Development of human-supporting hardware and software with limited capabilities

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ABSTRACT

This article details a smart staff created with high accuracy, and this staff will help the blind easily move safely from one place to another. Software will be installed on the blind support hardware and Raspberry Pi available in our republic. The device uses an ultrasound sensor to determine the barrier distance to the user. The device under study has a USB-camera module, this module announces a pre-existing risk in the program. The images presented on the USB-camera hardware only work when the device is present in its operating activities. It can detect an existing barrier, sending a voice message using a touch sensor included in the program with this accuracy. Warns the user between two and three meters away. By announcing the main content of the project that is being researched, weaning the way of life of representatives of the blind class with limited opportunities. The hardware used the Python programming language. This device is considered an electronic device, and the battery included in it is supplied with Oracle electricity.

Keywords:	Smart cane, Raspberry PI, Microcontroller, USB camera, Python programming language, RF module, Ultrasonic sensor.

Introduction

Humans get about 80 percent of the data from the organs of vision. It is not surprising that the visual cortex occupies almost half of the cerebral cortex-it is much larger than other sensory analyzers. Most people are immediately horrified, imagining that they are blind. In front of them, an impenetrable abyss seems to open: all colors fade, all images dear to the heart Turn Into Darkness. But in fact, blind people do not live in this gloomy place at all.

Blind people are people who cannot see or have very limited vision. This can be caused by a number of causes, such as genetic disorders, eye diseases, injuries or aging. The blind face many challenges and challenges in everyday life.

One of the main difficulties for the Blind is the availability of information and technology. Fortunately, with the development of technologies such as narrators, magnifying software and Braille displays, the blind can access data and use computers and mobile devices. However, not all websites and applications have been developed taking into account their availability for visually impaired people, which can pose a problem when using these technologies.

In addition to technological difficulties, the Blind also face problems related to social integration and the availability of public spaces. For example, blind people may have difficulty moving through the streets, using public transportation, and visiting shops and restaurants. These problems can be addressed by teaching society how to communicate and work with blind people and creating a more comfortable physical environment.

It is important to understand that blind people are full members of society and need equal opportunities and comfort. The world should be

more inclusive and friendly to people with disabilities, including blind people. This can be achieved by creating an affordable environment, how to educate society.working with blind people and using technologies that meet the needs of visually impaired people.

Blind people also need support and understanding from society. This includes financial support for education and employment, as well as the creation of communities where the blind can communicate and share experiences. It is important to know that limited vision does not define the personality of a blind person. The Blind are people with their own personal interests, goals and aspirations, and can succeed in many areas of life if they are given the opportunity and help. In general, blind people face many difficulties and obstacles in everyday life, but they have unique talents and abilities. In order for the world to be more inclusive and friendly for people with disabilities, including the blind, it is necessary to create a comfortable environment, train society to work with the blind and use technologies that take into account their needs. It is important to provide blind people with support and understanding, as well as not to forget that they are people with their own personal qualities and abilities.

It is known to all that the blind shahs cannot see the phenomena occurring in the environment, the objects and obstacles that are taking place in the movement. Naturally, this causes a great disruption in free movement.

The project below provides information about a device as well as software that can detect and report obstacles and objects to people who are not able to see through the program.

Previously, since different systems were not visually, now researchers have spent decades developing a smart person and a smart staff. They serve to provide visual assistance to people with disabilities, provide information about obstacles and their location. Over the past decade, research has been underway on a good design for new devices and a reliable system for visually impaired people to identify obstacles and warn them of danger.

A special software has been developed to detect smart staff obstacles, which helps blind people move carelessly. Voice messages alert the user and significantly reduce accidents. Audio automatic switching is also included to help them. This system provides the concept of providing intelligent electronic device support for blind people in public and private places. The proposed system includes an ultrasound sensor. Composed of sensors, sound panels, Raspberry PI and dynamic devices. The proposed system identifies existing barrier images. Activate and deactivate using the camera. Stick measures the distance between objects and a smart staff using an ultrasound sensor. If any object or barrier enters the range of the ultrasound sensor, the headset will say the name of the barrier in front of the bar. A smart staff is a simple and purely mechanical device for detecting obstacles here. This device is considered lightweight and portable. However, its range is limited due to its size. It helps to make the best trip for a person. A blind person can independently move from one place to another without the help of others. The main purpose of the system is to provide effective navigation assistance to blind individuals by providing them with information about their surroundings and surrounding objects.

The health monitoring system worn today is the main application of IoT. Similarly, many wearable devices have been developed for visually impaired people. Several systems are discussed here. For the Blind, a sensor-assisted staff consists of a light blind staff and a sensor-based barrier detection scheme. It was designed primarily to help a blind person pass safely from one place to another and to avoid any obstacles they may encounter. The device helps prevent accidents by detecting immobile and moving objects. The main component for the operation of this system is an infrared sensor, which is used for scanning with reflective waves that emit a predetermined area around a blind person.

Reflected signals from objects are used as input to a microcontroller and then used to determine the direction and distance of objects around a blind person. The main purpose of this is to provide a structure that allows the blind to walk freely to identify obstacles in different directions, to identify pits and Wells on the

ground. the innovative bar is designed for easy navigation for the blind. In this system, ultrasonic sensors are used to detect obstacles using ultrasonic waves. The Sensor detects obstacles and transmits the information received to the microcontroller. The microcontroller processes the data and calculates whether the barrier is close enough to a person. If the barrier is not close to the microcontroller, the scheme will do nothing. If the barrier is close enough to the microcontroller, it will send a signal signal. The system alerts blind people by making different sounds. Automatic microcontroller-based equipment allows a blind person to identify obstacles in front of them. The equipment part consists of an ultrasound sensor, a sound playback module and a microcontroller combined with additional equipment. Ultrasonic waves are used to detect obstacles. Temperature sensors are provided to detect a fire or high temperature area. Information from the detection barrier is received through the audio listening module. The system comes with an RF module to find the wrong line. These features are blindly independent and allow you to easily move from one place to another. Identifying objects for unlabeled magnification using the Haar tutorial involves providing object recognition algorithms to assist and guide users of related devices by helping to better understand an unknown device in adjusting its performance. The device serves to detect an object in real time using a camera.

Recommended system
The proposed system has a USB-camera hardware to determine the barrier distance from the user, which this hardware expresses by declaring a pre-existing risk in the program. The images presented on the USB-camera hardware will only work when the device is working. It can detect an existing barrier, sending a voice message using a touch sensor included in the program with this accuracy. Ultrasonic sensors operate on a sound basis. Sound waves are transmitted from the sensors towards the barrier. It can determine a distance of up to 3 meters in a 2 m permit. Sensors are located in five places. The sensors consist of the left, right,

middle left, middle right and bottom, respectively. Usually, a blind person cannot see what is on Earth. Thus, the bottom sensor monitors the height from the ground, providing the necessary safety measures. The proposed system will try to give the user vision, so we also need to think and process the image in front of us. The image is detected using image sensors (cameras). Here, image manipulation is carried out to identify obstacles that exist ahead, as well as to identify internal objects. The Raspberry PI has an image dataset of a large number of collected specimens. The images sent from the camera of various obstacles are compared and processed with the images stored in the data set using the image. The image is processed and classified using the Haar classifier. Haar classifiers identify objects that characterize an object in the real world.

Hardware project
The system consists of a USB camera, an RF module, an ultrasound sensor, a Raspberry PI and a stick with a headset connected to it. The Raspberry PI is the system's central controller. The Raspberry PI allows you to constantly measure the distance of obstacles in front of the ultrasound sensor. The ultrasonic sensor calculates the distance as follows:
The time it takes for ultrasonic waves to reach the barrier and reflect it. If the barrier is at a distance of 3 meters, the ultrasound sensor sends a signal to the Raspberry Pi.

Figure 1 Application

The Raspberry PI then activates a USB wired camera connected to it. When the camera is turned on, it takes the image that appears in front of it. The resulting image is also sent to the Raspberry PI. The Raspberry PI will have a data set of images consisting of a large number of assembled samples of various obstacles. Images sent from the camera are compared to images

stored in a data set using image processing. Morphological segmentation is used for image processing. The headset will be connected to the Raspberry PI to provide voice communication to the user.

This whole process is programmed in the Python programming language. An RF module is added to the bar to find the incorrectly placed bar. A sensor device is placed on the staff so that the blind can walk without suffering. If the sensor detects the obstacles in front of the device, the sound warning will be activated. Due to these characteristics, small-eyed humans can independently move from one place to another.

Importance of the system

The biggest advantage of the system is that it helps blind people to navigate smoothly both indoors and outdoors. Bar mounted devices make it convenient and easy to use. A smart staff will help you identify obstacles located at a certain distance in front of the user. The system is suitable for both internal and external use. Information about obstacles is provided by voice alerts that eliminate the difficulty of understanding the vibration patterns used in previous systems. The system is a medium-budget mobile navigation aid for the blind. When a blind person goes to an unfamiliar area, there is an opportunity to provide geopositional coordinates that indicate where they are located to their loved ones by clicking on a special button located on the device.

Conclusion

The SMART staff, created with the highest accuracy, will help the blind easily move safely from one place to another. This can also be seen as a rough way to give visual perception to people with little eyesight. This bar reduces the dependence of visually impaired people on other family members, friends. The recommended combination of different operating blocks creates a system that monitors the state of the user in real time and provides two-way feedback. The SMART staff detects objects or obstacles in front of users and returns the warning as a voice message instead of vibrating. Also, the introduction of automatic room equipment will be useful for replacing the

bar on which they are closed. The advantage of the system is that it can prove to be lower. 77954 eye ozij people across Uzbekistan is a cost solution.

A smart staff will help blind people to perform their tasks easily and comfortably. Usually the staff does not exceed the detection of a barrier, and a simple stick is not effective for visually impaired people. Because what things or what kind of things come to him. It cannot determine the size of this object and how far it is from the object. It is difficult for the blind to move from side to side. On a smart stick, the object is detected using a camera, as well as an ultrasound sensor that measures the distance between objects. If a blind person gets some kind of barrier in front of them, you can find out the barrier by hearing the sound that comes out. This system is very useful for people with poor eyesight. They are weak to see and often need the help of others

Reference

1. Duraisamy Sathya & Pugalendhi Ganesh Kumar, 'Secured Remote Health Monitoring System, IET Healthcare Technology Letters', vol. 4, issue. 6, pp. 228-232, 2017.
2. A. Dodds, D. Clark-Carter, and C. Howarth, The sonic PathFinder: an evaluation, Journal of Visual Impairment and Blindness, vol. 78, no. 5, pp. 206–207, 1984.
3. G. Balakrishnan, G. Sainarayanan, R. Nagarajan and S. Yaacob, Wearable Real-Time Stereo Vision for the Visually Impaired, Engineering Letters, vol. 14, no. 2, 2007.
4. R. L. A. Kuranov and V. Pisarevsky, An empirical analysis of boosting algorithms for rapid objects with an extended set of Haar-like features, Intel Technical Report MRL-TR-July 02-01, 2002.
5. R. Lienhart and J. Maydt, An extended set of Haar-like features for rapid object detection, presented at the IEEE International Conference on Image Processing, 2002.
6. Y. Freund and R. E. Schapire, Experiments with a new boosting

algorithm, in Proc. 13th International Conference on Machi