DEVELOPMENT OF BLIND ASSISTIVE DEVICE IN SHOPPING MALLS

Shilpa Narlagiri¹, Banala Saritha², G. Jhansi rani³

¹Assistant Professor, Department of ECE, SR University, Warangal.
³Assistant Professor, Sumathi Reddy Institute of Technology for Women, Warangal.

¹shilpa.n@sru.edu.in, ²banalasarita@gmail.com, ³gundala.jhansi@gmail.com

https://doi.org/10.26782/jmcms.2020.09.00021

Abstract

This Application enhances MATLAB for blind people in shopping malls with voice and image transmission. It is mainly designed to get the voice and image information of a particular object or product using MATLAB technology and android applications. Here in shopping malls we use this application to get the information quickly. In this section we have a web camera that is used to scan the different objects available in the malls. If an object is near the reader, the image will be scanned. Such information is delivered by the microcontroller to the Bluetooth module and is transmitted to Bluetooth incorporated into the mobile phone. The specific-object based knowledge or an application is opened on the android device. The smartphone shows the picture and details related to that item, and the same text will also be displayed on the mobile phone. Hence by using this project blind people can easily get the data or information that we want.

Keywords: AT89S52 microcontroller, USB Camera, Blind Assistive device, MATLAB

I. Introduction

Most visual consumers will never wonder how their sensor motors effortlessly handle the enormous complexity of a modern store, stocking an average 45,000 items, which have an average sized medium shop area of 4,529 square meters, unless they know close-up someone who is blind or visually distorted [XI]. They move effectively to the correct aisles, find the shelves with the appropriate items, recognize the goods in the stores, read their ingredients and deal with items that have been moved or discontinued.

The application used for the assessment of blind people in shopping malls. As per World Health Organization estimates, 39 million people are fully blind and 285 million are partially blind. To enhance their quality of life, this application has developed to demonstrate improvement in assistant technology for a lot of people and to ensure safety and independent mobility to visually disabled persons.

Shilpa Narlagiri et al
It uses MATLAB software and KEIL U vision to store the database and evaluation of the Application. Also used some hardware components like a microcontroller (AT8952), LCD, Bluetooth module, and android application. It is designed for blind people to shop in markets, as they can’t see anything it helps them to hear the product name without seeing through an android application via Bluetooth. By this any blind person can hear the voice without his/her own eyes.

II. Literature Survey

The 8051 Microcontroller and Embedded System—Mohd. Mazidi: In this book we referred the best way of implementing wireless technology.8051 Microcontroller Architecture, Programming & Applications. Fundamentals of Microprocessors and Microcomputers - B. Ram: (a) World Health Organization visual impairment and blindness [XI]. (b) American Foundation for the blind [II]. An embedded system is a special system in which the computer or system it controls is entirely encapsulated or dedicated. In comparison to a computer of general use, such as a personal computer, an embedded device performs one or more predefined functions, usually with very specific requirements. Since the system is specifically designed, design engineers can optimize it and reduce the product size and cost. Embedded systems are often produced massively, and benefit from scale savings.

III. Existing System

(i) RFIWS: A walking bar has been designed to help the blind navigate their sidewalk on the radio frequency recognition. This system makes it possible to calculate and evaluate the estimated distance between the walking edge and the blind. The RFID is used to transmit and receive data via radio waves. The core elements of the Radio Frequency Identification technology are the RFID tag and RFID reader. In the centre of the sidewalk several RFID tags are placed taking into account the equal and accurate distance between them and the RFID reader. To track and analyze the obtained signal, the RFID must be attached to the stick. Sound and vibration are generated to inform the users of the distance from the sidewalk boundary to the human.

(ii) Blind Assistive Device Using Rfid: The RFID enhances visitor’s museum with voice and image transmission is designed to get the voice and image information of a particular thing/person using RFID technology and android applications. This Application can be used in museums to get the information easily. In this section, we have an RFID reader which is used to read the different tags available in the products. When a tag is placed in the vicinity of the reader it will read the information contained in the tag. If an object is near the reader, the image will be scanned. Such information is delivered by the microcontroller to the Bluetooth module and is transmitted to Bluetooth incorporated into the mobile phone. The specific-object based knowledge or an application is opened on the android device. The smart phone shows the picture and details related to that item, and the same text will also be displayed on the mobile phone. Hence by using this we can easily get the data or information that we want. The purpose of this application is to develop a system, which uses android and RFID technology to give the information about a particular product with an image and voice in an easy way.
IV. Proposed System

As there are few limitations in the already existing systems, we updated the information and made used MATLAB software to work efficiently and easily understandable by the users. In the proposed system we are using MATLAB software to identify the particular product in the shopping malls. Also, we are using Bluetooth technology for transferring product details to the user. The user needs android mobile to receive the product details and android mobile gives the product name as voice output.

METHODOLOGY

![Block Diagram](image)

**Fig. 1: Block Diagram**

**Step1:** Designing a device for blind peoples to shop in shopping malls by using the camera.

**Step2:** Initializing the data in the shopping malls.

**Step3:** The camera will capture the image of a particular product to display the text in LCD and also to send the voice of the same text to the android mobile. Hence by using this we can easily get the data or information that we want.

**Step4:** Information will be sent to the LCD.

**Step5:** If the blind person touches any product, it just checks the camera that if it is a product or not, if yes go to the next step.

**Step6:** Information about that particular product will be known through image and voice process.
Fig. 2: Schematic Diagram

This schematic diagram informs the module of the pins connected to the pins of the microcontroller.

A. Regulated Power Supply:

This section is intended to supply Power to all the sections mentioned above. It consists essentially of a Transformer that steps down AC 230Volt to AC 9Volt, followed by the diodes. To control the dc voltage received, a positive voltage regulator is used.

Fig. 3: Regulated Power Supply

B. Microcontroller (AT89S52):

This component is the control unit for the entire Application. Microcontroller AT89S52 was used for implementing the application. The Atmel AT89S52 is a
powerful microcontroller that offers a highly-flexible and economical way of providing a large number of embedded control applications by combining an 8-bit CPU with Flash-programmable in-system on a monolithic chip.

Fig. 4: AT89S52 microcontroller

C. USB Camera

USB cameras are cameras whose image data is transferred by using USB 2.0 or USB 3.0. USB cameras are equipped using the same USB technology used on many computers to communicate using dedicated computer systems with a transfer rate of USB 2.0 of 480 MB/s. It is the perfect solution for many imaging applications. That range of USB 3.0 cameras with data transfer rates up to 5 Gb/s is also available.

Fig. 5: USB Camera

D. Bluetooth

AUBTM-22 is anSPP profiled Bluetooth v1.2 module. The purpose of the module is to be incorporated into another host device that needs Bluetooth functions. The HOST device can send commands to AUBTM-22 via UART. AUBTM-22 will scan the commands and perform the correct functionality, for example, set the
maximum to transmit power, modify the module name. Next to this module, the UART data with SPP profiles can be transmitted.

E. 16*2 LCD Display

Liquid Crystal Display used to display the parameters for status of the proposed system. This can display 32 characters having 2 columns.

```
lcdint();
sconfig();
lcmd(0x80);
disp_str("WELCOMETOTHE");
lcmd(0xC0);
disp_str("PROJECT");
```

![Fig. 6: 16x2 LCD](image)

F. MATLAB Software

MATLAB has proved to be a very versatile and useful language for computing scientific and mathematical ideas. It integrates computing and visualization in a user-friendly environment with a familiar mathematical notation that articulates problems and solutions.

There are five main parts of MATLAB:

- **The MATLAB Language** - MATLAB is a high-level matrix language that enables both small-scale programmings to quickly produce simple, unobtrusive programs and large-scale programming to produce complex and extensive applications.

- **The MATLAB Working Environment** - This is a collection of tools and facilities that MATLAB operates for the programmers and users. It also provides features to create manage and debug MATLAB applications.

- **Handle Graphics** - The MATLAB graphics program consists of high-level commands for image processing, presentation, visualization and animation of two-dimensional and three-dimensional data. This also provides low-level commands so that the user can customize the appearance of the graphics and construct a full interface.

- **The MATLAB Mathematical Function Library** - This is a large set of...
computational algorithms ranging from simple functions to more advanced functions.

The MATLAB Application Program Interface (API)- It is a library that allows the user to write the languages C and Fortran for interacting with MATLAB.

V. Results And Discussion

When the components are connected as per the connection and when the power supply is ON, Power is supplied to the circuit and LCD displays. The text Welcome to the project is displayed on the LCD.

Fig. 7: When the power is supplied to the circuit

After displaying the text on LCD, place the camera infront of any object which u want to check. The camera captures the product and scans through the MATLAB program and displays the given product text on monitor as below. It also gives the name of the product.

Fig. 8: When the camera scans the product and displays on monitor

Shilpa Narlagiri et al

262
After scanning the product through a web camera, it displays the name of the product on the monitor and it also shows on LCD and it gives an audio clip of the product through Bluetooth via android mobile.

**Fig. 9: Output of the Application**

**VI. Conclusion & Future Scope**

The proposed prototype has been successfully designed and tested. The characteristics of all the used hardware modules have been standardized. These requirements have resulted in the efficiency of the system, which can satisfy both the needs of the user and the perspectives of the engineers. The sensors and the techniques used may be limited if we use them in correctly. For example, the system utilizing infrared technologies may not have worked very well during the day time because of the infrared exposure to the sunlight, while the systems using Radio Frequency Identification cannot provide a wide range because of the need for tags to be placed wherever the system is in operation. Also, MATLAB is low cost and very easy to use. Hence this Application can also implement to visually impaired people. And can be used to every blind person.
References

I. American Foundation for the Blind. [(accessed on 24 January 2016)]. Available online: http://www.afb.org/

II. Bronfenbrenner U, Kazdin AE, Eds. Ecological systems theory. Encyclopedia of Psychology. Vol 3. Washington, DC, US: American Psychological Association, Oxford University Press 2000; pp. 129-33.

III. Baldwin V D. Way finding technology: A road map to the future. J. Vis. Impair. Blind. 2003;97:612–620.

IV. Food marketing institute research. The food retailing industry speaks 2006. Food Marketing Institute 2006.

V. Kulyukin V, Gharpure C. Ergonomics for one. In: A robotic shopping cart for the blind proceedings of the acm conference on human robot interaction (HRI). Salt Lake City 2006; pp. 142-9.

VI. Vinay Kumar P., Saritha B, “Wireless arm based automatic meter reading & control system”, International Journal of Recent Technology and Engineering, Volume-7, Issue-5, PP 292-294.

VII. Krishna S, Panchanathan S, Hedgpeth T, Juillard C, Balasubramanian, Krishnan NC. A wearable wireless rfid system for accessible shopping environments. 3rd Intl Conference on BodyNets’08; Tempe, AZ 2008.

VIII. National Federation of the Blind. [(accessed on 24 January 2016)]. Available online:http://www.nfb.org.

IX. Stapleton-Gray R. Scanning the horizon: A skeptical view of RFIDs on the shelves. 2005; Available from: www.rfidprivacy.us/2003/papers/stapleton-gray3.pdf.

X. The 8051 Micro controller and Embedded Systems -Muhammad Ali Mazidi Janice GillispieMazidi

XI. Velazquez R. Wearable and Autonomous Biomedical Devices and Systems for Smart Environment. Springer; Berlin/Heidelberg, Germany: 2010. Wearable assistive devices for the blind; pp. 331–349

XII. Kumar P., Dwari S., Saini R.K. “Triple Band Dual Polarized CPW-Fed Planar Monopole Antenna”, Wireless Personal Communications, volume-99, issue-1, PP 431-440.

XIII. Kumar P., Dwari S., Bakariya P.S. “Compact triple-band stacked monopole antenna for USB dongle applications”, International Journal of RF and Microwave Computer-Aided Engineering, Volume-28, Issue-1.

Shilpa Narlagiri et al
XIV. Deepak N., Rajendra Prasad C., Sanjay Kumar S. “Patient health monitoring using IOT” International Journal of Innovative Technology and Exploring Engineering, Volume-8 ,Issue-2, PP 454-457.

XV. World Health Organization Visual Impairment and Blindness. [accessed on 24 January 2016)]. Available online:http://www.Awho.int/media centre/factsheets/fs282/en/.

Shilpa Narlagiri et al