGINEERING SIGNIFICANCE**

The following results have been found after completing the development of the system:

- A) Sending of the SMS from the hardware module when the intruder is detected in the premises.
- B) Alarm generation at the user application when the threat reporting message has been received.
- C) Successfully sending the query to the server for the contact number of the nearest guardian.
- D) Successful determination of the nearest guardian using the location of the guardians' location at the server.
- E) Successful update of guardian's location at the server.

The importance of the system lies in the fact that the usage of the system is not limited to just old people, it can be used by even those who have visual impairment or any other physical incapability. Also, the two major drawbacks of the surveillance systems has been overcome, thereby making the system more reliable than the other existing system. Moreover, the system provides independence to the user as well as the guardian in a very cost-efficient way. The whole system has been developed under 1200 INR. Hence, the application is very important for revolutionising the way we take care of our elders and people with special needs in a robust, efficient and economical way.

The image of the hardware module is given below:

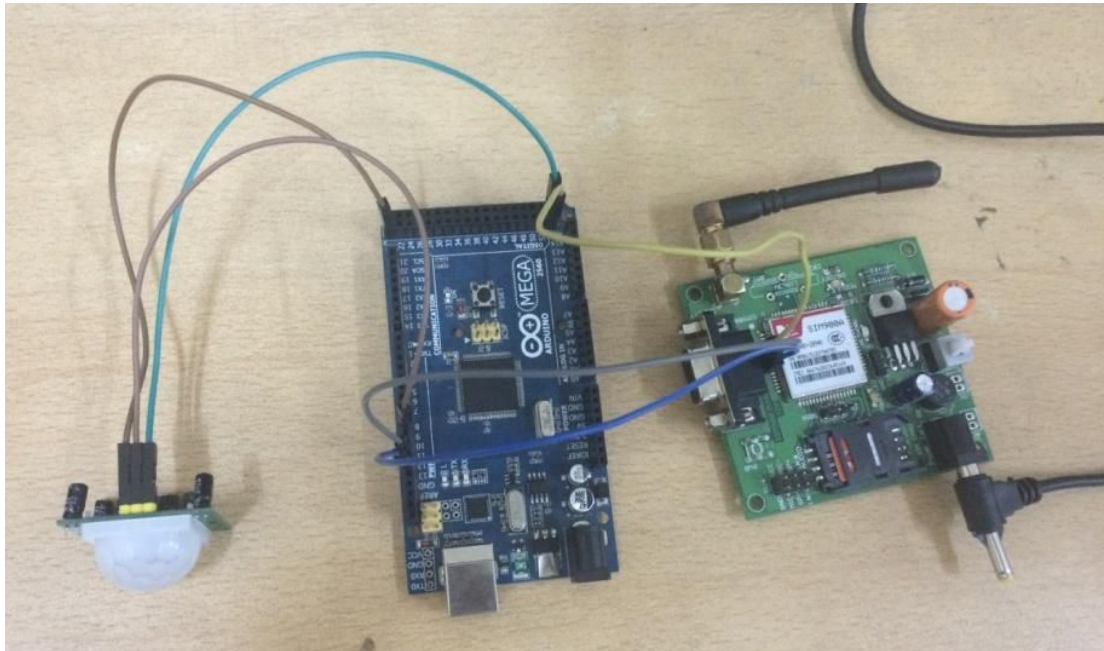


Image 1: Hardware module of the system

The screenshots of the system are given below:

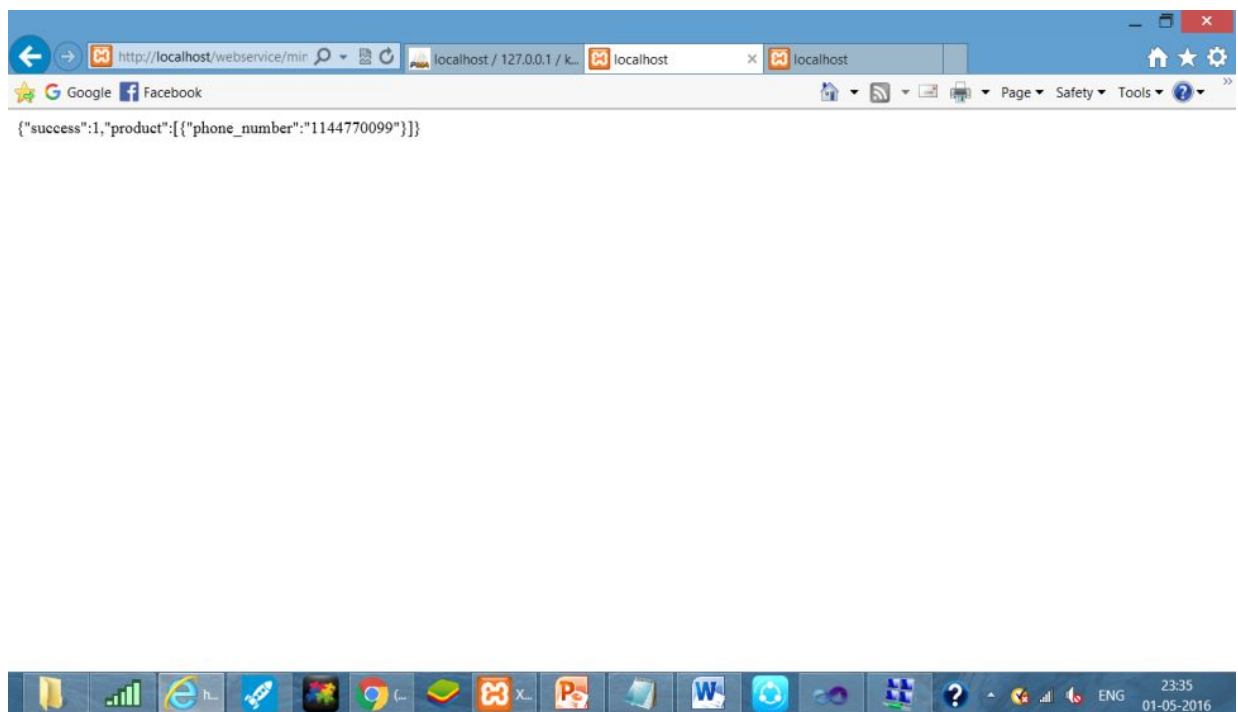


Image 2: Phone number of the nearest guardian being returned by the server

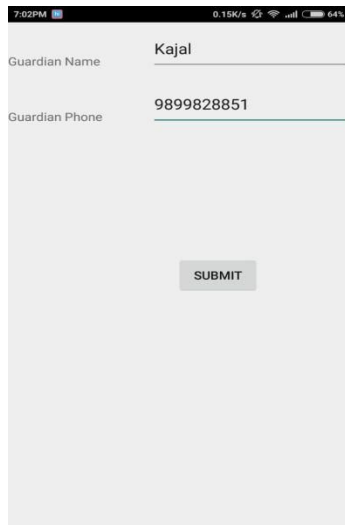


Image 3: Interface of guardian application

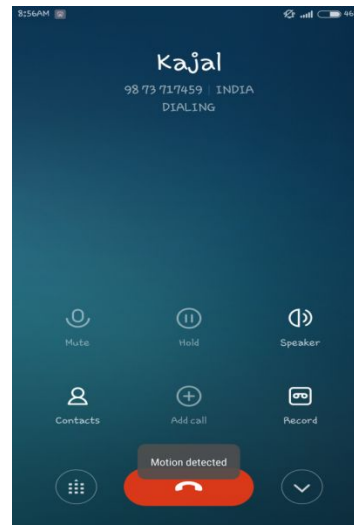


Image 4: The generation of call to the nearest guardian on tapping the user app screen

## CONCLUDING REMARKS

The system has been tested in real-time to ensure its efficiency and it is successfully notifying the nearest care taker in case an intruder has been detected. Therefore, we can conclude that the system is robust, cost-efficient and the android application used to provide the interface to the system is easy to use. This invention provides a method for security of old and differently challenged people which is a major concern for the society as they are dependent upon other people for all their needs. Our method provides security for such people by sensing the environmental factors near the premises of the user during the hours when user is expected to be alone. The hardware is responsible for sensing the environmental factors and comparing the values the environmental parameters to their thresholds. As per our method, whenever an abnormal value has been detected which surpasses the threshold value, the hardware generates an alert at the user's smart device. The user can take an action by tapping the phone to notify the nearest guardian or ignore the threat, if required. According to the method used, if the user chooses to tapping the phone, the SOS call generated to the nearest guardian immediately.

The method hence makes people independent by ensuring the safety without any human interaction for surveillance. The invention includes a method which affects masses as it can also be used by physically dependent, differently-abled and old people. Thus, the invention is of great importance to the industry as well as the society.

In future scope, we aim to make the system even more robust by improving the algorithm of the application. We aspire to put great emphasis on increasing the efficiency of the hardware interface. We

would work upon increasing the functionality by deploying the system for home security. We would extend the optimisation of the hardware module by using a Wifi module instead of a GSM module.