

AUTOMATIC INDICATOR SYSTEM ON DETECTORS FOR THE BLIND

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Abstract: Blind is a condition of a person who has a problem or obstacle using his sense of sight, usually with a special stick, which is white with a horizontal red line. The problem that is often faced by the visually impaired is inefficient assistive devices, such as a special stick for the blind which has many weaknesses such as not being able to indicate the size of the distance around the blind person, the blind cannot know the distance of objects and if one touches an object with a stick it will endanger themselves. the blind person and also the people around him. People with visual impairments or visual impairments are one part of society that need special attention, many obstacles occur to the blind when carrying out daily activities, one of which is knowing the objects around them, to be able to solve these problems, a microcontroller is needed. The purpose of this research is to design a tool to detect objects for the blind by using sensor technology to assist the alertness and mobility of the blind. The method used in this study uses the method of data collection and system development (prototype). The results of the study resulted in a device that can detect objects around blind people with the help of a microcontroller and ultrasonic sensor equipped with an alarm buzzer as a distance indicator. by directing the palms in various directions.

Keywords: arduino; blind detector; indicator system; prototype

Abstrak: Tunanetra adalah kondisi seseorang yang mengalami gangguan atau hambatan dalam indra penglihatannya biasanya dengan menggunakan tongkat khusus, yaitu berwarna putih dengan ada garis merah horizontal. Masalah yang sering dihadapi oleh tunanetra adalah alat bantu yang tidak efisien, seperti tongkat khusus tunanetra yang mempunyai banyak kelemahan seperti tidak dapat mengindikasikan ukuran jarak yang ada disekeliling tunanetra tersebut, tunanetra tidak dapat mengetahui jarak benda dan jika salah menyentuh benda dengan tongkat maka akan membahayakan diri si penyandang tunanetra dan juga orang-orang disekelilingnya. Penyandang cacat mata atau tunanetra adalah salah satu bagian dari masyarakat yang perlu mendapat perhatian khusus, banyak kendala yang terjadi pada tunanetra disaat melakukan aktifitas sehari-hari yang salah satunya adalah mengetahui benda yang ada disekelilingnya, untuk dapat menyelesaikan kendala tersebut dibutuhkan *microcontroller*. Tujuan penelitian ini menghasilkan rancangan alat mendeteksi benda bagi tuna netra dengan menggunakan teknologi sensor untuk membantu kewaspadaan dan mobilitas tuna netra. Metode yang digunakan dalam penelitian ini menggunakan metode pengumpulan data dan pengembangan sistem (*prototype*). Hasil penelitian menghasilkan suatu alat yang dapat mendeteksi benda di sekeliling penyandang tunanetra dengan bantuan mikrokontroler dan sensor *ultrasonic* yang dilengkapi dengan alarm buzzer sebagai indikator jarak, alat pendeteksi bagi tunanetra ini dipasangkan di sekitar sarung tangan agar penyandang tunanetra dapat dengan leluasa mendeteksi benda-benda disekeliling hanya dengan mengarahkan telapak tangan ke berbagai arah.

Kata kunci: arduino; alat pendeteksi tunanetra; prototype; sistem indikator

INTRODUCTIONS

Blind means visual impairment [1]. Problems that often occur that are often faced by the blind are inefficient assistive devices, such as a special stick for the blind which has many weaknesses such as not being able to indicate the size of the distance around the blind person, the blind cannot know the distance of objects and if the wrong object touches the stick with a stick then will endanger the blind person and also the people around him [2].

People with visual impairments or visual impairments are one part of society that need special attention, many obstacles occur to the visually impaired when carrying out daily activities, one of which is knowing the objects around them, to be able to solve these problems, a microcontroller is needed. So from these problems, a tool was designed that can detect objects around blind people with the help of an Arduino Uno microcontroller [3] and an ultrasonic sensor equipped with a buzzer alarm as a distance indicator. freely detect objects around just by directing the palm of the hand in various directions. This research uses Arduino, HC-SR04 proximity sensor which can measure the distance of the sensor with objects as far as 4 meters. [4][5].

Several studies were also carried out by developing using sticks and sensors [6][7][8]. Meanwhile, other studies have also added RFID technology to blind sticks [9]. Apart from sticks, there are some who are trying to take advantage of smartphone technology. This can be exemplified in another research that uses an Android-based smartphone to detect potholes for the blind [10]. In other research, there are those who use

this tool. This tool works with the help of sensors that by detecting objects and holes in the front and bottom. When the sensor is working, the speaker gives a warning to the user the glasses [11]. From the weaknesses in previous studies, a walking aid was developed that can detect objects for the visually impaired, that is, they can move right and left and also do not use a stick but use gloves, where sensors can move in all directions if there are obstacles or obstacles.

METHODS

The framework of this research can be seen in Image 1.

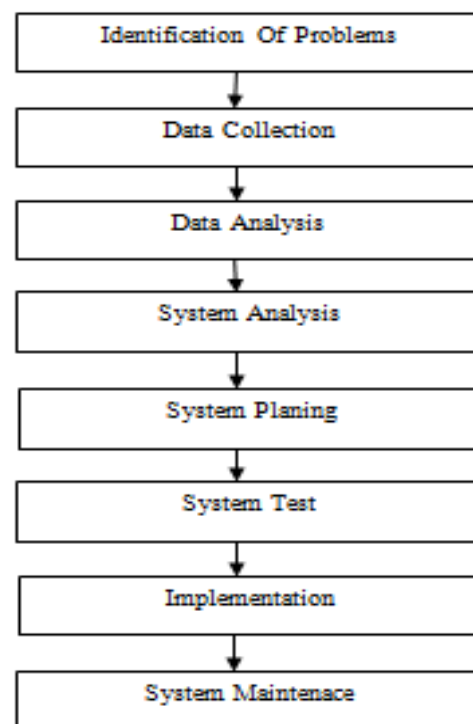


Image 1. Research Frameworks

Identification of Problems

Identification of problems in automatic indicators of object detection devices for the blind, namely inefficient aids, such as

special sticks for the blind which have many weaknesses such as not being able to indicate the size of the distance around the blind and blind people cannot know the distance of objects and if they touch the wrong object with stick, it will endanger the blind person and also the people around him.

Data Collection

Collecting data and information, namely interviews with resource persons who are experts in their fields, in addition to literature study to strengthen the information and data that have been collected through literature/journals related to this research.

Data Analysis

By analyzing the data used or required in this study.

System Analysis

This system analysis studies and understands the components used in the design of prototype automatic indicators for the blind.

System Planning

The stages of development are the analysis, design, coding and testing stages

System Test

By testing the prototype whether the electronic components are running well.

Implementation

At this stage using gloves to be implemented to detect objects that are passed.

System Maintenance

By doing maintenance or maintenance on this tool whether the components used have problems or not.

RESULTS AND DISCUSSION

At this analysis stage, an analysis will be carried out based on the results of the tests that have been carried out and the author will carry out the advantages and disadvantages of the system.

After conducting several tests on the object detection system for the visually impaired, it will be concluded that the object detection system designed for the visually impaired has fully worked as the authors expected in this study.

Table 1 Test Results For All Sensor

NO	Ultrasonic Sensor	LED	Alarm
	Sensor	Led Sensor	
1	On	On	Alarm On
2	Off	Off	Alarm Off

The description of table 1 is:

1. If the two sensor circuits are connected properly, the connected LED will turn on and the Arduino will provide information to the alarm that an object is passed by the blind.
2. If the sensor circuit is not connected properly or turns off, the LED connected to the Arduino will turn off and the alarm will not provide information that there are objects around the road being passed.

To see the alarm is functioning normally or damaged we must test the entire series of sensors that have been made on the system. If the entire sensor circuit is connected properly, the LED connected to the circuit will turn on and the alarm will sound.



Image 2. Physical Form of Tool Circuit

In Image 2 above, the physical form of a prototype of a series of different detecting tools for the blind.



Image 3. Ultrasonic Sensor Tool

In Image 3, the shape of the ultrasonic sensor device is described which is attached to a glove placed in the palm of the hand.



Image 4. How The Tool Works

In Image 4, it is explained how the object detection device for the blind can work if there is an obstacle in front of them. obstacles that are within 5 cm to 50 cm of obstacles in front of the user. If the distance between the obstacle and the sensor is more than 50 cm, the buzzer will not sound or there is no obstacle.

CONCLUSIONS

The performance system on this blind aid is built with an Arduino IDE system. The media used in making walking aid sticks for the blind are gloves with Arduino nano hardware, using an ultrasonic sensor HC-SR04 which can read distances at a distance programmed on the Arduino Nano and an output in the form of a 5 V buzzer.

From the results of testing tools with blind respondents, it was found that

the buzzer will sound if the sensor detects an obstacle within the ultrasonic sensor range below 50 cm. If the distance between the obstacle and the sensor is more than 50 cm, the buzzer will not sound or there is no obstacle. And from the results of the battery life test, the battery life with a maximum power of 3.6 Wh can be used for a maximum of 9 hours, the battery is used continuously or the buzzer is on for 9 hours.

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