



A WEARABLE SYSTEM TO SAFEGUARD A PERSON

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Abstract: In Global scenario the prime question in every girl's mind is about her safety and the harassment issues. The only thought hunting every girl is when they will be able to move freely on the streets even in odd hours without worrying about their security. Our project suggests a new technology to protect women. Our project "A WEARABLE SYSTEM TO SAFEGUARD A PERSON" describes about safety electronic system, which is basically a shock generating jacket for providing security to the person who will wear it. It will not only give shock to the person who is going to touch it, but it will also share an "Emergency SMS", connect call, share location of the victim to the pre-defined numbers. It will also upload photos of the surroundings of the victim to the server and provide self-shock protection to the victim.

Keywords: Shock generating Jacket, Stun gun technology, GPS, GSM, Self-shock protection, Camera

1. INTRODUCTION

Our project titled as "A wearable system to safeguard a person" has been undertaken with the aim to increase the security system along with to reduce the women's fear to go outside alone. We had used a Step-up transformer for generating high voltage to give shock to attacker due to which the attacker will be immobilise for some time and could not harm the victim. The attacker will be safe and will not die but just get immobilise for some time. The strips on the Jacket will pass the voltage to attacker's body when he tries to touch the jacket.

The second major part of our project is the camera module which will take photographs of the surrounding of the victim continuously and will upload to server so that someone can fetch the place or the person visible in the images. The GPS and GSM module are also adding amazing features to the system that it could send Emergency SMS, connect call, and send location of the victim to the pre-defined numbers.

The third and most important part of our project is to provide safety from self-shock to the person who is going to wear the jacket. And we had completed this task by adding a circuit in the system which will sense the shock in the victim's body and give an input signal to the micro-controller and microcontroller will turn off the high voltage supply in the jacket automatically and can save the victim from any mis-happening.

2. NEED OF PROPOSED WORK

The main purpose of this research is to enhance the security for the women so that they can feel safe while going outside alone.

- In our case study we have found many brutal cases of sexual harassment where girls have lost their lives, but they could have been saved if our project would be there in that situation.
- Working at nights has been a trend lately in India for both for men and women. But recently a lot of cases have been occurring that are posing a great threat to the security of women.

The concerns mentioned above are the main reason to develop such project which can help women. Now we are planning to save our present & future generation with a convenient technology which will help them to safeguard themselves in brutal conditions as well. Here we are introducing a "SAFETY JACKET" which will help you by providing a shock of 120 to 220 volts to the person who will try to touch you. Whenever you feel unsafe you can turn on the circuit by pressing a SOS button.

3. OBJECTIVES

The main objectives of this project are: -

- To provide safety and security to the women. It will be a kind of 'Kavach' for women.
- To share the location of the victim to his/her loved ones which will help the victim's family or the contacts to reach to them as soon as possible.



- To send an “Emergency SMS” to the predefined contacts. So that the contacts can get to know that the person is in difficulty.
- To connect the call to predefined numbers, so that the victim can talk to the contacts without using mobile phone.
- To provide electric shock to the aggressor when he will touch the jacket. That electric shock will immobilize him and in that period the victim can save herself.
- To provide the safety to save the victim from self-shock, the body sensor will sense the self-shock and the circuit will turn off automatically.
- To send current pictures of surroundings of victim to the server.

4. METHODOLOGY

This project is divided into three parts, shock generating jacket, self-shock protection circuit, emergency call and SMS. Shock generating Jacket is used to give shock to the aggressor. A voltage multiplier circuit and step-up transformer are used to generate high voltage and this high voltage will be supplied in strips attached with jacket.

And second part is self-shock protection circuit which is used to save the user who will wear the jacket. If victim feels self-shock due to moisture or any other mishappening then this circuit will sense the current flowing in the victim's body and circuit will be turned off quickly by this feature, and hence we can save the user.

And third part is the circuit used for sending Emergency SMS and connecting the call to the predefined numbers. In this feature victim can press a button to send an emergency SMS and can press another button to connect the call and can talk to loved ones without using cell phone. This will also share the live location of the user to predefined numbers.

Basically, this device is dependent on voltage multiplication. Here in the block diagram, we can see we had used aluminium strip attached with jacket. The high value voltage will be in the strips. When attacker will attack on the person then he/she will definitely touch the jacket and at that moment attacker will get a strong electric shock from the jacket. And for providing high value voltage a voltage multiplier circuit and step-up transformer is used. This circuit will work as a domestic inverter circuit.

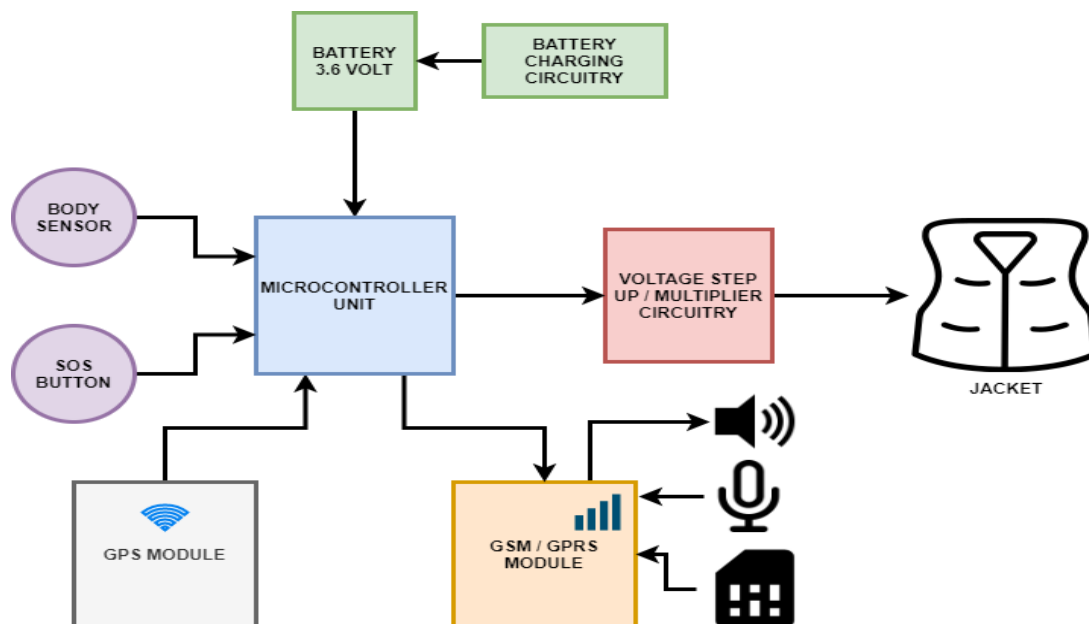


Fig 1 Block Diagram of the system

5. WORKING

First of all, we need to connect the circuit with the battery. We need to insert a valid sim card in the GSM module which must have valid recharge. And now whenever the user feels unsafe, or someone tries to molest him/her then he/she can press the button 1. By pressing the button 1 commands will be sent to GSM and GPS module through the Arduino nano module, then GPS module fetch the location and GSM module will send an emergency SMS and current location of the user to the predefined numbers continuously until we again press the button 1. By pressing button 1 PIC16F676 microcontroller will also give command to transformer and voltage multiplier circuit to generate high

voltage and supply them to aluminium strips which are pasted on the jacket. The electricity flowing in the jacket is of around 120-220 volts which is being produced by step-up transformer and voltage multiplier circuit.

Now, by pressing button 2 user will be able to connect call to the predefined numbers. By pressing button 2 the Arduino will start sending commands to the GSM module and call will connect to the number which is entered first in the program; if the first number is not reachable/ not answering/ engage/ busy, etc. then the module will connect the call to the second predefined number which is written in the program. Now for disconnecting the call the user needs to press the button 2 again.

The camera module in the project will start clicking pictures of surrounding as soon as the battery gets connected with the circuit. And with the help of GPRS module the Arduino will start uploading the photographs to the firebase server continuously.

Also, the module has an amazing feature of self-shock protection which works as follows:

One terminal from the circuit will be in touch with user's body and the circuit has a sensor which will sense shock in the user's body through the connected terminal and will give this information to the Arduino nano and then Arduino nano will give commands to stop the current flowing in jacket. And this complete task will be executed in nano seconds so the user will not be able to feel the shock, and this is how we can save the user from self-shock. And this is how the whole circuitry works

6. RESULT AND OBSERVATIONS

This project is designed to safeguard a person from any attacker. In our project we had achieved all the objectives, which were considered in the beginning. However, we were facing problem to demonstrate the project with high voltage as it might cause any mishappening in the demonstration, so we have reduced the value of the voltage which is producing in the jacket. The value of the voltage we were considering 20,000 volts but now we are taking 120-220v output from the jacket so that we can safely demonstrate our project without any mishappening.



Fig 2 Actual photograph of our project

During the testing of our system, observations are as follows: -

- 1) It is sending emergency SMS to the predefined numbers by pressing button 1.

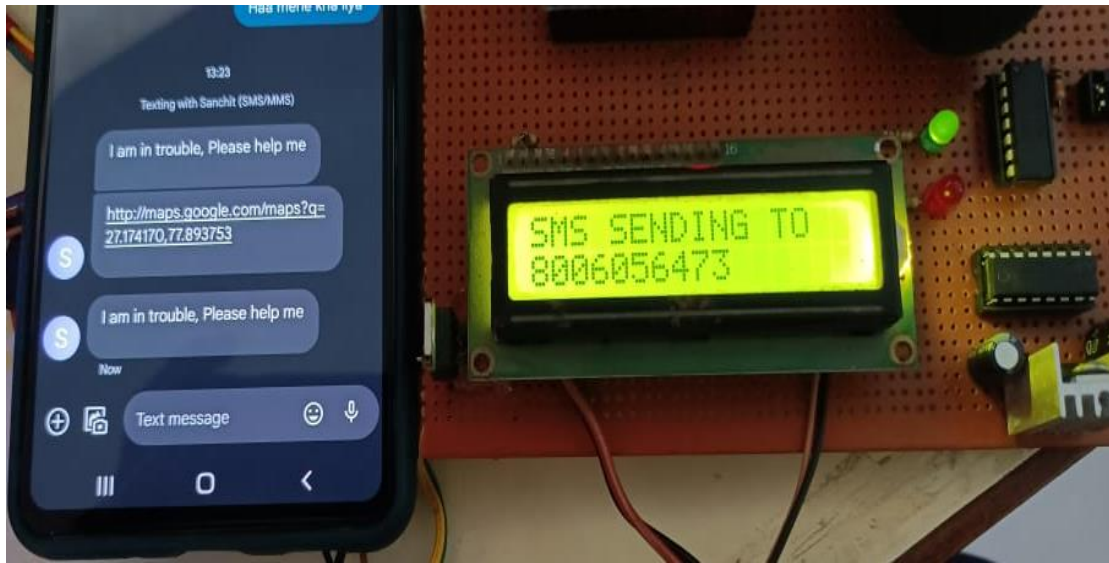


Fig 3 Emergency SMS sending

Fig 3 shows, SMS is sending to predefined numbers. LCD is showing “**SMS SENDING TO XXXXXXXXXXXX**” and received SMS “**I am in trouble, please help me**” on predefined numbers that can be seen on the left side of the image in the cell phone.

- 2) It is sending Current location to the predefined numbers by pressing button 1.

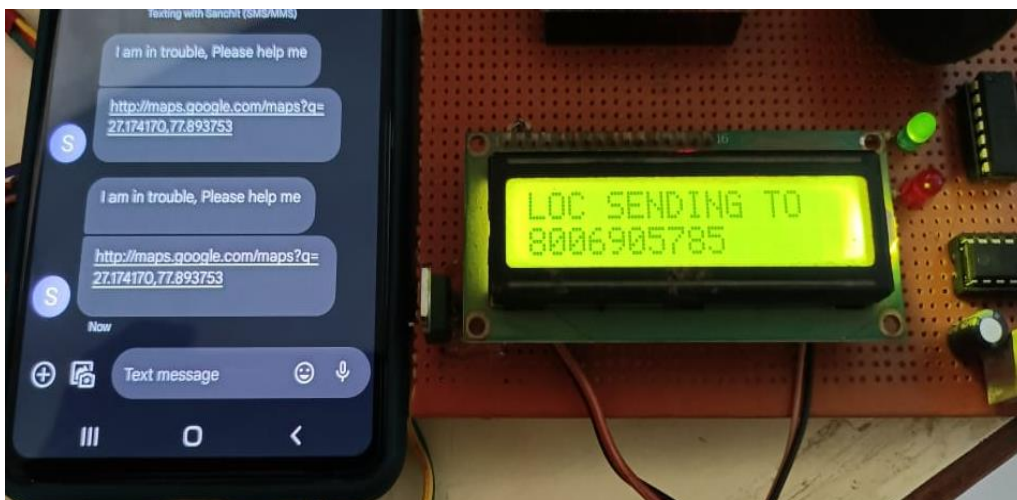


Fig 4 Current location sending

Fig 4 shows, location is sending to predefined numbers. And LCD is showing “**LOC SENDING TO XXXXXXXXXXXX**” and received current location on predefined numbers can be seen on left side of the image in the cell phone.

- 3) It is connecting a call to predefined numbers by pressing button 2. Victim can speak on microphone and can listen through speaker.



Fig 5 Call connected

Fig 5 shows, the predefined number has received call and the call is in connected state now. And we can also see message displayed on LCD as “CALL CONNECTED.”

4) It is uploading current images continuously on firebase server.

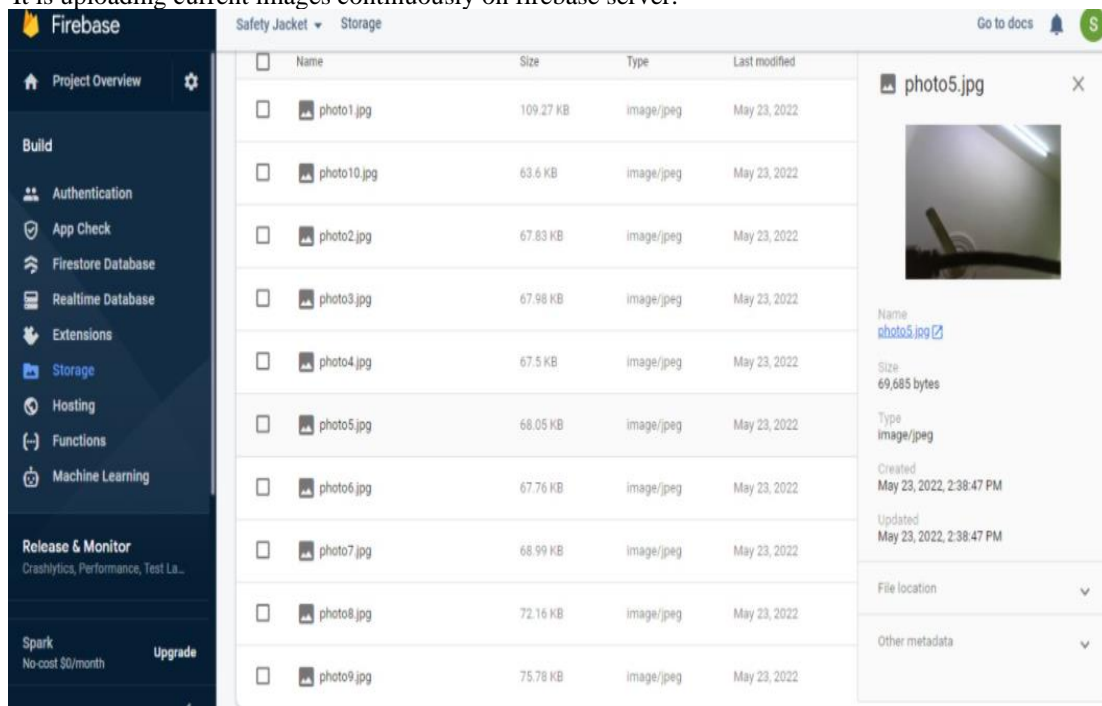


Fig 6 Images on Firebase server.

Fig 6 shows current images that are taken by the camera and has been uploaded to the firebase server. As soon as the circuit is connected to the battery, camera starts clicking images of the surroundings and uploads to server.

5) It is producing 220 volts voltage across the strips and Nano Ampere current through the aluminum strips attached to the jacket.



Fig 7 Voltage measurement across aluminum strips

Fig 7 is showing voltage producing by the aluminum strips i.e., 220 volts.

- 6) Circuit is turning off automatically when victim senses current that is flowing in the jacket in his\her body due to few reasons which are as follows: -
- When victim's body is soaking wet.
 - When victim is touching aluminum strips by his/herself.
 - When attacker is touching the jacket by one hand and hold the victim by another hand.

7. CONCLUSION

The proposed design will help the person when one is in danger zone. One can make rescue of oneself in danger situations. And this circuit will use to remove or decrease the tension of one when he/she walks alone in night hour also, so that one never can feel helpless at any situation and can protect her/him by herself/himself. And the culprits face will be captured by camera so that police will be able to catch him easily. One can connect call to loved ones without even using cell phone. He/she can talk to the loved ones with the help of the circuit only.

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