

SMART BLIND STICK FOR VISUALLY IMPAIRED PEOPLE

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Abstract - Currently, blind people use a traditional cane as a tool for directing them when they move from one place to another. Although, the traditional cane is the most widespread means that is used today by the visually impaired people, it could not help them to detect dangers from all levels of obstacles. In this context, we propose a new intelligent system for guiding individuals who are blind or partially sighted. The system is used to enable blind people to move with the same ease and confidence as a sighted people. Moreover, it provides the direction information as well as information to avoid obstacles, Humans, water and footsteps based on sensors. The system is linked with a GPS navigation to pin-point the location of the blind person using ANDROID application.

Key Words: Ultrasonic sensor, Moisture sensor, PIR sensor and Microcontroller

1. INTRODUCTION

Blindness is a very common disability among the peoples throughout the world. According to the World Health Organization (WHO) 285 million people are visually impaired worldwide, 39 million are blind and 246 have low vision. About 90% of the world's visually impaired in countries. For the indigents blindness is a curse. They need help to walk outside and all other daily essential works. So the paper glows a system that tries to remove the curse of blindness and make them self-dependent to do their daily chores. It is a walking stick, normally used by the blinds. But it is fully automated, easy to maintain, cheap and it is very comfortable to use. The power consumption is low and can be operated easily. Above all the stick is very economic over the conventional one. The walking stick mentioned above is a stick that consists of a circuit board that contains ATMEGA8 micro controller, different sensors, and voice board. The entire project is designed using micro-controller based upon its reliability. The micro-controller is code protected so its security bridge cannot be override except the vendor or owner. Here one micro-controller is used, that is ATMEGA8. All sensors data are taken by the micro-controller and it produces the sensors of output. Blind people use a traditional cane as a tool for directing them to move from one place to another. Advanced navigation technique for visually impaired people. Bioengineering for the people with disabilities. With the development of Sensors and android app technology a new series of devices, known SMART BLIND STICK were developed.

2. WORKING OF THE SYSTEM

Blind stick is an innovative stick designed for visually disabled people for improved navigation. We here propose an advanced blind stick that allows visually challenged people to navigate with ease using advanced technology. The blind stick is integrated with ultrasonic sensor in fig -1 along with water sensing. Our proposed project first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. On sensing obstacles the sensor passes this data to the microcontroller. The microcontroller then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the microcontroller sends a signal to the Bluetooth which is in the circuit board. the phone bluetooth connect with the circuit's bluetooth with the help of GPS we navigate to the desired location.

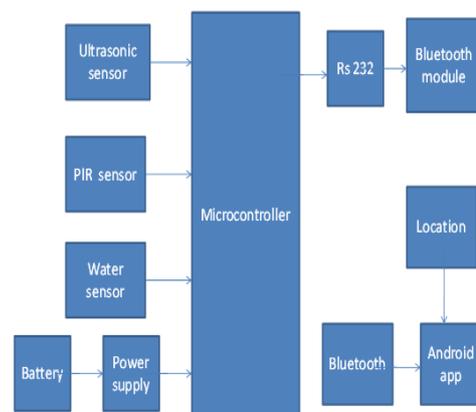


Fig -1: Block Diagram

3. COMPONENTS USED

The system is fully an embedded based system. Embedded Systems is the evolution or further development of computing system. The object avoidance algorithm prescribes an alternative direction that would clear the obstacle and then resume in the desired direction. An embedded system is a combination of computer circuitry and software that is built into a product for purposes such as control, monitoring and communication without human intervention. There are two types of components 1)Hardware 2)Software

3.1 Microcontroller

ATmega8 is the microcontroller used in the project. The controller has peripheral features like inbuilt ADC, required to get the signals from the sensors. Maximum clock frequency is 16MHz and hence faster than 8051. Based on RISC and Hardware architecture and hence even more fast. Embedded C is used for programming the microcontroller. ATmega8 is a 8 bit data, 8 bit address Microcontroller has In-built EEPROM, RAM, Digital I/O, Timers, A/D Converter, PWM Generator and Serial Communication Interface.

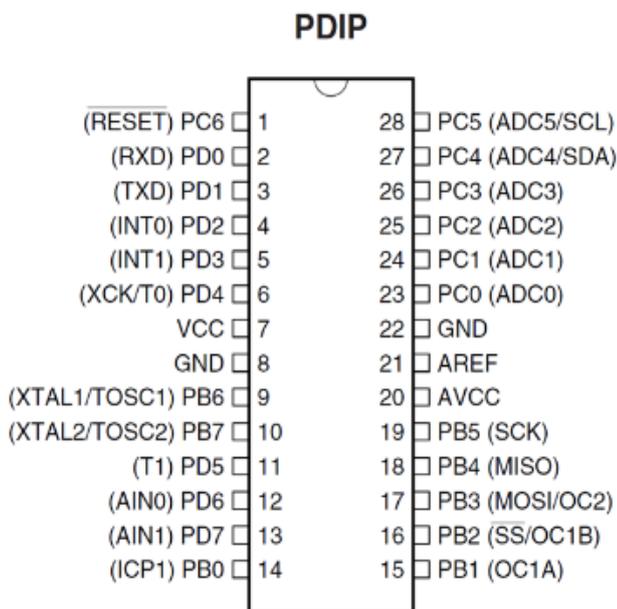


Fig -2 Pin Diagram

3.2 Power Supply

A regulated power supply is the power supply with rectification, filtering and regulation being done on the AC mains to get a regulated power supply for microcontroller and for the other devices being interfaced in it. A power supply can be broken down in to series of blocks, each block performs a particular function.

3.3 RS232 Interface

The serial port of the computer is used for communication with the hardware. The serial port of the computer uses RS232 standard for communication. RS232 standard voltages are not compatible with conventional TTL / CMOS circuits. Hence IC MAX232 is used for voltage conversion between RS232 port and the microcontroller. MAX232 enables full duplex communications, while doing the necessary voltage conversions.

3.4 Sensors

There are different types of sensors used in the proposed system. 3 sensors are used in here as Ultrasonic sensor, Water sensor and PIR sensor.

3.5 Ultrasonic Sensor

This linear 'sensor' is typically a few meters up to a few hundred meters in length. Infrared proximity sensors work by sending out a beam of ultrasonic, and then computing the distance to any nearby objects from characteristics of the returned (reflected) signal.

3.6 PIR Sensor

PIR (Passive Infra-Red) Sensor is a pyroelectric device that detects motion by measuring changes in the infrared levels emitted by surrounding objects. This motion can be detected by checking for a high signal on a single I/O pin in human body.

3.7 Moisture Sensor

Used to sense the level of water content in the land below 10 meters of distance.

4. CONCLUSION

The system designed is very precise and very easy in handling. This system is advantageous for commercial as well as residential purpose. The components used are readily available which makes construction very easy. The structure is compact which allows the system to be installed on any platform.

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