Women safety system using Arduino UNO and integrated safety app

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ABSTRACT

It is an accepted fact that brutal crimes against women are occurring in India daily. Now many Indians do not deny or shy away from conversations relating to eve-teasing, sexual assaults or rape. Even the common man's conversation on the streets often steers towards the escalated and horrendous attacks on women. The device called as "Virtual Friend" is specially designed for the women in trouble. It is a device used for the women in a chaotic situation. The basic approach is to use the Arduino Uno microcontroller based on ATmega328P has the function of send and receive data which is provided by Arduino GSM shield using GSM network. Arduino Uno gets the coordinates of the current location; it transfers the coordinate details to the user's smart phone via Arduino GSM shield. The SOS light is a signal used to alert the passerby and it gives the sign of universal help to the victim who is in distress. The alarm buzzer is activated if the woman is in danger situation. In the critical situation, the women send the message or make a call including the location of the particular incident to the registered contacts through the use of GSM and GPS.

Keywords: *Arduino Uno ATmega328P, Arduino GSM shield, GPS, SOS light, Safety app.*

1. INTRODUCTION

Even the common man's conversation on the streets often steers towards the escalated and horrendous attacks on women. An overbearing concern each of us has towards the women in our families has lent a sense of urgency to our dialogue on the critical and pressing issue of women's safety. Many special devices are primarily western and most of them have not reached India yet.

Another issue is the high cost of manufacturing these devices. To make applications efficient, they would require GPRS services which might not be feasible. Applications get hanged, which lowers down the response time. These applications consume too much of battery power.

Most of the applications available in the market do not work without the Internet or mobile network. This is exactly where the government needs to step in and try and mitigate cost and infrastructure issues for the corporations working in this direction

The problem with apps is that they tend to be clumsy. The women have to open her phone, unlock it, open the app and then press a button. Also, most of the times, the perpetrators usually go for the phone first. The need is to develop independent devices like safety bands, rings, key rings etc. that can be carried around in disguise and used faster, and which will allow the women to send emergency messages with their location in times of distress.

The device called as "Virtual Friend" is especially designed for the women in trouble. It is a device used for the women in chaotic situation. The basic approach is to use the Arduino Uno microcontroller based on ATmega328P has the function of send and receive data which is provided by Arduino GSM shield using GSM network. The current location of the victim is identified by the GSM network using Arduino Uno by initiating the user's smart phone. At once the Arduino Uno gets the coordinates of the current location the Arduino transfers the coordinate details to the user's smart phone via Arduino GSM shield. The SOS light is a signal used to alert the passerby and it gives the sign of universal help to the victim who are in distress. The alarm buzzer is activated if the woman is in danger situation. In the critical situation the women send the message or make a call including the location of the particular incident to the registered contacts through the use of GSM and GPS. Even if the device is thrown away it sends the message and making a call to the registered emergency contacts until they picked up or open the message.

2. LITERATURE SURVEY

The paper titled [1] discussed a voice keyword recognizing app to recognize the user and activate the app functionality even when the mobile keypad locked. The GPS module tracks the longitude and latitude to trace an exact location of a user and sends the pre-stored emergency message including location to the registered contact numbers. The Audio Recording module starts the recording of the conversation for five minutes and stored as evidences. The message goes in queue if network problem and send when network gets available. A notification is generated for successful deliver the message. Also, user can select contact through voice-based contact list and make a call. Note: The spoken keyword converted into a text to compare with the registered keyword.

The paper [2] proposes a SCIWARS app (Spy Camera Identification and Women Attack Rescue System) which consist of two modules. A first module act as an intelligent alerts system which detects the infrared rays coming from every Night-vision hidden cameras placed in changing rooms- hotels room etc and also informed the user about unsafe place through message. Now it's the user responsibility whether to register a complaint or not by forwarding the notification with the location to legal authorities such as Police. The second module will get activated by pressing any key continuously which will provide the help to the victim from physic attack in unsafe situation. It sends the emergency message containing location to register contacts. It also records the voice and captures the images of the surrounding for 45 seconds. This information also stored in secret location of mobile for future evidences. This app also able to converts the receiver mobile

The paper [3] proposes an android app to provide security at two different situations as follows. The First module provide security to Women at Emergency Situations propose a Save Our Souls (SOS) app to provides the security on a single click of SOS button for the women travelling at night or alone. No need to unlock the screen, instead by just pressing the power button it directly triggers the application to run at the background, to send the emergency message including the location in the form of latitude and longitude to the registered contacts. The second module proposes an android based home security system that provides security of house belongings and Senior Citizen in the user absence. Since the security of senior citizen is always a concern with increasing number of robbery incidents. This app informs the user about an attempt of intrusion activity at home through a message and a feedback SMS triggers an alarm in the house. The minimum requirement is the android mobile, a hardware circuit embedded with a switch and GSM modem that are connected to the door. When an intruder tries to open the door, the switch triggers an interrupt for the microcontroller to activate the GSM modem to send warning SMS to the store registered number in the modem. At the receivers end the application pop up the menu frequently for user attention. If the user fails to acknowledge in the defined time interval, then the automatic positive acknowledgement message get send to the remote GSM modem which in turn interrupt the microcontroller for an alarm.

The Paper [4] proposed a portable device as a belt which is automatically activated base on the pressure difference crosses the threshold in an unsafe situation. A GPS module tracks the location and sends the emergency messages to three emergency contacts every two minutes with updated location through GSM. The system also activates the screaming alarm that uses a siren, to call out for help and also generates an electric shock to harm the attacker for self-defense which may help the victim to escape. The device mainly consists of micro controller on the ATMega328 board which programmed using the ARDUINO programming language.

The paper [5] proposes the women security device called as "Suraksha" which is easy to operate the device. This device can be activated through- voice command, Press a switch key and shock (i.e. when the device is thrown with force, a force sensor used to activate the device). In an emergency situation, it will send the message including instant location to the police, via the transmitter module and registered numbers via a GSM module. Currently, the work is under process to embed it in jewelry, mobile or another carrier like belt etc. It can play a major role in the propose projects where all the police stations are connected and share the criminal records, crime investigating cases etc.

The paper [6] proposes an extended vehicle tracking system to track the vehicle based on GPS with that it also provides the safety through an emergency button kept under the vehicle seat using GSM. As the increasing economic growth rate of a country, many companies are establishing their setup in the nearby region of the cities. Since the security of women employees' inside the private transportation is the companies' responsibility. In the unsafe situation, an employee needs to press the emergency button to activate the device Teltonika-FM1100. It, in turn, enables simultaneously the Android device used to capture the images inside the vehicle and the GPS system which track the vehicle position in the form of latitude and longitude. An alert message including the location is sent a card to the company special team and nearby police station through GSM SIM. After that, it is the responsibility of police squad and company team to handle the situation.

The paper [7] proposed a women safety system which used a microcontroller ATMEGA 328P. Here the MEMS sensor is used to sense any mishappening with women according to the extraordinary movement of the body. If in any case, MEMS sensor is unable to sense the mishappening then the switch in the watch can be pressed manually to indicate any mishappening. As soon as any mishappening is detected by the sensor the same is indicated to the controller. Upon receiving the signal the controller starts generating shock waves through shock wave circuit and at the same time a message containing the location of the victim obtained through GPS is transmitted to the relative or friend whose number is already in the program.

The paper [8] discussed 5 various apps which are available in the market. They are as follows:

The first one is called "Safetipin". The application has three basic features such as emergency contact numbers, GPS Tracking, and directions to safe locations etc. The app also pins the safe areas along with their safety scores to go at the time of any problem. It enables the users to pin potentially unsafe areas to help others. This app now only works at Delhi and Bangalore.

The second app called "Raksha" women safety alert: The app is equipped with a button, which will send alert messages to the specified contacts with the GPS coordinates in a situation of emergency. You can select the contacts, which will be able to see your location. If the app is switched off and/or is not working alerts can be sent by pressing the volume key for three seconds.

The third app called "Himmat". To use the application initially, the user has to register at the Delhi Police website. After the registration for the appropriate authentication, OTP is sent and verified, which has to be entered at the time of completing the app configuration. In a distress situation if the SOS alert is sent from the app by the user it will send the GPS information along with video/audio data which will be transferred to the Police control room following which the police will take action.

The fourth app called "Women Safety": The app will send an SMS to a predefined phone number along with GPS coordinates with a link to Google Maps location. The app will capture two pictures with the rear and front camera, which are directly uploaded to the server.

The last app called "Bsafe: It allows contacts follow you through a live GPS trail and also set a timed alarm which goes off if you haven't 'checked in'. Moreover, it will also have fake call services which make your phone ring and at the same time notifying the emergency contacts with GPS location,video and even siren. There is also a 'Guardian Alert'button, which will send the GPS location and video at that time.

3. PROPOSED SYSTEM

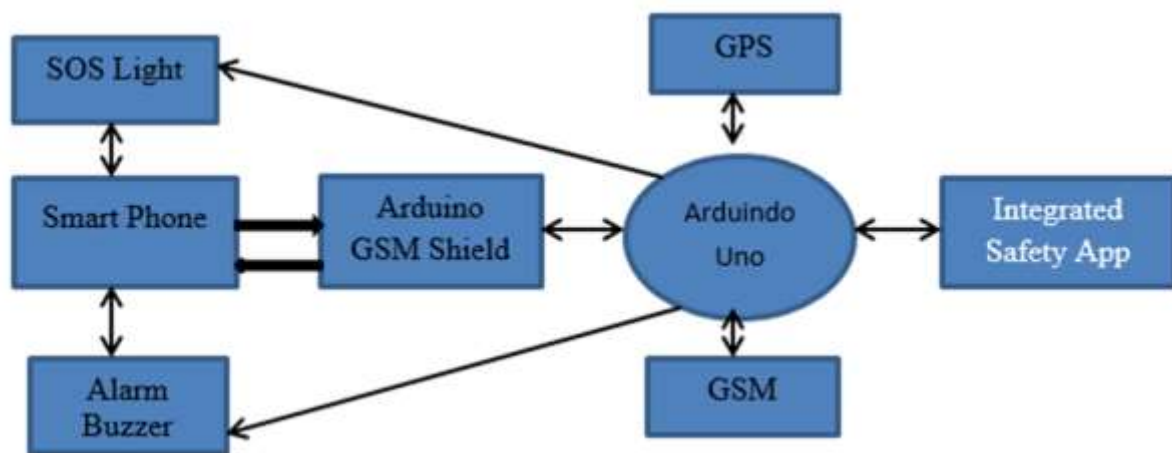Figure1 shows the block diagram of Women Safety System and Integrated Safety app

Figure (1) Block Diagram of Arduino Uno device with safety app

The block Diagram shows the women safety app and it provides the current location of the women upon the receiving of the message from the user. The GSM shield acts as an interface and sends the message to the Arduino Uno and this in turn communicates the GSM and GPS modules and give back the result to GSM shield. The GSM shield now returns the location to the smart phone. By the mean time if an emergency situation arises the SOS light or Alarm Buzzer is used to alert the passerby about the incident and initiate the first help for the victim. Apart from these functionalities, the integrated safety app is used by the women if no one is present for the first help.

4. CONCLUSION

The women safety device is capable of securing her in a distress situation. It provides alarm, SOS light and even integrated safety app for their very critical environment. The family member can locate their women and take necessary action to rescue the women from danger. The safety device can be enhanced much more in the future by using highly compact Arduino modules. It also contains safety app which is the environment where she finds the safest place in the app and rescue herself if no help is present at that time.

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