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SMART AND INTELLIGENT SHOES

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ABSTRACT

In this paper, a smart shoe for women has been presented by authors. The whole system uses GPS modem, electric shock circuit and ESP8266 Microcontroller board. GPS receiver works as the detector, it fetches the location of the concerned accident in the form of latitude and longitude. It also fetches the continuous location of the user by using cloud services. ESP8266 is a Wi-Fi module with Microcontroller works as the backbone of the system. Whole system can be activated by just a single press of panic button. Hardware representation of the system has also been presented in this time processing of data presented in various figures.

Keywords: Navigation, Cloud Database, Smart Shoes, Alert System, Etc.

I. INTRODUCTION

At the present scenario women are competing with men in every prospect of society. Women contribute to fifty percent of the development of our nation. Many unfortunate incidents have been taking place in women's case. This project discusses on a security system that is designed solely to serve the purpose of providing security and safety to women so that they never feel helpless while facing such social challenges. 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. The idea to develop this model for women is that its completely comfortable and easy to use as compared with already existing women security solutions such as a separate garments, smart band, bulky belts, and mobile apps that are just very abstract and obsolete. 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 feel 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 seen in the android application. So, women can be saved and protected, by taking immediate action. Above all the electric shock circuit which has been described in the work can be very dangerous for the victim and it seems not user friendly as it can in turn harm the victim itself. 'SHE – Society harnessing equipment' is an anti-rape device having sensors and shock circuit board attached to the lady's inner wear. Smart shoes for women safety uses GPS module and shock circuit which are interfaced with ESP8266 Node MCU Wi-Fi module with microcontroller. The fundamental problem of all this device and technologies are that they are not physically viable. It is difficult for a woman to use innerwear or a belt or watch with so many devices on it. 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. The microcontroller processes the whole information for sophisticated use. When a women's is in any kind of critical situation then the system can be activated by just pressing the panic button. 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. We came to know about so many cases regarding women harassment and rape in recent times, and the number of cases increases day by day. To control this type of crimes there needs a device where women can save themselves.

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II. METHODOLOGY

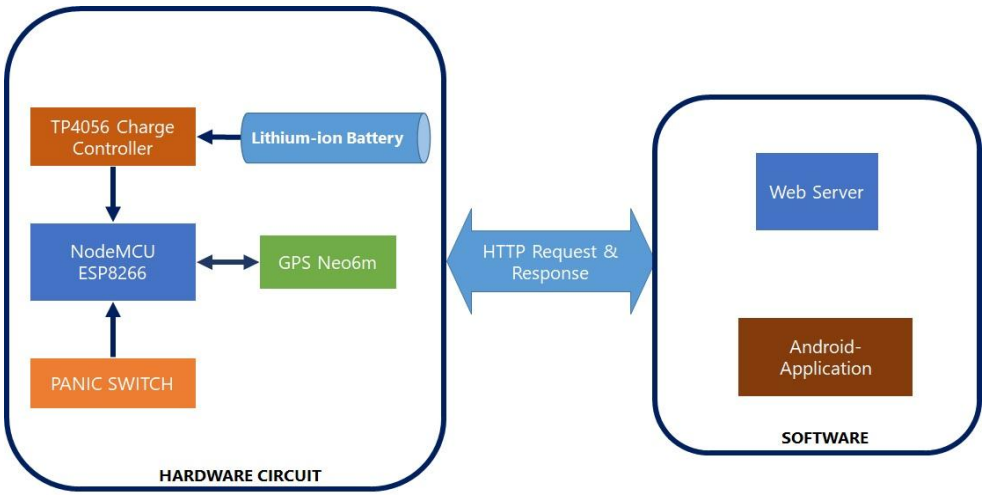

Fig: Block Diagram Smart Shoe System

III. WORKING

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. The best part of this device is its compact structure. All the models, power source and devices are engraved inside the shoe sole, making it a practically viable and user for any women's daily life. If a women's faces any kind of trouble, then she can start and active the whole system just pressing a panic swich which is located at the back side of shoe. For defence purpose and 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 here 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 and alert signal to the family and friends by pressing panic swich which is located at the back side of shoe. Here a shock circuit is use 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 use in this project is ESP8266 Node MCU. GPS relates to the Node MCU assembled inside the shoe. A 3.7v, 2200mAh lithium battery has been use as a power supply for operation for the whole system.

COMPONENTS

1. ESP8266 Node MCU

ESP8266EX is capable of functioning consistently in industrial environments, due to it wide operating temperature range. ESP8266EX is integrated with a 32-bit Ten silica processor, standard digital peripheral interfaces, antenna switches, RF balun, power amplifier, low noise receiver amplifier, filters, and power management modules. All of them are included in one small package. 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 operation modes customers can take advantage of using features like out-of-box cloud connectivity, low power operation and Wi-Fi security support, including WPA3.

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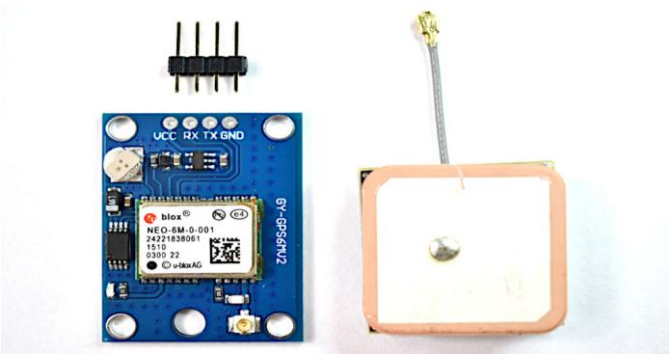
2. NEO 6M GPS MODULE



At the heart of the module is a NEO 6M GPS chip from u-box. The chip measures less than the size of a postage stamp but packs a surprising number of features into its little frame. It can track 22 satellites on 50 channels an achieves the industry's highest level of sensitivity i.e. -161 Db tracking, while consuming only 45 A m supply current. One of the best features the chip provides is power save mode (PSM). It allows a reduction in system power consumption by selectively switching parts of the receiver ON and OFF. The necessary data pins of NEO 6M GPS chip is broken out to a 0.1" pitch headers. This includes pin required for communication with a micro controller over UART. The model support baud rate from 4800 bps to 230400bps with default baud of 9600.

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 battery 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.

4. Toggle Switch

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

5. Lithium-Ion Battery

As 18650 Battery is a lithium-ion rechargeable battery. The first 4 digits of the designation "18650" indicate the physical dimension while the 5th digit indicates it is a cylinder cell. The standard 18650 battery is 18mm around

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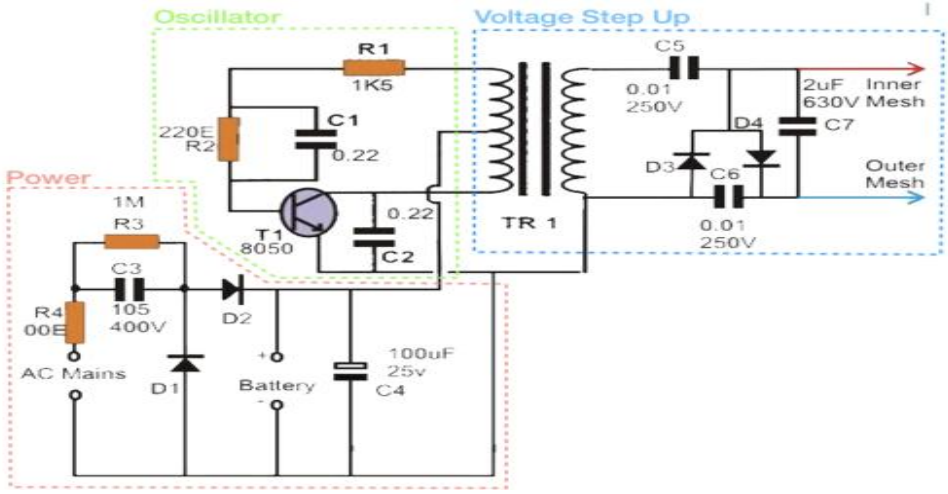
65mm long. This type of battery is very common in applications such as laptop battery packs, flashlights, electric vehicles, cordless tools, and various other devices that require portable power. This battery comes with internal protection circuit. Maximum voltage is up to 4.1V on a full charge. Lithium-ion batteries use an intercalated lithium compound as the material at the position 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.

IV. MODELING AND ANALYSIS



Working Principle:

Circuit arrangement of shoes are presented here in the fig. figure above represents the right shoe. Right shoe is studded with shock circuit arrangement for self-defence purpose of the victim. One can easily activate the shock arrangement 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

V. RESULT

This project is based on IOT along with an android app. If a woman 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.

VI. CONCLUSION

This smart safety shoe for women is a ready to use device for day-to-day use of women. As per our knowledge, no such off the shelf and ready to use device is present which can be used by women for safety purpose. In this device no such complex charging circuit is needed, nor any kind of wires can be seen from outside. The sole motive of this woek has been to deliver a ready to avail and portable solution for smart women safety device. Women Won't feel helpless anyone and can walk out at any time of the day without concerning about their safety.

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