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Ultrasonic Blindmate with GPS Tracking

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Abstract:-This project is designed in order to help visually challenged people. The generally available blind stick are capable to finding obstacle that touch the stick physically, but here we propose an advanced blind stick that allows blind person to sense objects before stick touches them. Also it includes GPS tracking feature to find blind person and system allows the blind person to send out message with his GPS location to the caretaker or relatives in case of trouble or being lost.

Keywords:-Ultrasonic sensor, GPS, GSM, Arduino, Voice module.

I. INTRODUCTION

In well-developed countries, footpaths are wider and safe with few obstacles, but in India, people who are visually impaired are reluctant to leave their homes, because of obstructions at footpaths. Hence, we want to work on ultrasonic blind stick.

We designed this project in order to help visually challenged people. The blind sticks which are available now-a-days are capable to finding obstacle that touch the stick physically, but here we propose an advanced blind stick that helps blind person to sense objects before stick touches them.

In addition, this blind stick includes GPS tracking feature to find blind person and system allows the blind person to send out message with his GPS location to the caretaker or relatives in case of trouble or being lost.

This paper is organize in following manner. Section I starts with the brief introduction to our project that is ultrasonic blindmate and the need to build it, Section II contains the existing work of blindstick to detect various kind of obstacles. Proceeding ahead, Section III describes proposed system and it include system overview. Finally, Section IV concludes research work with future directions.

II. RELATED WORK

This system uses ultrasonic sensor to sense object within a specified range of the person and deliver message of a particular type of signal obstacles. To detect water in front of blind person we can use moisture sensor i.e. shorting system. As soon as the front of the system dip in the water that system signals the blind person will receive unique message.

This system also has a light sensing feature to give blind person a sense of light if there is light or darkness so that he come to know whether there is night or has entered in a very dark room.

III. PROPOSED ALGORITHM

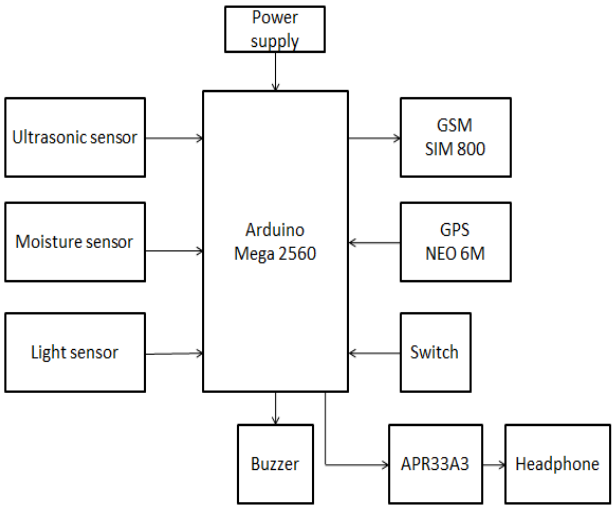

Fig. 1:- Block diagram of proposed system

We can choose the location from the set of destinations stored in specified memory and it will lead in the correct direction by GPS system.

A. *Ultrasonic Sensor*

Fig. 2:- Ultrasonic Sensor.

Ultrasonic sensor ranging module HC - SR04 provides detecting range of 2cm-400cm. These modules consist of ultrasonic transmitters, receiver and control circuit. The basic principle of ultrasonic sensor:
(1) It uses IO trigger for at least 10us high-level signal.
(2) Ultrasonic Module automatically sends eight 40 kHz pulse of signals and detect whether there is a pulse signal receive back.
(3) IF the signal back, through high level , time of high output IO duration is the time from sending ultrasonic to returning. Thus, we can measure
Test distance = (high-level time×velocity of sound (340M/S) / 2.

B. *GSM Sim 800*

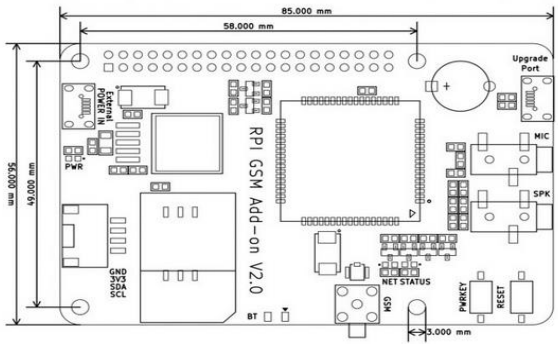

Fig. 3:- GSM module

Our GSM Modem can accept any GSM network operator SIM card and it is act like a mobile phone with its own unique phone number. We can use RS232 port to communicate and develop embedded applications is the main advantage of using this modem. Various applications like SMS Control, data transfer, remote control and logging can be easily developed using this modem.

GSM and GPRS MODEM is a class of wireless MODEM devices, which are designed for communication of a computer with the GSM and GPRS network via communication links. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication, which is the necessary of the network. In addition, they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification purpose. A GSM and GPRS MODEM can perform the following operations:

1. They can receive, send or delete SMS messages in a SIM.
2. They can read, add, and search phonebook entries of the SIM.
3. They can Make, Receive or reject a voice call.

The MODEM needs AT (Attention) commands, for interacting with the processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. The MODEM sends back a result after it receives an AT command. Different types of AT commands supported by the MODEM can be sent by the processor/controller or computer to interact with the GSM and GPRS cellular network.

C. *Arduino MEGA 2560*

Fig. 4:- Arduino MEGA 2560

On the ATmega2560 the Arduino Mega 2560 is a microcontroller board are based. It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 4 UARTs (hardware serial ports), 16 analog inputs and 16 MHz crystal oscillator, also it have USB connection, a power jack, an ICSP header, and a reset button like facilities. It contains everything that is required to support the microcontroller; we can simply connect it to a computer with a USB cable or power it with an AC to DC adapter or battery to get started.

D. *Moisture Sensor*

Fig. 5:- Moisture sensor

Moisture sensors use to detect the relative humidity of the immediate environments in which they are placed. They measure both the moisture and temperature in the air, water and express relative humidity as a percentage of the ratio of moisture in the water to the maximum amount, which is held in the water at the current temperature. As air becomes hotter, it holds more moisture, so the relative humidity changes with the temperature. It also detect water molecules in surrounding atmosphere.

Most moisture sensors use capacitive measurement to determine the amount of moisture in the air. This type of measurement relies on two electrical conductors that is simply we can take two wire with a non-conductive polymer film laying between them to create an electrical field between them.

Moisture from the water collects on the film and causes changes in the voltage levels between the two plates. This change then converted into a digital measurement of the water's relative humidity after considering the air temperature.

E. *Light Sensor*

Fig. 6:- Light sensor

A light sensor is a one of the type of passive sensor that is use to indicate the intensity of the light by examining the radiant energy that exists in a certain range of frequencies. In the spectrum of electromagnetic waves, we can examining the ranges of frequencies that are used to detect using a sensor are between infrared to visible and up to ultraviolet.

Light sensors convert the light energy in the form of photons to electrical energy in the form of electrons. Hence, they have various names like Photo Sensors or Photo Detectors or Photo Electric Devices.

F. *APR 33A3*

Fig. 7:- APR 33A3

Todays, consumers demand the best in audio/voice. They want crystal-clear sound quality wherever they are in whatever format they want to use. To enhance a listener's audio/voice experience and improve sound quality APLUS incorporates technology can be used. APR33A series is one of the most powerful audio processor it is also have a high performance audio analog-to-digital converters (ADCs) and digital-to-analog converters (DACs). APR33A series is a fully integrated solution and they are offering unparalleled integration high performance with analog input, digital processing and analog output functionality. The APR33A series provides all the functionality, which used to perform demanding audio/voice applications. High quality audio/voice systems with lower bill-of-material costs can be implemented with the APR33A series because of its integrated analog data converters and full suite of quality-enhancing features such as sample-rate converter.

G. GPS Neo 6m

Fig. 8:- GPS NEO 6M

The NEO-6 module series is a family of GPS receivers featuring the high performance u-blox 6 positioning engine. These flexible and cost effective receivers offer numerous connectivity options in a miniature 16 x 12.2 x 2.4 mm package.NEO-6 modules is ideal for battery operated mobile devices because of their compact architecture, power and memory options. It is very strict cost and space constraints.

The 50-channel u-blox 6 positioning engine boasts a Time-To-First-Fix (TTFF) of under 1 second. The dedicated acquisition engine, with 2 million correlators, is capable of parallel time/frequency space searches, enabling it to find satellites instantly. NEO-6 GPS receivers giving innovative design and technology suppresses jamming sources and mitigates multipath effects. NEO-6 GPS receivers used to excellent navigation performance even in the most challenging environmental conditions.

IV. CONCLUSION

The system we have developed which successfully use for GPS Tracking. Obstacles detection before stick touches them physically. Water, Light and Fire indication. If the person loses the stick, he can use an RF remote so the stick start beeping and person can find it.

The user can choose the location from the set of destinations stored in memory and will lead in the correct direction by GPS system.

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