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Ultrasonic Radar Based Cost Effective Vision for Visually Challenged Individuals

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ABSTRACT: Detection of objects present at home is a main difficulty of a visually impaired person. It makes it uncomfortable to blind person to walk freely through the house. So, we are approaching a proposed project which will help them to find different objects present indoor in different locations, and give voice output to them. Motion detection of objects or living beings might be interesting in many domains, such as security devices, radars, the positioning of industrial robots, liquid levels in tanks, the depth of snow banks and auto guidance systems. Most of these applications require that the detection system to be non-invasive and to not disturb the normal work environment, devices or living beings in the area of detection. This involve the choice of discrete vectors for information transport, with high immunity to all other factors unless the state of motion. The detection system may be passive, but in this case, the moving object must have a specific property that can be detected, for example, light or infrared radiation. This conditioning limits the field of system applicability, but presents the advantage of high discretion for detector. There are also active detection systems, consisting of a transmitter and a receiver that does not impose any special condition for the detected object. The distance is measured by the processing of the reflected ultrasound signal, after this blind person will get an idea of different objects, wall and other things present indoor and can freely walk through the house.

KEYWORDS: Ultrasonic Sensor, Microcontroller, Distance Measurement, Communication Equipment.

I. INTRODUCTION

In the point of view of a blind person it is very difficult to adjust in new, different places, they faces difficulties as different places have different dimensions, objects etc. So they want to have a thing which can make them aware about the surrounding atmosphere where they want to stay. The product should be portable itself. So we have proposed a system named “Ultrasonic Outwardly Disabled Radar System for Indoor Conditions” which will start counting obstacles present in the room and make it voice output form to understand by blind person. In this way blind person will get a detailed idea about length and breadth of existing room. Along with height, width and approximate shape of an object comes in front of it. By using this project a blind person can easily be adjust in any room architecture. It wills future make a disabled person to be more convenient. So the objectives of system are, • To find number of objects present indoor which will help visually impaired for assuming exact location. • To find exact distance and angle at which obstacles like furniture, walls and other small things are present. • To send this cautions to IOT for voice yield from it.

II. LITERATURE SURVEY

1. Ahman Emmanuel Onoja, Abdusalaam Maryam Oluwadamilola, Lukman Adewale AJAO, “Embedded System Based Radio Detection and RangDepartment of E& TC DPCOE PUNE 3 Ultrasonic Radar System ing (RADAR) System Using Arduino and Ultra-Sonic Sensor”, American Journal of Embedded Systems and Applications, 2017. The applications of the radio detection and ranging (RADAR) systems in military installations as well as scientific and commercial facilities is powered by the ability of the RADAR systems to use electro-magnetic waves to determine the speed, range, altitude or direction of objects, either fixed or in motion. In the years since RADAR systems came into prominence, incalculable developments have occurred. Some of these are in the fields of navigation and positioning, target detection and tracking, energy optimization, and other applications. In this research, existing radar technologies are examined and an Arduino based RADAR system is proposed. The advantage of this is to drastically reduce power consumption and allow the designers to have access to a wide range of online communities of Arduino programmers

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and open source reusable code. The system consists of an ultra-sonic sensor, an Arduino micro-controller, a servo motor and a java application for mapping the electro-magnetic waves. A prototype system is built by connecting the ultrasonic sensors to the Arduino microcontroller's digital input/output pins and the servo motor also connected to the digital input/output pins. Both the ultrasonic sensor and the servo motor are then clipped together so that as the servo motor sweeps from right to left through an angle of 1800 the servo will rotate alongside it.

2. Prof. D.A.Ghoghre, AhireDhanshri, Ahire Priyanka, "Radar System Using Arduino", IOSR Journal of Electronics and Communication Engineering (IOSR-JECE), National Conference on Emerging Trends in Engineering & Technology, 2017. RADAR is an object detection system which uses Microwaves. Microwaves are nothing but the radio waves. It uses microwaves to determine the Range, Altitude and Direction or Speed of objects. The radar dish or antenna transmits pulses of radio pulses which returns back from any object in their path. Arduino is a single board microcontroller. It is to make using electronics in multidisciplinary projects more accessible. This project focus at making a Department of E& TC DPCOE PUNE 4 Ultrasonic Radar System Radar which is efficient, cheaper and reflects all the possible techniques that a radar consists of.

3. Haitham K. Ali, Jihan S. Abdaljabar, Sura M. Abdullah, "Design of Ultrasonic Radar", International Journal of Emerging Science and Engineering (IJESE) ISSN: 2319–6378, Volume-3 Issue-7, May 2015. Ultrasonic technology has been on the market for years and is still considered a trusted technology throughout the industry. The design of the Ultrasonic Radar is very useful for many applications like homes, shops, military and object detection. The aim of this work is to build an ultrasonic transceiver which is basically one kind of a radar system to get exact distance and angle for fixed objects placed around the device based on the speed of ultrasonic waves in open air. An Arduino microcontroller was used to transmit and receive the ultrasonic waves through 40 KHz in order to provide the flexibility of usage requirements. A delay occurred between the transmitted and the received waves govern the reflection of sound. Some tests were done using two kinds of alarms first: the visual alarm which done by a personal computer screen designed to be a radar screen. Second the audible beep alarm which done by an LCD digital screen.

4. Mr. Deshmukh Gourav V., Miss. NalavadeDhanashri N., Mr. Salve Krushna H., Miss. D. A. Shaikh, "Ultrasonic Radar for Object Detection, Distance and Speed Measurement", International Journal of Research in Advent Technology (IJRAT), 2017. The proposed system "ultrasonic radar for the object detection,distance and the speed measurement" employs an ultrasonic module that includes an ultrasonic transmitter and receiver along with the 89c52 microcontroller. It operated by transmitting 40 kHz frequency pulse which is not audible to the human ear. Module rotate with step angle of the stepper motor with specific angle for a specific time interval, microcontroller receive an echo signal back as response of the transmitted signal by transmitter and the distance between the object and system is measured by calculating time interval taken by the signal to transmit and the echo reception. Whereas the detected signal is shifted Department of E& TC DPCOE PUNE 5 Ultrasonic Radar System toward the module or away from the module which give the information about the speed of that detected object which is shown on PPI DISPLAY.

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III. PROPOSED SYSTEM

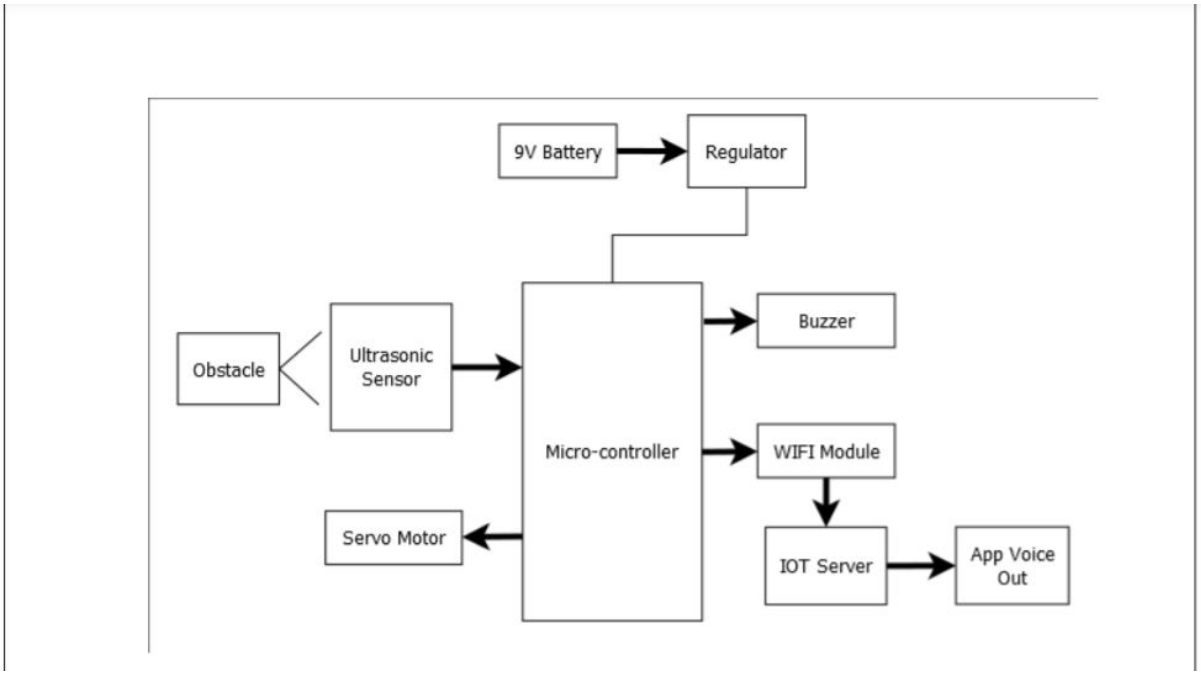

Fig: Proposed System

Ultrasonic sensor emits an ultrasound at 40Hz which travels through the air and if there may be an item or obstacle on its course it'll bounce back to the module. On the way to generate the ultrasound you want to set the Trig on a high state for 10 µs. The Echo pin will output the time in microseconds the sound wave travelled. As an instance, if the item is 10 cm far away from the sensor, and the velocity of the sound is 340 m/s or 0.0340 cm/µs the sound wave will need to tour about 294 u seconds. So with a view to get the gap in cm we want to multiply the received journey time fee from the echo pin by way of 0.034 and divide it with the aid of 2.

• Power Supply A power supply is an electrical device that supplies electric power to an electrical load

• Ultrasonic Sensor As the name indicates, ultrasonic sensors measure distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception. An optical sensor has a transmitter and receiver, whereas an ultrasonic sensor uses a single ultrasonic element for both emission and reception.

• Servo Motor A servo motor is a rotary actuator or motor that allows for a precise control in terms of angular position, acceleration and velocity, capabilities that a regular motor does not have. It makes use of a regular motor and pairs it with a sensor for position feedback. The controller is the most sophisticated part of the servo motor, as it is specifically designed for the purpose.

• Wifi Module The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer Espress if Systems.

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IV. IMPLEMENTATION RESULTS

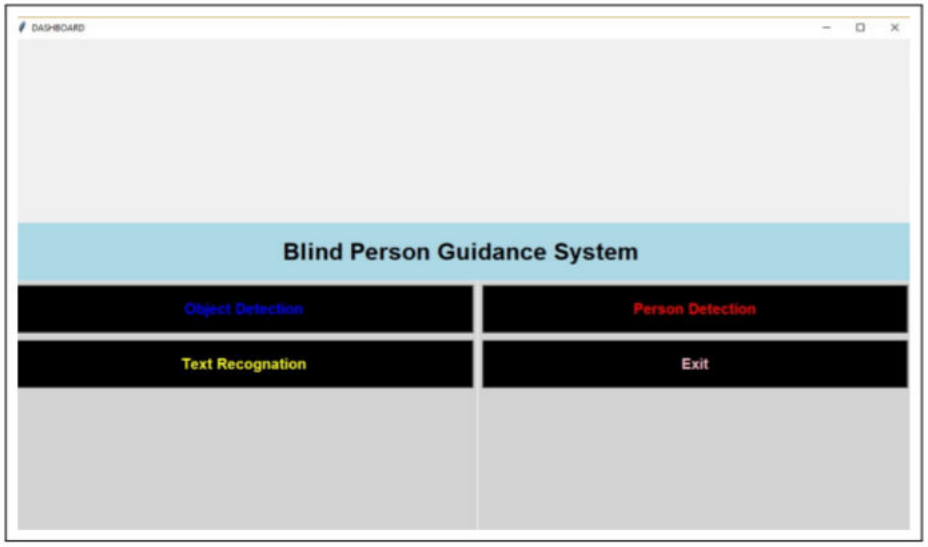

Fig2: Dashboard

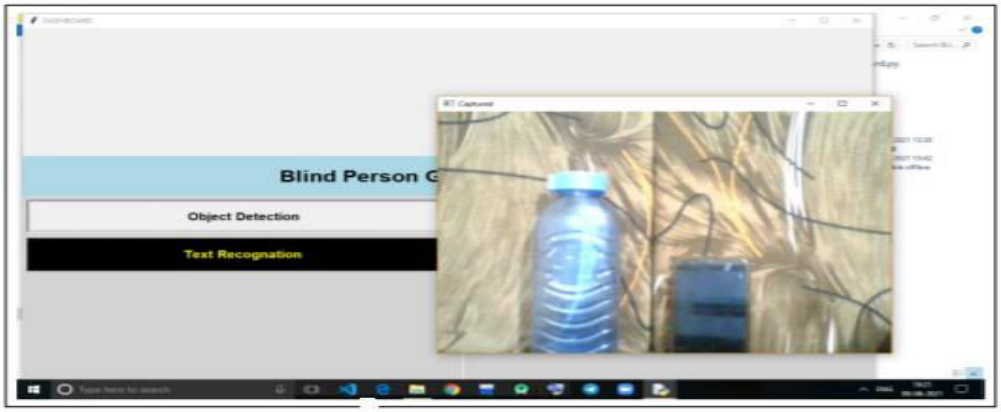

Figure . · Object Recognition

Figure Object Recognition

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APPLICATION • Real time indoor mapping

• Can be used in blind goggle technique.

ADVANTAGES • Indoor system can be modified to more accurate level.

• Active batches of RF are used to communicate information about different assets.

• Proper assets management can be done

V. CONCLUSION

In this work, we proposed a low-cost, compact Ultrasonic Outwardly Disabled Radar System for a light-free mapping of indoor environments. In particular, the proposed hardware and software design of the system allowed us to create a small hardware device that can be use by a user or be integrated in a ready-to-use robot module and to find objects and trace out voice commands according to that.

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[1] Ahman Emmanuel Onoja, Abdusalaam Maryam Oluwadamilola, Lukman Adewale AJAO, "Embedded System Based Radio Detection and Ranging (RADAR) System Using Arduino and Ultra-Sonic Sensor", American Journal of Embedded Systems and Applications, 2017.

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