SMART AND INTELLIGENT SHOES

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ABSTRACT

In this age of technology, mobile phone is one of the gadgets that almost everyone uses to keep in touch with family and friends. This project is design of such an embedded device that not only helps women take care of themselves but also help them be fearless. This proposed model uses a microcontroller based embedded device to be placed inside the women shoe and an android application specially designed for safety of women. This app can be activated by a single toggle switch, whenever need arises. This project make use of GPS module and a shock circuit that are interfaced with ESP8266 Node MCU. Microcontroller works as the backbone of the system. Whole system can be activated by just a single press of panic button. The GPS module tracks the location and app identifies the location of the place. The GPS module also tracks the continuous location of the user. Women facing any troubles or in any kind of danger, can immediately make use of this device, embedded in their shoe to escape from the dangerous situation and even harm the attacker.

Keyword: - *Smart Shoes, Cloud Database, Alert System, Navigation, Safety, location tracking*

1. INTRODUCTION

This project proposes an idea which changes the way everyone thinks about women safety. The best way to minimize chances in becoming a victim of violent crime is to identify and call on resources to help you out of unsafe situations. This project will help to ensure the safety of the women all over the world. It reduces the risk and helps them in need by identifying the location of person who is in danger. By using this smart shoe, the women can alert their family members and even harm the attacker. The proposed model consists of ESP8266 Node MCU Wi-Fi module with microcontroller is placed inside the shoe, whenever women feels unsafe or in dangerous situations she needs to just ON the toggle switch so that the system initiates to track the location which we can see in the android application. So women can be saved and protected, by taking immediate action. Smart shoes for women safety uses GPS module and a shock circuit which are interfaced with ESP8266 Node MCU Wi-Fi module with microcontroller. Inside this system, GPS receiver works to detect the location of the incident with the help of satellites in the form of latitude and longitude data. When a women is in any kind of critical situation then the system can be activated by just pressing the panic switch. Victim can even harm the attackers by using the current shock which released from the other pair of the shoes. In this system, we are using an alert system which is placed at home. As the panic button get switched ON, the GPS tracks the location of the victim which is interfaced with the microcontroller. We get an emergency update on android application and the buzzer give an alert message to the family members and friends of the victim at home. To control this type of crimes there needs a device where women can save themselves.

1.1 Aim

The main aim of this project is to design an effective smart shoes which becomes the helping hand for women's. They can use smart shoes for safety purpose. The GPS and android application helps them to track their location and the family members or care takers can see this location via android app.

1.2 Objective

The main objective of this project is to provide a safety to the user. The design smart shoes are fully rechargeable shoes. This system tracks the location which helps the user in their emergencies through which we can easily trace them. The smart shoes are used for women safety welfare. It help the women's in their panic situation.

2. PROJECT METHODOLOGY

Here in this project we tried to overcome the difficulties present in the existing technologies that have already been discussed earlier. The shoe represented here is practically user friendly for day-to-day life. If a woman faces any kind of trouble then she can start and active the whole system just pressing a panic switch which is located at the

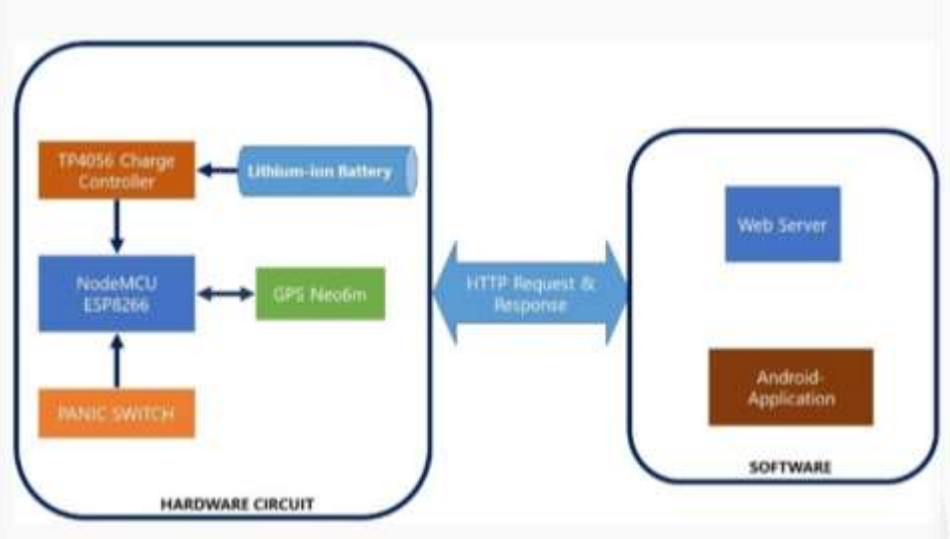

Fig : Block Diagram of Smart Shoe System

back side of shoe. It is useful if the victim is not able to use her hands because sometimes the attackers might lock her both hands and close her eyes too.

For defence purpose an electric shock system has also been incorporated inside device. For that when the girl will be trying to get rid of eve teaser, she can easily use this electric shock. And though the output is in front side of the shoe and far from her feet that's why she cannot be affected by the shock. This shoe consists of GPS module, shock circuit, ESP8266 Node MCU, TP4056 charge controller, Lithium-ion battery, charging slots and toggle switch. The basic idea of this device is to track the real time location of the user and send an alert signal to the family and friends by pressing a panic switch which is located at the back side of shoe. Here a shock circuit is used in this device which produces a shock of 600KV that is sufficient to harm the assaulter and gives enough time to escape for the victim. The main controller used in this project is ESP8266 Node MCU. GPS is connected with the Node MCU assembled inside the shoe. A 3.7v, 2200mAh lithium battery has been used as a power supply for operation of the whole system.

2.1 Components Used

2.1.1 ESP8266 Node MCU

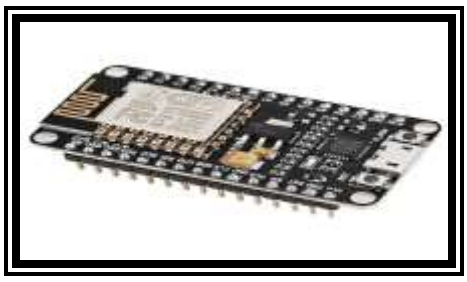

Fig -2.1.1: ESP8266 Node MCU

ESP8266EX is capable of functioning consistently in industrial environments, due to its wide operating temperature range. ESP8266EX is integrated with a 32-bit Tensilica processor, strandard digital peripheral interfaces, antenna switches, RFbalun, power amplifier, low noise receiver amplifier, filters and power management modules. ESP8266 modules can work with ESP-AT firmware to provide Wi-Fi connectivity to external host MCUs, or as self-sufficient MCUs with an RTOS-based SDK that can natively run connectivity applications. In both of these opeation modes, customers can take advantage of using features like out-of-box cloud connectivity, low power operation and Wi-Fi security support, including WPA3.

2.1.2 Neo 6M GPS Module

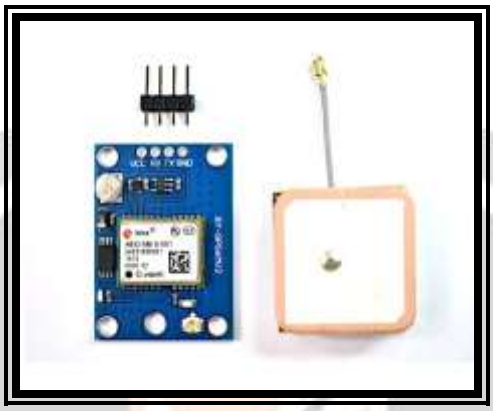

Fig -2.1.2: Neo 6M GPS Module

At the heart of the module is a NEO 6M GPS chip from u-blox. It can track up to 22 satellites on 50 channels and achieves the industry's highest level of sensitivity i.e. -161 dB tracking, while consuming only 45mA supply current. The necessary data pins of NEO-6M GPS chip are broken out to a 0.1" pitch headers. This includes pins required for communication with a micronontroller over UART. The module supports baud rate from 4800bps to 230400bps with default baud of 9600.

2.1.3 TP4056 Charge Controller

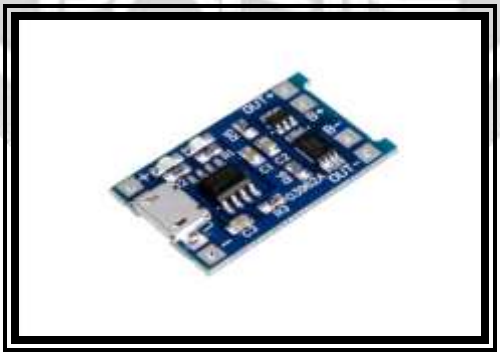

Fig -2.1.3: TP4056 Charge Controller

TP4056 is very efficient. 3.7V Lithium-ion cell charging module. We can charge any rechargeable battery by applying the required voltage and current but it may damage due to overcharging. For better efficiency and durability, we used the TP4056 charging module. It is a low cost reliable battery charging module. It will protect the battry from being over-charged. The main feature is the battery auto cut off from the charging circuit when fully charged. It also disconnects charging if the battery temperature goes high. This module can charge batteries consist

of single cell. The module is basically made for charging rechargeable lithium batteries using the constant current / constant voltage charging method.

2.1.4 Lithium-Ion Battery

Fig -2.1.4: Lithium-Ion Battery

An 18650 Battery is a lithium-ion rechargeable batery. The first 4 digits of the designation "18650" indicate the physical dimensions while the 5th digit indicates it is a cylinder cell. The standard 18650 battery is 18mm around 65mm long. This type of battery is very common in applications such as laptop battery packs, flashlights, electric vehicles, cordless tools, and various other devices that require portable power. This battery comes with internal protection circuit. Maximum voltage is up to 4.1V on a full charge. Lithium-ion batteries use an intercalated lithium compound as the material at the positive electrode and typically graphite at the negative electrode. The batteries have a high energy density, no memory effect (other than LFP cells) and low self-discharge.

2.1.5 Toggle Switch

Fig -2.1.5: Toggle Switch

The Toggle Switch control is a toggle button with a lever that appears rounded. The toggle switch control causes an event to occur when it is toggled. There are three graphical states for the lever: up, down, and neutral. The neutral position appears only when there is Three State property check box is selected.

2.2 Software

2.2.1 MIT App Inventor

MIT App Inventor is an online platform designed to teach computational thinking concepts through development of mobile applications. It is an online development platform that anyone can leverage to solve real world problems. It provides a web based "What you see is what you get" (WYSIWYG) editor for building mobile phone applications targeting the Android and iOS operating systems. The platform has also been adapted to serve requirements of more specific populations, such as building apps for emergency/first responders and robotics.

The MIT App Inventor user interface includes two main editors: the design editor and the blocks editor. The design editor, or designer is a drag and drop interface to lay out the elements of the application's user interface (UI). The blocks editor is an environment in which app inventors can visually lay out the logic of their apps using colour-coded blocks that snap together like puzzle pieces to describe the program. To aid in development and testing, App Inventor provides a mobile app called the App Inventor Companion that developers can use to test and adjust the behaviour of their apps in real time. In this way, anyone can quickly build a mobile app and immediately begin to iterate and test.

2.2.2 Arduino IDE

Arduino IDE is an open-source software, designed by Arduino.cc and mainly used for writing, compiling and uploading code to almost all Arduino modules. It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process. It is available for all operating systems i.e. MAC, Windows, Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role in debugging, editing and compiling the code. A range of Arduino modules available including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more. Each of them contains a microcontroller on the board that is actually programmed and accepts the information in the form of code. The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board. The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Arduino Module. This environment supports both C and C++ languages.

3. SHOCK CIRCUIT DIAGRAM

Circuit arrangements of shoes are presented here in the figure. Figure above represents the right shoe. Right shoe is studded with shock circuit arrangements for self-defence purpose of the victim. One can easily activate the shock arrangements by just toggle the panic switch, residing the back side of right shoe. The shock circuit will be activated as soon as the user toggle the panic switch on the right shoe. Shock probes can be seen at the front of the right shoe. The working of this circuit is very simple. A high voltage power supply is given to the metal mesh. So when the metal meshes will come in physical contact it creates a low resistance path between the meshes so the high voltage creates an ARC through the body of the person which is instantly electrocuted.

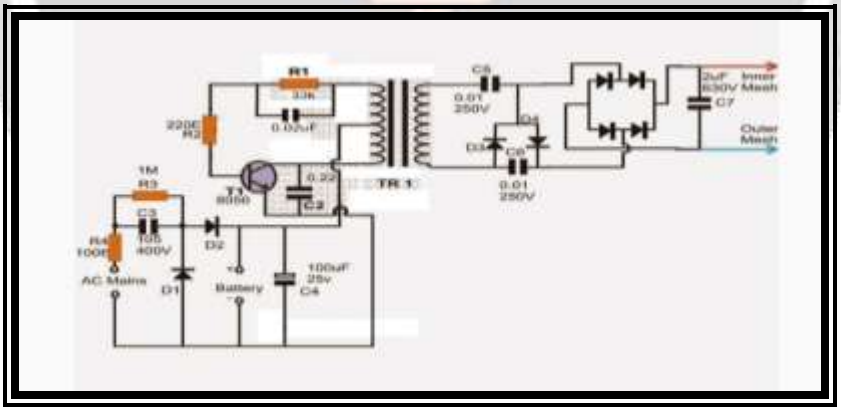

Fig: Shock Circuit Diagram

4. RESULT

This project is based on IoT along with an android app. If a women is in panic situation then she toggle the panic switch residing the back side of the smart shoes. The siren of the alert system gets ON and the GPS tracks the location of the user which we can see through the android app. For self-defence purpose a 1200V shock has been

used here in this shoe. User can easily activate the shock circuit by toggle the switch studded back side of her right shoe. The mobile application gets connected to the embedded device by clicking the button "Pair me". Once the Wi-Fi connectivity is established, the present location of the user will be updated in app. For this the GPS of smart phone must be enabled. And "Disconnect" button is provided in order to disconnect between the embedded device and app.

5. CONCLUSIONS

This smart safety shoe for women is a ready to use device for day to day use of women. In this device no such complex charging circuit is needed, nor any kind of wires can be seen from outside. Women won't feel helpless anymore and can walk out at any time of the day without concerning about their safety. The proposed system defends the women in the critical situation of rape and molestation. The overall system is first of its kind that provides a complete kit solution to the existing women safety problem, with the complete system the women can now travel freely without any hesitations of getting harmed by the societal issues.

6. ACKNOWLEDGEMENT

We find pleasure in introducing this project before you. We would like to place on record here to various individual whose co-operation had made be possible for us to complete this work. We sincerely thank Dr. A. M. Shende Principal of Priyadarshini J. L. College of Engineering, Nagpur for providing us a good environment to undergo this project. We projectees describe our success in this venture to our guide Prof. Purnashti Bhosale dynamism contributed in a big way completing this project. We thank from the bottom of our heart to Dr. P. B. Pokle, H.O.D Electronics and Telecommunication Engineering, Priyadarshini J.L. College of Engineering, Nagpur for encouraging spirit given by him and his guidance.

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