ULTRASONIC ASSISTANCE FOR VISUALLY IMPAIRED PEOPLE

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Abstract: In this paper we propose an embedded mobile electronic device that guides the visually impaired individuals for independent assistance. The device consists GPS, Mobile internet, Bluetooth and Ultrasonic device for obstruction detection. Whenever there is a potential obstruction in the user's path, he/she will be notified through the Bluetooth device from the data obtained from the Ultrasonic device. The built-in integrated processor combined with the software function translate the hardware level raw data to information such as direction and obstacle alert. The user can also input places and will be assisted real time through the Bluetooth device. The output through the Bluetooth would be voice assisted.

Key Words: GPS, Ultrasonic gadget, ultrasonic sensor, Bluetooth, alert.

1.INTRODUCTION

The work we present in this paper is based on the use of new technologies to improve mobility of outwardly impaired people. The research focuses on obstacle detection in order to reduce navigation difficulties for visually impaired people. Moving through an unchartered environment becomes a real challenge when we can't rely on our own eyes. Since dynamic obstacles usually produce noise while moving, visually impaired people develop their sense of hearing to localize them . However they are reduced to their sense of touch when the matter is to determine where an inanimate object exactly is. The common way for navigating of visionless person is using a white cane or walking cane. The walking the quality of life. So we needed to handle these serious issues by giving a financially savvy gadget that gives data that is increasingly valuable in each ways and shrewd in recognizing potential issues. By the joining of equipment and programming we can dodge the necessity of consistent system availability that which oversees information throughput adroitly and consequently aligns the gadget with the end goal that it need not be running continually. The gadget would be developed to such an extent that it isn't influenced by regular outer factors, for example, warmth, fluid and residue particles. The way that it is compact implies that it ought to give enough battery life that is adequate for the duration of day and not slamming amid vital minutes particularly heading out to new places.

2. LITERATURE SURVEY

Many techniques have been devised for obstacle detection, vehicle tracker, some of them as devised from the previous papers are a) Detection and Discrimination of obstacle to vehicle environment under convolutional network [1] – which uses the optical method and neural network convolution to detect obstacles, they used an improved algorithm but using optical method made it complex under complex lightning system, without any optimizing features.

b) Obstacle Detection for Intelligent Transportation and k nearest neighbour[2]- this algorithm provided a good approach towards obstacle detection, since use of stereovision is done, lightning complexity is also removed but it is not available to all types of users and not economic. c)Obstacle detection for self-driving car in Pakistan's perspective[3]- used LIDAR, MHT algorithm but failed for dynamically changing objects.

d)Obstacle and track detection method using sensors, gsm/gps[4]- secured remote controlling of vehicles, low cost but used only for front barrier detection, track not arranged properly. After surveying these papers and numbering the drawbacks the basic requirement is to make a less complex system supporting proper economic conditions and working under various situations.

3. EXISTING SYSTEM:

There are various proposed systems available in the market right now, One of them is LPS's or Location Positioning System a device which detects the current position and output the information via the Bluetooth device. Mostly the output maybe a speech or it is displayed through text if it has a built in display these are not available to a certain extent and are not commonly found as they are quite expensive. The most common ones are the physically available ones such as walking cane, guide dogs, memorizing frequent location or audio support. These are not viable in some situation and may cause disturbance to oneself or to the society.

CVS or Computer Vision software inputs the current real-time environment and outputs the current imagery in audio format for better understanding of the environment. It can also display if it support a built-in display. It requires for the visually impaired to have access to a computer.

Real-time Obstacle Detection based on advanced sensor and software combination allows for fast moving robots to avoid obstacle in a clutter environment. It uses Ultrasonic sensor to detect nearby obstacle and command line action software to prevent the obstacle.

Freescale Semiconductor is a distance detection device which can be used to measure the distance and returns output either in audio or display format. It embedded semiconductor with Ultrasonic sensor with a build-in display to show the distance in meters.

4.PROBLEM STATEMENT:

According to the World Health Organization (WHO) there are over 285 million people who are visually impaired and 39 million people who are completely blind. As a result normal day to day activities could be challenging for the visually

impaired. Moving through a crowed place would be an arduous task. These also has the potential to cause safety concerns which may cause risk to the particular individual or even to the society. The most common forms of aids available are walking cane, guide dogs or human assistance. Some serious drawbacks to these devices such as walking cane doesn't provide any additional information. Guide dogs requires a lot of time consuming training and personal human assistance destroys the purpose of supporting the visually impaired individual independently. These sorts of limitations certainly decreases the quality of life. So we wanted to tackle these major issues by providing a cost effective device that provides information that is more useful in every ways and smart in identifying potential problems. By the integration of hardware and software we can avoid the requirement of constant network connectivity that which manages data throughput smartly and thereby calibrates the device such that it need not be running constantly. The device would be constructed such that it is not affected by common external factors such as heat, liquid and dust particles. The fact that it is portable means that it should provide enough battery life that is sufficient throughout the day and not crashing during important moments especially travelling to unfamiliar places.

5. PROPOSED SYSTEM

Our proposed technique is to create a portable device for visually impaired individuals that will provide direction to new locations and alert the user of obstacles in their path during outdoor navigation. A technological approach would be useful because access to internet and GPS will help increase their independence by helping them get to locations they don't normally travel to.

The scope of the project is to provide user directions to locations when they are outdoors and also alert the user of obstacles in their path while they are trying to get to those locations. The blind assist project will be the integration of sensors (ultrasonic sensors, Bluetooth), GSM internet, GPS, and the ATOM processor.

After we integrate all the hardware we will create a software function that translates information gathered by the hardware into directions and obstacle alerts. For our solution implementation the atom processor will be the focal point of our design.

It will constantly receive three core pieces of information from various sensors. The three pieces of information are distance of an object from the user, user request for directions, and request for date and time. The design would be compact as possible which would result in cost-effectiveness, easily portable and a light weight product.

6.SYSTEM ARCHITECTURE:

- Vest – where device is mounted

USB GPS receiver – to get users location

USB wireless receiver – to get access to internet

- Ultrasonic sensors – distance calculation sensor

Mini wireless keyboard with braille stickers – for inputting desired address

Wire keypad – control keypad that allows user turn on/off system, request system status(date, time, internet connection), turn on/off obstacle alert and turn on/off GPS directions

Arduino microcontroller – used to connect ultrasonic sensors to atom board

3 microprocessors – one acts as the base station while the other two are connected wirelessly and are attached to a wristband with vibrators mounted on them.

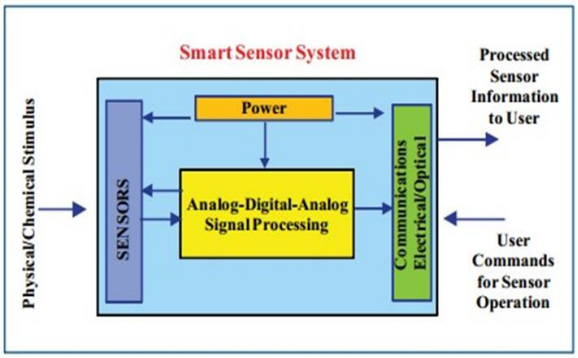

Fig.6 System Architecture

The proximity sensor receives the data and sends it to the arduino microprocessor which is connected to the atom processor . The atom processor is the main processing component which then sends the signal to the external communication device which is directly connected with the user. Similarly a command given by the user is processed by the atom processor and further commutated to the gps device. A standard Power system is used to power all the devices , sensors and processor portably with the use of a battery.

7.CONCLUSION

We concluded that our device is very capable to aid any visually impaired person providing navigation, assisting features and its features make it very portable and user friendly. After wearing this device the user will not be needing any guidance help as they can depend on their own. The visually impaired just needs to recharge the battery. The relevant motors sends info as the sensor gets near to the obstacle and thus translates the information of distance and direction of the obstacle to the user. The intensity of information can also regulated by the distance from the obstacle and increases as the obstacle approaches. In future modification to battery technology, location providing gsm services, warning including battery capacities can be greatly enhanced.

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