Safety Navigation For Visionless People Using Arduino

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Abstract- This system uses different sensor as ultrasonic sensor, the ultrasonic sensor will measure the distance of the obstacle from the user. If the system detects any obstacle it will indicate the user through the buzzer. The main objective of this project is to help blind people to walk with ease and to be warned whenever their walking path is obstructed with other objects, people or other similar odds. As a warning signal, a buzzer is connected in the circuit, whose frequency of beep changes according to the distance of object. The closer the distance of obstruction, the more will be the buzzer beep frequency. We can say that the beep frequency is inversely proportional to the distance.Ultrasonic sensor sends high frequency pulses, these pulses reflects from object and takes as Echo, time between echo and Trig is measured by the Arduino which is directly proportional to distance.

Keywords- Ultrasonic sensor, controller, LED, Buzzer.

I. INTRODUCTION

Blind people face several problems in their life, one of these problems that is the most important one is detection the obstacles when they are walking. In this research, we suggested a system with two cameras placed on blind person's glasses that their duty is taking images from different sides. By comparing these two images, we will be able to find the obstacles. In this method, first we investigate the probability of existence an object by use of special points that then we will call them "Equivalent points", then we utilize binary method, standardize and normalized cross-correlation for verifying this probability. This system was tested under three different conditions and the estimated error is acceptable range. Blindness is a state of lacking the visual perception due to neurological or physiological factors. The partial blindness represents the lack of integration in the growth of the optic visual or nerve center of the eye, and total blindness is the full absence of the visual light perception. In this work, cheap, a simple friendly user, smart blind guidance system is designed and implemented to improve the mobility of both blind and visually impaired people in a specific area. The proposed work includes a wearable equipment consists of light weight blind stick and sensor based obstacle detection circuit is developed to help the blind person to navigate alone safely and to avoid any obstacles that may be encountered, whether fixed or mobile, to prevent any possible accident. The main component of this system is the infrared sensor which issued to scan a predetermined area around blind by emitting-reflecting waves. The main objective of this project is to develop an application for blind people to detect the objects in various directions, detecting pits and manholes on the ground to make free to walk Detecting objects using image processing can be used in multiple industrial as well as social application. This project is proposing to use object detection for blind people and give them audio/ vocal information about it. We are detecting an object using the mobile camera and giving voice instructions about the direction of an object. User must have to train the system first about the object information .We are then doing feature extraction to search for objects in the camera view. We are taking help of angle where object is placed to give direction about the object.

II. SYSTEM ARCHITECTURE AND SYSTEM COMPONENTS
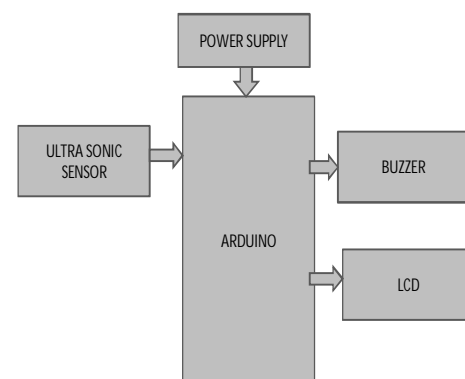
System components

2.1 Arduino Uno

ARDUINO is an open-source computer hardware and software company, project and user community that designs

and manufactures microcontroller-based kits for building digital devices and interactive objects that can sense and control objects in the physical world.The project is based on microcontroller board designs, manufactured by several vendors, using various microcontrollers. These systems provide sets of digital and analog I/O pins that can be interfaced to various expansion boards ("shields") and other circuits. The boards feature serial communications interfaces, including USB on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino project provides an integrated development environment (IDE) based on the Processing project, which includes support for the C and C++ programming languages. The first Arduino was introduced in 2005, aiming to provide an inexpensive and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors.

2.2 Buzzer

A buzzer or beeper is a signalling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise). Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board.

Another implementation with some AC-connected devices was to implement a circuit to make the AC current into a noise loud enough to drive a loudspeaker and hook this circuit up to a cheap 8-ohm speaker. Nowadays, it is more popular to use a ceramic-based piezoelectric sounder like a Sonalert which makes a high-pitched tone. Usually these were hooked up to "driver" circuits which varied the pitch of the sound or pulsed the sound on and off. In game shows it is also known as a "lockout system," because when one person signals ("buzzes in"), all others are locked out from signalling. Several game shows have large buzzer buttons which are identified as "plungers". The word "buzzer" comes from the rasping noise that buzzers made when they were electromechanical devices, operated from stepped-down AC line voltage at 50 or 60 cycles. Other sounds commonly used to indicate that a button has been pressed are a ring or a beep. Some systems, such as the one used on Jeopardy!, make no noise at all, instead using light.

2.3 ULTRASONIC SENSOR

Ultrasonic sensors can detect movement of targets and measure the distance to them in many automated factories and process plants. Sensors can have an on or off digital output for detecting the movement of objects, or an analog output proportional to distance. They can sense the edge of material as part of a web guiding system. Ultrasonic sensors are widely used in cars as parking sensors to aid the driver in reversing into parking spaces. They are being tested for a number of other automotive uses including ultrasonic people detection and assisting in autonomous UAV navigation.[citation needed] Because ultrasonic sensors use sound rather than light for detection, they work in applications where photoelectric sensors may not. Ultrasonics are a great solution for clear object detection, clear label detection and for liquid level measurement, applications that photoelectrics struggle with because of target translucence. As well, target color and/or reflectivity do not affect ultrasonic sensors, which can operate reliably in high-glare environments. Passive ultrasonic sensors may be used to detect high-pressure gas or liquid leaks, or other hazardous conditions that generate

ultrasonic sound. In these devices, audio from the transducer (microphone) is converted down to human hearing range. High-power ultrasonic emitters are used in commercially available ultrasonic cleaning devices. An ultrasonic transducer is affixed to a stainless steel pan which is filled with a solvent (frequently water or isopropanol). An electrical square wave feeds the transducer, creating sound in the solvent strong enough to cause cavitation.


2.4 LIQUID CRYSTAL DISPLAY

A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements. An LCD is a small low cost display. It is easy to interface with a micro-controller because of an embedded controller (the black blob on the back of the board). This controller is standard across many displays (HD 44780) which means many micro-controllers (including the Arduino) have libraries that make displaying messages as easy as a single line of code.

LCD display unit

LCDs are used in a wide range of application including computer monitors, televisions, instrument panels, aircraft cockpit displays, and signage. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones, and have replaced cathode ray tube (CRT) displays in most applications. They are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they do not suffer image burn-in. LCDs are, however, susceptible to image persistence.
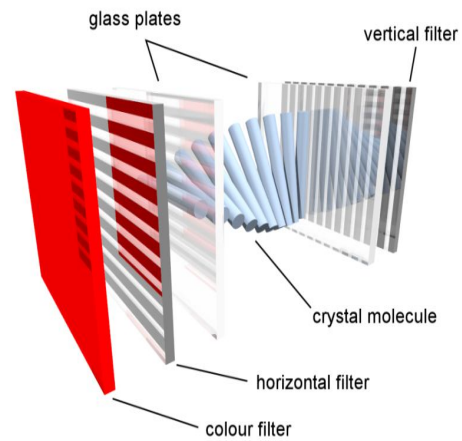

Internal working of LCD unit

III. MODULES

3.1 Arduino Modules

Arduino is an open source, computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone.

Arduino boards are available commercially in preassembled form, or as do-it-yourself kits. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers.

The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project. The Arduino project started in 2005 as a program for students at the Interaction Design Institute Ivrea in Ivrea, Italy, aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors.
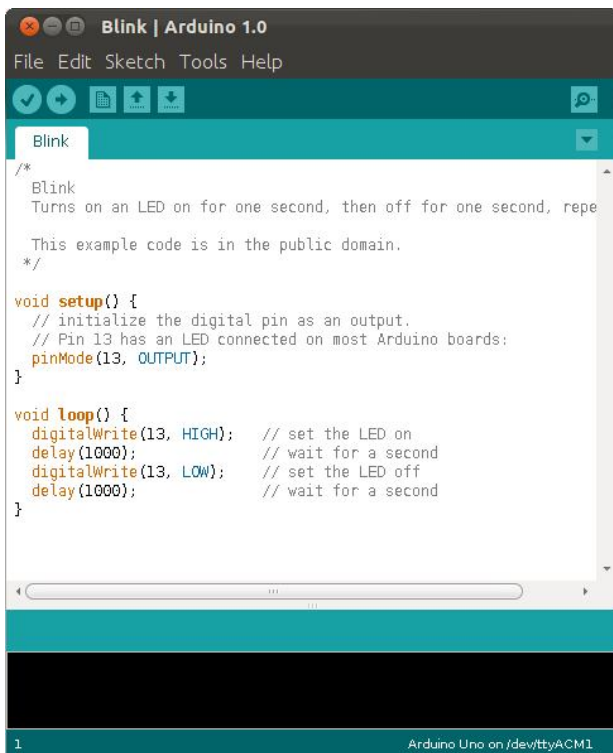
3.2 PROTEUS ISIS7 SIMULATOR

Proteus (**PRO**cessor for **TE**xt **E**asy to **US**e) is a fully functional, procedural programming language created in 1998 by Simone Zanella. Proteus incorporates many functions derived from several other languages: C, BASIC, Assembly, Clipper/dBase; it is especially versatile in dealing with strings, having hundreds of dedicated functions; this makes it one of the richest languages for text manipulation.

Proteus owes its name to a Greek god of the sea (Proteus), who took care of Neptune's crowd and gave responses; he was renowned for being able to transform himself, assuming different shapes. Transforming data from one form to another is the main usage of this language.

Proteus was initially created as a multiplatform (DOS, Windows, Unix) system utility, to manipulate text and binary files and to create CGI scripts. The language was later focused on Windows, by adding hundreds of specialized functions for: network and serial communication, database interrogation, system service creation, console applications, keyboard emulation, ISAPI scripting (for IIS). Most of these additional functions are only available in the Windows flavour of the interpreter, even though a Linux version is still available.
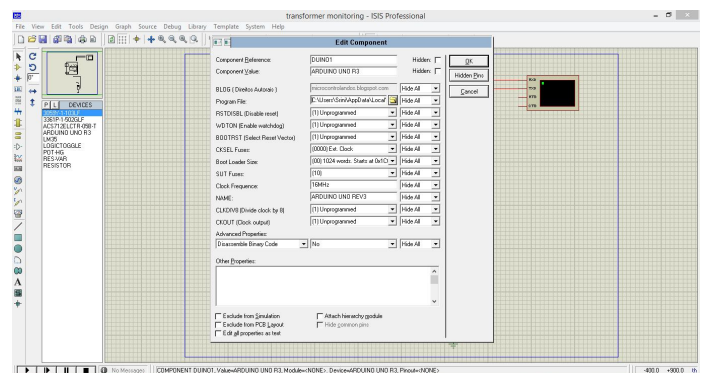
Proteus was designed to be practical (easy to use, efficient, complete), readable and consistent.

Its strongest points are:
- powerful string manipulation;
- comprehensibility of Proteus scripts;
- availability of advanced data structures: arrays, queues (single or double), stacks, bit maps, sets, AVL trees.
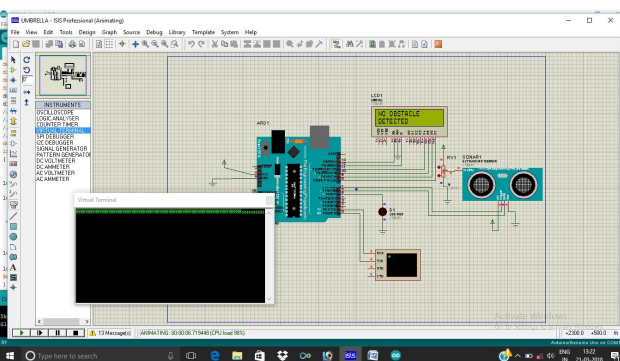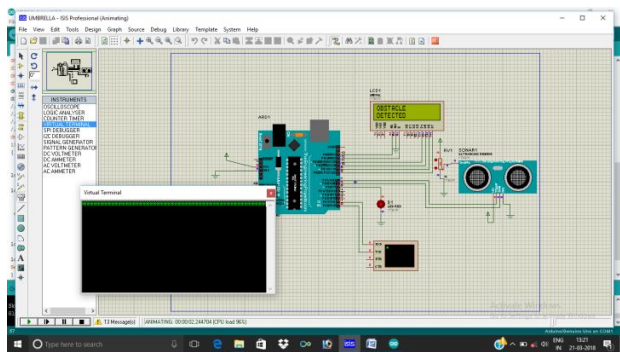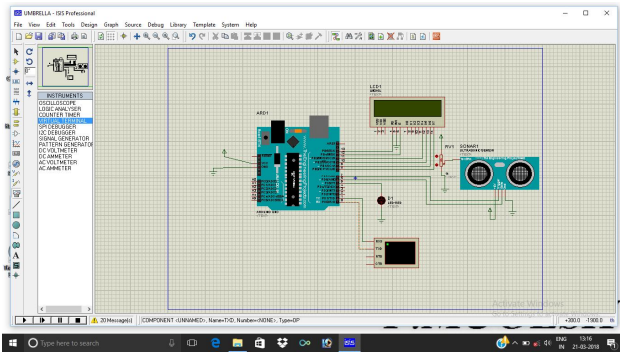
The language can be extended by adding user functions written in Proteus or DLLs created in C/C++.

Proteus is design software developed by Lab center Electronics for electronic circuit simulation, schematic capture and PCB design. Its simplicity and user friendly design made it popular among electronics hobbyists. Proteus is commonly used for digital simulations such as microcontrollers and microprocessors. It can simulate LED, LDR, and USB Communication etc

IV. CONCLUSION

Here we have successfully modelled the Object Detection. The tests will went smoothly and had no problems. This system uses different sensor as ultrasonic sensor, the ultrasonic sensor will measure the distance of the obstacle from the user. If the system detects any obstacle it will indicate the user through the buzzer. This report introduced two environmentally-friendly designs for a blind people. We presented information about the Blind people application. This application will be more effective for blind people. It is important to develop this application for the future. The system is used by Blind peoples but the normal people also can use.

REFERENCES

[1] L. Atzoria, A. Ierab, and G. Morabitoc, "The Internet of Things: A survey", Computer Networks, vol. 54, No. 15, pp. 2787-2805, Oct. 2010.

[2] Haga, S., Sano, A., Sekine, Y., Sato, H., Yamaguchi, S., & Masuda, K. "Effects of using a Smart Phone on Pedestrians", Attention and Walking. Procedia Manufacturing, 3, 2574-2580, 2015.

[3] Jeon, S., Lee, C., Han, Y., Seo, D. and Jung, I., "MinT: Middleware for cooperative interactions of things," 2016 IEEE International Conference on Consumer Electronics (ICCE), pp. 127-128, Jan. 2016.

[4] Application Note, "Electronic Compass Design using KMZ51 and KMZ52", Philips Semiconductors, 2000.