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# SAFE: A Women Security System

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***Abstract*****—** *In India women are harassed at workplace or while travelling at odd hours. Alarming increase in such motivated us to make a system which will help to prevent the same. Most of the cases are unreported due to public shame. Even if the cases are reported, culprits could not be punished due to lack of evidence. Our attempt is to make a working system which will prevent molestation or at least record evidence of the crime.*

***Keywords*****—** *Android Application Development, RaspberryPi, Portable Camera System.*

## I. INTRODUCTION

The system consists of three main components namely, an Android Application, Main Device and Portable Camera. Together these devices will work as an effective security system.

We have the Main device which consists of Raspberry Pi, integrated GSM/GPS Shield along with a manually operated pepper spray. The device will also feature a rechargeable battery to power the circuitry.

Secondly we have a camera module which can be attached to strap of a backpack or any other suitable location. A manual switch will activate the module and will allow it to capture events occurring real-time in time lapse format. The events will be stored in micro SD card which will have maximum capacity of storing more than twenty thousand images in lowest resolution format.

Android application can be used in two possible ways in which it will either use Phone GPS system or it will use GPS system of main device to capture location. Both these functions can be activated by using either volume up or volume down buttons respectively.

## II. HARDWARE COMPONENTS

### *A) Main Device*

Main device consists of a Raspberry Pi which will be connected to GPS/GSM shield. We have specifically chosen Raspberry Pi Zero which has small dimensions. This is done in order to make a device which is portable in size.

Raspberry Pi Zero is connected with Adafruit FONA 808 – Mini Cellular GSM+GPS Breakout. It is a small module which will work on any GSM Network with 2G SIM. We have also used slim sticker type band antenna for enhanced cellular reception.

Manually operated pepper spray is placed on top of the circuitry. The entire setup is placed inside a cylindrical can which is completely closed from one end and houses pepper spray from other end. The design also has ports for charging the battery and accommodates the circuitry in it. The design has a locking mechanism which secures the pepper in it. This arrangement is quite sturdy and can withstand moderate physical stress.

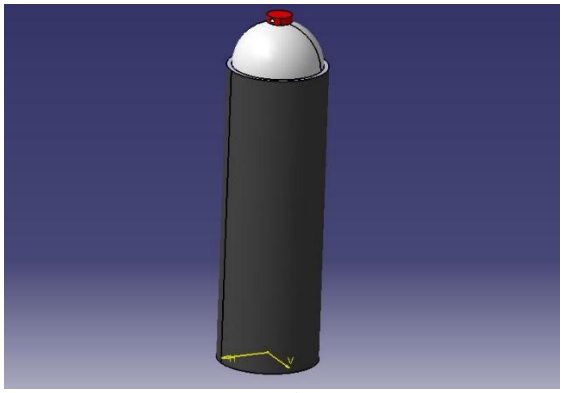

Fig. 1. Design of main device.

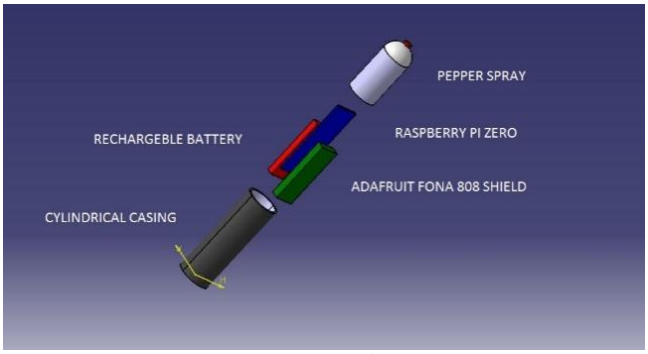


Fig. 2. Exploded view of main device.

### *B) Portable Camera*

The design of the camera ensures that it can be worn fairly easily and can also be embedded into strap of a backpack. The camera can be activated using a switch and will record in time-lapse format. The images are stored into a micro SD card which can hold up to twenty thousand images in it. The arrangement also has a small battery which can be replaced easily

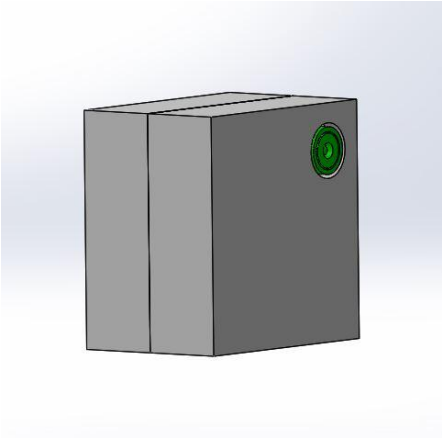

Fig. 3. Design of portable camera.



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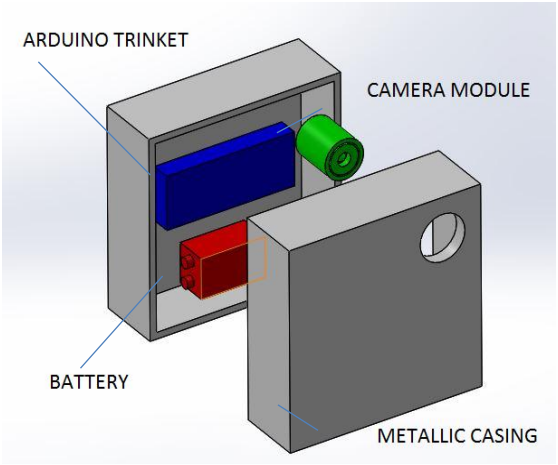

Fig. 4. Exploded view of portable camera.

The Camera module is capable of capturing images which will have a resolution of 640X480. Even though camera can be used to capture video at 480p this is found to generate lot of heat and the battery drains quickly. Hence we have made it to work at rate of 6 images per minute which is equivalent to one image for every ten seconds.

Max storage capacity = 22500 images
Rate of capture = 1 images/10 sec
Total hours of continuous capture
= (22500X10)/3600
= 62.5 hours of footage

This camera module has functionality to erase old memory and to keep recording in loop format until battery is empty. The battery is swappable and runs for around three weeks in continuous capture mode. However it is better to start recording only when one feels insecure in order to increase the life of the device. This will also make sure that battery is not drained when one is harassed. The camera itself can be covered in nylon material which will blend in with the strap of the bag. Exposing the turn ON switch will also enable easy activation whenever necessary.

## III. Software Component

### *A) Android Application*

An Android application called as "SAFE" consists of two types of functions in it. The first function is to use the GPS of phone itself in order to get the necessary location. This location is then sent to user in form of coordinates which can be converted into exact location on map. Second functionality is to activate the main device which will obtain the necessary location data and send this data to mentioned recipients. The application works in both ways by pressing and holding the Volume Up or Volume Down buttons respectively. This is done because we have added faster location tracking GPS module in the main device. Moreover this will make sure that if GPS of phone does not work then there is another device which will do the job. This double layer check ensures that accurate location information is sent to recipients. The block diagram below accurately represents the flow of actions which are actuated by the application.

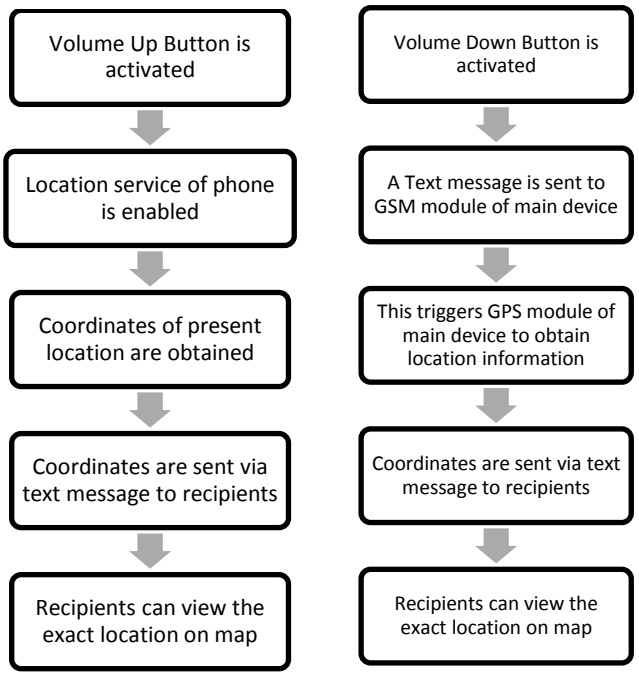

Fig. 5. Operational flow of event.

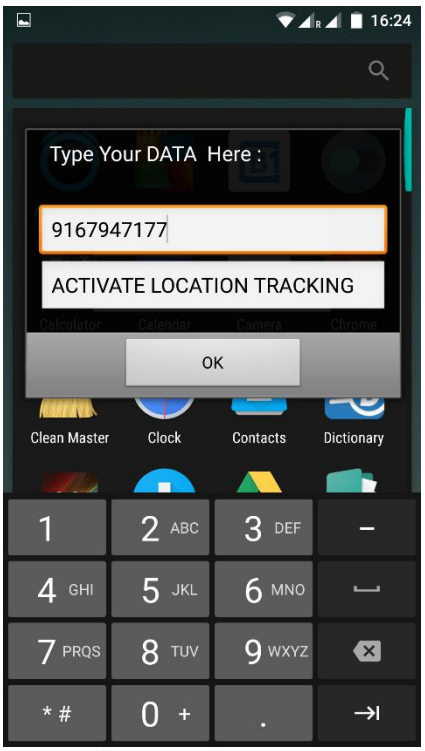

Fig. 6. Phone number of SIM in GSM Module is entered. The message is entered which activates the location tracking through GPS Module which will send the coordinates to enlisted recipients.



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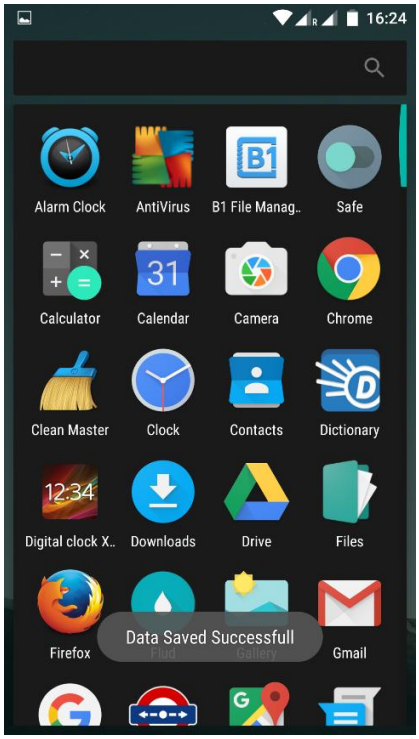



Fig. 7. Message is shown that data is saved successfully.

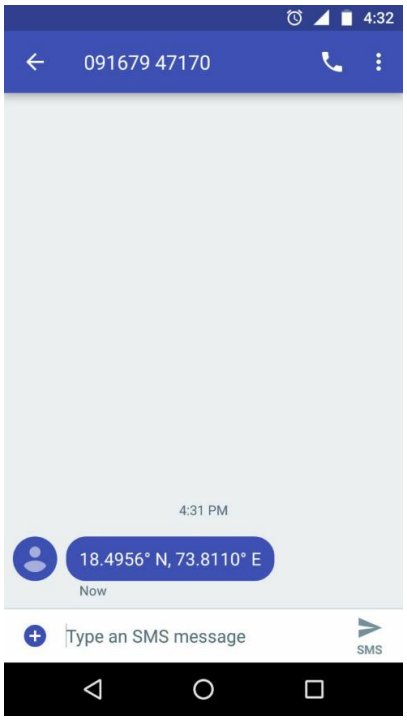



Fig. 8. Location is received by recipient when hardware interrupt signal is given through Android application.

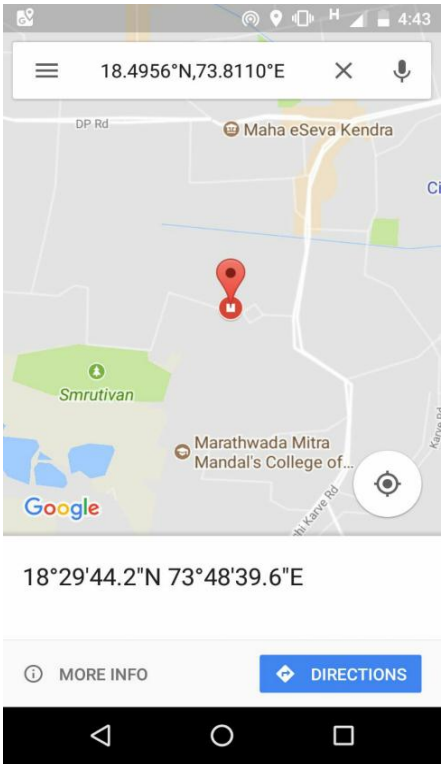
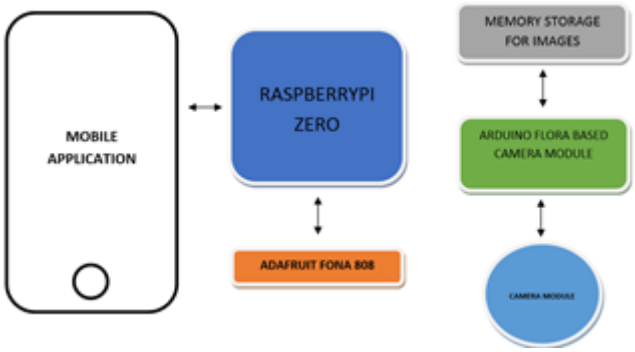



Fig. 9. Coordinates can then be converted into real location on map.

## IV. Block Diagram




## V. Future Work

SAFE can be improved further if we use custom designed printed circuit board. Such modification will make the main device even smaller in size and hence more portable. It will significantly reduce the weight of the device overall durability of product can also be improved by using polycarbonate casing. Producing such a product in large number will also reduce its cost enhancing its value even further. Moreover an application for IOS can be made for I-Phone users since they cannot use the Android Application. In case of the camera module the capacity can be increased to store an entire day of recording. Using a rechargeable battery for camera module will also make its daily usage hassle-free. Camera can also be integrated with the main device and thus multiple components will not be necessary if users prefer to use a single device. This along with automatic sending of images captured to server will ensure data security. Memory cards do get corrupted and this means that the data is lost forever. Sending



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it to an external device will solve this problem effectively. Addition of better camera sensor along with powerful microprocessor will ensure quality video capture. This will also result in better low light performance of the camera module.

## REFERENCES

[1] D. Uma, V. Vishakha, R. Ravina, and B. Rinku, "An android application for women safety based on voice recognition," *International Journal of Computer Science and Mobile Computing*, vol. 4, issue 3, pp. 216-220, 2015.

[2] Magesh Kumar. S and Raj Kumar.M, "IPROB – Emergency application for women," *International Journal of Scientific and Research Publications*, vol. 4, issue 3, pp. 1-4, 2014.

[3] V. Pawar, Prof. N. R. Wankhade, D. Nikam, K. Jadhav and N. Pathak, "SCIWARS android application for women safety," *International Journal of Engineering Research and Applications*, vol. 4, issue 3 (version 1), pp. 823- 826, 2014.

[4] B. K. Baishya, "Mobile phone embedded with medical and security applicationsm," *IOSR Journal of Computer Engineering (IOSR-JCE)*, vol. 16, issue 3 (version IX), pp. 30-33, 2014.

[5] X. Shu, Z. Du, and R. Chen, "Research on mobile location service design based on android," *5th International Conference on Wireless Communications, Networking and Mobile Computing 2009*, pp. 1-4, 24-26 Sept 2009.

[6] S. Mohamed Ashiq and C. Manivelprabhu, "Design of electric shock antenna watch with automated sms facilities for women safety in india under government license," *International Journal of Emerging Technology and Advanced Engineering*, vol. 3, issue 3, pp. 575-577, 2013.

[7] J. Jeyakar, R. Venkatesh Babu, and K. R. Ramakrishnan, "Robust object tracking using local kernels and background information," *IEEE International Conference on Image Processing*, 2007.

[8] S. Mazhar Hussain and S. Jhani Bhasha, "Design of women safety system using RFID, 8051microcontroller and GSM based Technology prototype," *International Journal of Advanced Research in Computer and Communication Engineering*, vol. 3, issue 6, pp. 6849-6850, 2014.

[9] K. Srinivasa Ravi, G. H. Varun, T. Vamsi, and P. Pratyusha, "RFID based security system," *International Journal of Innovative Technology and Exploring Engineering*, vol. 2, Issue 5, 2013.

[10] "SURAKSHA, A Device to Help Women in Distress: An Initiative by a Student of ITM University, Gurgaon" http://efytimes.com/e1/118387/SURAKSHA-A-Device-To-Help-Women-In-Distress-AnInitiative-By-A-Student-Of-ITM-University-Gurgaon.

[11] P. Bhilare, A. Mohite, D. Kamble, S. Makode, and R. Kahane, "Women employee security system using GPS And GSM based vehicle tracking," *International Journal For Research In Emerging Science And Technology*, vol. 2, issue 1, pp. 65-71, 2015.



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