SONAR GLOVES

KIRAN VENKATACHALAM .N.RANGANATHAN NEKETA JAIN PREKSHA KOTHARI
student student student student
COMPUTER SCIENCE & ENGINEERING
SRM University,Ramapuram
Chennai, India

Abstract: **It is a wearable equipment that helps the visually impaired individual to guide through obstacles. It uses the SONAR technology to sense obstacles and maneuver. Ultrasound waves are emitted from the gloves and then the reflected waves are received and sent to a microcontroller. The microcontroller then instructs the motor indicating the direction in which the visually impaired individual should move to avoid the obstacle.**

Keywords— Arduino; wearable; smart glove; portable; ultrasonic; sonar; servo motors

I INTRODUCTION

It is a very difficult world for disable people to live in and it is the citizens of the society's moral responsibility to contribute and make difference to people's life. Visually challenged strata of society is facing numerous challenges and it is our responsibility to reach out to their special needs. Sonar Gloves is one such initiative that pushes the envelope to whole new extent. Sonar gloves is a light wearable assist that uses the SONAR technology to guide the visually impaired through real time obstacles. SONAR (Sound navigation and ranging) uses sound waves of ultrasonic frequency to get the job done.
Sonar gloves is a step forward to provide affordable and practical solutions to the problems faced by the visually challenged group of society.

II LITRATURE SURVEY

problem statement

Visually impaired people cannot guide through obstacles and face real time difficulties while travelling.
To combat this, gloves that use the sonar technology helps the visually impaired individual to dodge obstacles.
The existing wearable assists are bulky, heavy and hence not portable and also not user-friendly.

objective

Considering the vast possibilities in technological advancements, sole focus is on betterment of the current wearable assists, making them affordable and portable. Sonar gloves is designed to do all the tasks yet be affordable and extremely portable. It uses powerful components to get the job done and is designed to provide user-friendly assist to the visually impaired individual.

III ANALYSIS

This project is a prototype and a system concept to provide a formidable and near world class technological assist to our visually challenged strata of the society and make their life a little better to live in today's world. The Sonar Gloves uses the arduino to do so, the ultrasonic sensors receive the ultrasonic waves that are reflected from the obstacle that was emitted by the glove itself. This wave then is captured and sent to arduino board to calculate the distance between the individual wearing the gloves and the obstacle in his or her path. Servo motors are then instructed to vibrate in the direction in which the individual should move. The intensity of the vibration of the motor is directly proportional to the proximity of the obstacle to the individual.

Modules

Connecting the Arduino to PC

The Arduino board is connected to the system that is a computer and the Arduino software is allowed to detect Arduino board.

Interfacing the GSM to Arduino

The GSM modules is connected to the Arduino through the jumper wires and the requirements of the GSM module is codded through Arduino software.

Interfacing the Ultrasonic sensors to Arduino

The Ultrasonic sensor is then interfaced with the Arduino board and programed for emitting and recapturing the waves through the Arduino software

Interfacing the Compass sensor to Arduino

Compass sensors are then programed to detect obstacles in the form of potholes and uneven floorings and this is done by interfacing the compass sensor with the Arduino board and codded through the Arduino software

Uploading the codes through Software

Software's library files are built with C and C++ and the functionality of the components are codded through this software.

Testing phase

The prototype is put through extreme conditions to test it under many possible situations that it might have to come across in its life span and also it is put to test in most in unlikely situations and make sure it passes the quality standards.

Architecture diagram

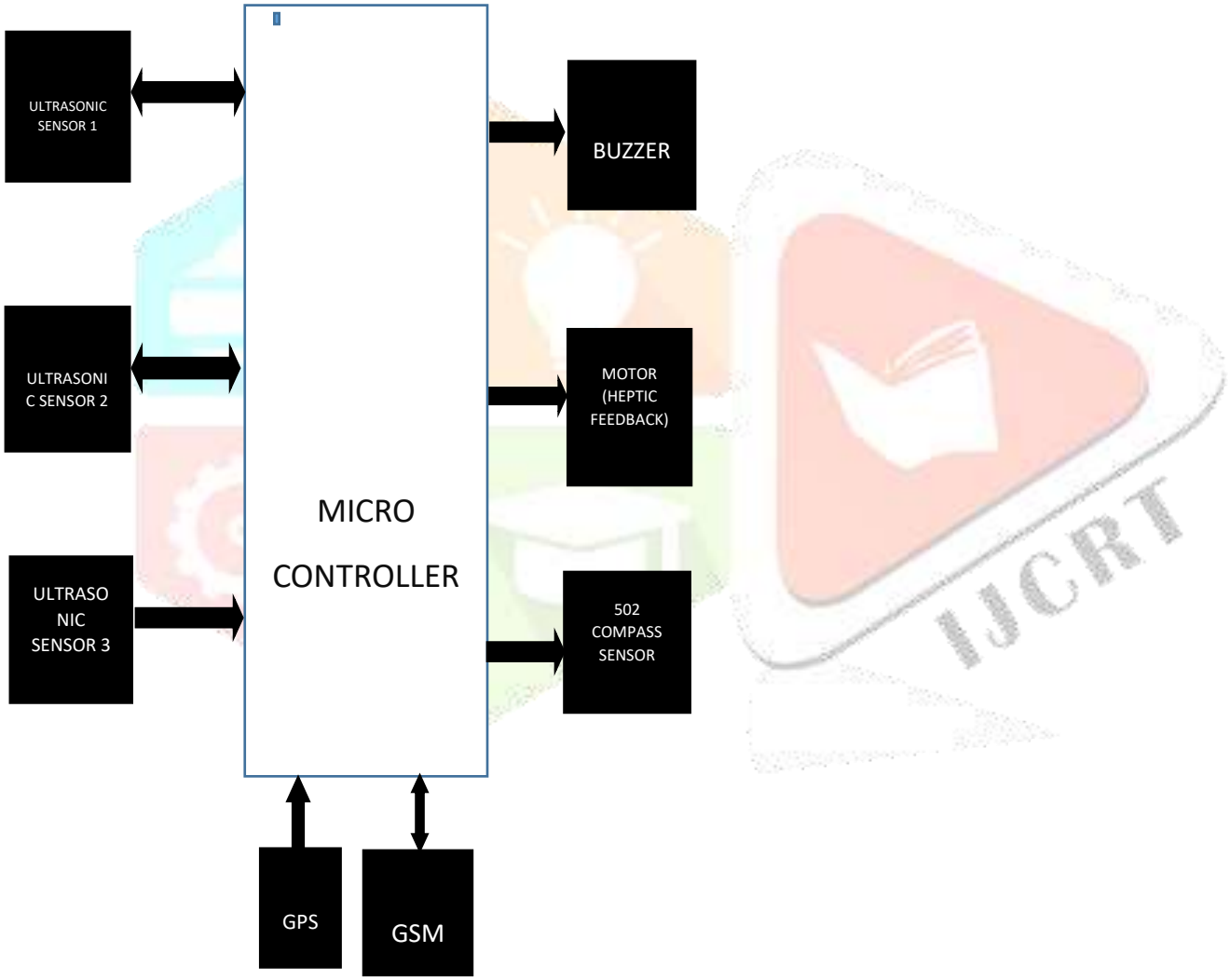

Figure 3.1 Architecture Diagram

IV EXPECTED OUTPUT

The Sonar Gloves when put to use should be able to provide an accurate result whenever any obstacle is detected. It should sense the real time obstacles with at-most precision and instruct the individual to take suitable actions in the interest of avoiding the obstacle by giving a user friendly feedback using right and left servo motors. The intensity here plays an important role in understanding so as to how close the obstacle is to the individual and how quickly he or she should respond to the environment.

The gloves should emit ultrasonic waves towards the object or obstacle and then capture the reflected waves from the object. The time taken by the wave to come back after reflection from the object is recorded and with this recorded time taken by the ultrasonic wave the distance between the individual and the obstacle is calculated.

After the distance is calculated the servo motors should respond with suitable intensity of vibration to suggest directions in order to avoid the obstacle.

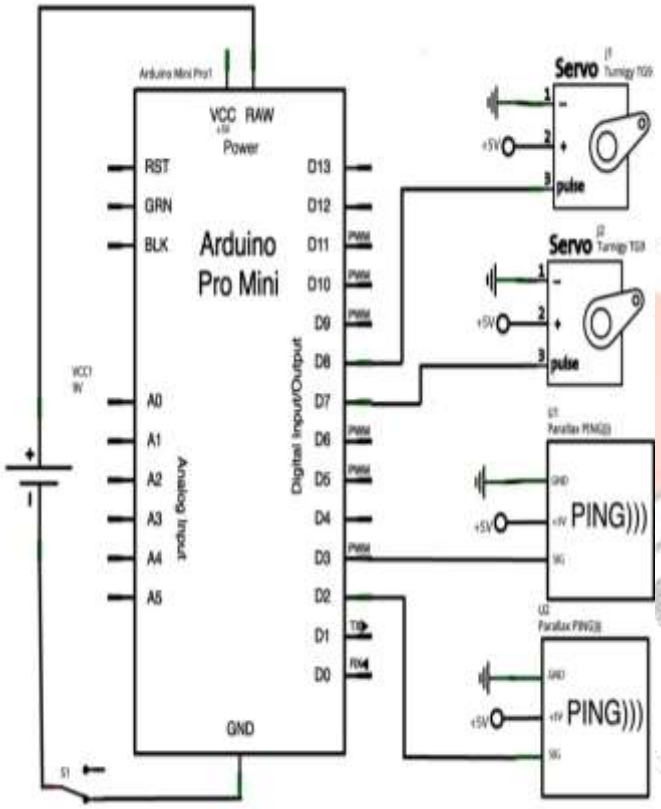

Figure 4.1 Circuit Diagram

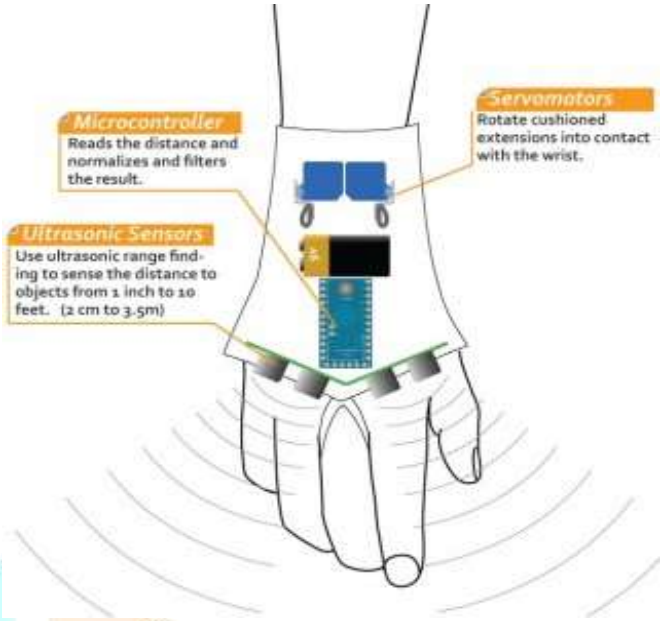

Figure 4.2 Prototype

V CONCLUSION

This project is a mobility aid that requires almost no training to use whatsoever and is a very simple, easy and a very user-friendly assist that allows the visually impaired individual to guide through real obstacles by using a simple phenomenon called SONAR. This wearable assist is light, portable and is efficient to get the job done and help maneuver an individual through obstacles. Future works on this project can be a further development of this wearable assist in terms the range within it detects obstacle and response to that obstacle is given allowing ample amounts of time for the visually impaired individual to take necessary actions making it faster and efficient.

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