PepperShield

Team

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Abstract

PepperShield is an augmented pepper spray to be used as a device for self defence in the event of a criminal attack on the individual. Motivated though it is by the need for a defence mechanism to counter the rapid rise in crimes against women, especially in India, it can be used by any individual for protecting oneself or another person under the circumstances of a criminal attack.

The device is provided with a camera which takes a picture of the attacker at the moment the deterrent spray is released. The device then sends the photograph to the victim's cellphone via Bluetooth and triggers the sending of an SOS message to preset emergency contact numbers, along with the victim's current location tracked through GPS.

Motivation

The catastrophic rise in the crime rate and violence against women calls for an urgent solution. Self defence being the best form of immediate protection in the event of a criminal attack, we have designed PepperShield as a device that will provide a safeguard against the attacker, as also contact emergency numbers for help.

Numerous victims of attempted rape, molestation or kidnapping refrain from filing an FIR or pursuing a case against the criminal for lack of evidence. In order to help the victims feel fearless and bring the perpetrators of the crime to justice, PepperShield provides a photograph of the crime suspect at the moment of perpetrating the attack, thus preserving valuable evidence to identify and testify against the attacker when a criminal case has been registered.

Component Requirements

1. Microcontroller: Based on the cost and the memory available, we choose AVR ATmega1284P. Other options available are ATmega128 available at lesser cost but works slightly slower.

2. Connection module: Bluetooth UART module to connect with the cellphone.
3. Camera module: One compatible with the ATmega controller. The currently selected model is OV7670 VGA SENSOR.
4. Trigger mechanism : A push button to go with the pepper spray.
5. Spraying mechanism : Pepper spray synchronized with trigger for microcontroller.

Implementation

1. Acquire a small scale pepper spray mechanism (if it is not easily available, we may have to think of someway of fabricating something suitable to our requirements)
2. Work on a camera device (like OV7670 VGA SENSOR). Also integrate this with a high power LED so that a proper photograph can be clicked (the LED will function as a mini-flash device).
3. Develop a trigger mechanism by which the device action is called (like a button or switch) and suitably integrate this with the ATmega board.
4. Work on Bluetooth module which will transfer the photograph clicked from the board to the phone. (We can also think of storing the photo clicked on a micro SD card on the board itself – this will reduce error in transfer of the image via Bluetooth)
5. Development of Android Application which works on the signal received from the ATmega1284P-Bluetooth module and correspondingly saves the photograph of the attacker and also initiates the sending of an SOS message with location details tracked via GPS.
6. Overall integration of all the above components (All the circuit connections are made and a power source is added to the device).

Cost Estimate

1. Microcontroller : AVR ATmega1284P : Rs 750
2. Connection module : Bluetooth UART module : upto Rs 1000 depending on the model.
3. Camera module : OV7670 VGA SENSOR : Rs 1000
4. Trigger mechanism : Push button : Rs 100
5. Pepper spray : upto Rs.500
6. Circuitry components : Rs 1000

Therefore the total cost of the components is maximum Rs 5000.

Timeline

Week 1 : Implementation of spray mechanism synchronised with the trigger for camera

Week 2 : Setup and configuration of Bluetooth communication module to send the photograph from camera to cell phone.

Week 3 : Development of Android application to receive and store the photograph, and send an emergency SOS message to preset contact numbers

Week 4 : Aesthetics and additional feature implementation, possible miniaturization

Week 5 : Testing and debugging

Week 6 : Buffer week.