

Multitasking Trolley for Visually Impaired Person

A PROJECT REPORT

Submitted by

B Veda Vishnu Datta	-	11209C001
J Sai Shanmukhnath	-	11209C003
K Mounika	-	11209C004
P Dakshina Murthy	-	11209C009

Under the guidance of

Dr. T. Dinesh Kumar

(Assistant professor, Department of ECE)

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Enathur, Kanchipuram - 631 561

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BONAFIDE CERTIFICATE

Certified that this report “**Multitasking Trolley for Visually Impaired Person**” is a Bonafide work of “B Veda Vishnu Datta(11209C001), J Sai Shanmukhnath (11209C003), K Mounika(11209C004), P Dakshina Murthy(11209C009)” who carried out the project under my supervision.

SIGNATURE:

Dr. T. Dinesh Kumar
Assistant Professor
Department of ECE,
SCSVMV

SIGNATURE:

Dr. R. Jayalakshmi,
Head of the Department
Department of ECE
SCSVMV

Submitted for the Project Phase-I Viva Voice Examination on_____

Place: Kanchipuram

Date:

Internal Examiner

External Examiner

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Abstract

Vision is one of our most important tools to help us survive in the world. Not being able to see well or at all is only the tip of the iceberg that people who are visually impaired have to deal with. Along with that, comes a whole new set of societal challenges, stigma, fears, and beliefs making these groups a minority and not shedding enough light on issues that they face is more common than we realize. While everyone in today's world chases the buzzwords artificial intelligence and robotics to create complex technologies to solve problems like the mundaneness of a task, it would be incorrect to forget about the bigger picture that hints at helping mankind save the rest of it. The visually impaired face a variety of issues right from not being able to navigate along a path to the very basic grocery shopping at a shopping mall. This project proposes an idea of a multitasking trolley that assists the visually impaired to navigate through various isles of a shopping mart and help them purchase the items they wish to buy with the help of assisted buttons and haptic feedback control without feeling the need for any human assistance.

TABLE OF CONTENTS

S.NO	TITLE OF CHAPTER	PAGE NO.
1	Abstract	4
2	Introduction	6
3	Problem Statement	8
4	Objective	8
5	Literature Survey	8
6	Methodology	11
7	Arduino Architecture	12
8	Simplified Block Diagram	13
9	System Requirements	13
10	Conclusion	14
11	References	15

Chapter 1

Introduction

The American Foundation for Blind approximates that someone goes blind or visually impaired every 7 minutes in America; about 8 million people in America face visual challenges that makes reading difficult. These blind people confront daily problems, a few of which are as basic as taking the bus or buying food. The visually impaired must heavily use their senses of touch, smell, taste, and sound to go about their daily chores. While some activities can still be done to a great extent, shopping is something that evidently requires a different approach, every item at the shopping mall cannot be recognized from the sense of touch, apart from unpackaged goods which is a very small number of fruits and vegetables, especially in countries like India, the sense of smell is also not of much use. Tasting an item before billing can cause a lot of trouble and if it is not a box of cereal, other items cannot be recognized from the way they sound.

A market is a place where people get together to buy and sell the goods they need for their daily lives. As buyers, we go to the market at least once a week (if not daily). Moreover, a lot of people find it fun to go grocery shopping. If asked, visually impaired people would not give the same answer. It is one of the biggest problems that they must deal with. For them going to buy groceries entails finding a person to go with who can help them. The reason for that is not being able to recognize let alone compare items that others easily do. The person they go with or one of the people at the mall itself becomes responsible for reading out items from the shopping list or the ingredients off packets. They are stripped off that feel good factor that comes from shopping alone, that so many people experience. All these problems get magnified during the holiday season, when the whole world is at the shopping center. Navigating from one place to another for those with vision themselves can be difficult, it is impossible to imagine the kind of trouble the visually impaired must face during this time.

In the 21st century, it has been seen through the years that humans have used technology to make lives easier and it has for some. Even if the groups of people who are visually impaired, deaf, and mute are a small percentage, it is important to realize that they are a small percentage of a very big population. Hence, in numbers these people are a group that should have a good amount of research and development allocated from all the science and technology centers that work towards solving the issues that they face. Until recently, efforts to develop technologies to help visually impaired people navigate were bounded by gadgets that assisted them in only avoiding hurdles. After the blind community adopted the cane as the primary method of detecting obstacles, considerable effort was

spent to supplement or replace the cane with electronic travel aids such as laser canes and ultrasonic obstacle avoidance systems. However, even with these technologies, visually impaired travelers have difficulty in traveling independently because they still need more information than these devices provide to effectively navigate unfamiliar areas [3]. This solves only the issue of wayfinding, but a very wide range of problems can be solved if small inventions and innovations are used in collaboration. The advances in technology know no bounds and hence, if these problems are talked about more, more people would get started on finding solutions and the world would reach that point much more quickly when the ones with such disabilities can independently get out of their homes to do grocery shopping.

Hence, this paper talks about a smart shopping cart that can be used to assist the visually impaired to help them make the process and the basic activity of grocery shopping much easier.

Chapter2

Problem Statement:

Develop an innovative and user-friendly multitasking trolley equipped with assistive technologies to aid visually impaired individuals in navigating various environments, performing multiple tasks, and enhancing their mobility, safety, and independence in everyday activities.

Chapter 3

Objective:

To design and develop a machine which helps the visually impaired to navigate in a smooth and efficient way by avoiding the obstacles, in the path specified. The proposed system consists of a battery-oriented components that use a DC Battery as its primary energy source.

Chapter 4

Literature Survey:

“Smart Shopping Cart for visually impaired individuals” Vikram Shete, Ariz Shaikh, Rhea Sawant, Chetna Singh, Sridevi Ponmalar, Harikrishnan – **August 2022**

These six buttons have their functionality name engraved as braille script for the people to understand. The use of uncontracted braille script would be beneficial to both children as well as adults. The uncontracted braille script is a basic and standard system in which every letter of every word is expressed in braille. Braille is a pattern of raised dots that people that are visually impaired may read with their fingertips.

It is not considered as a language; rather it is thought of as a code which is implemented to get an understanding of other languages for a vast population of people who are visually impaired.

“Smart Shopping Cart for Physically challenged” Sanchit Pandey, K.G. Sawarkar- **November 2022**

This paper gives an overview of existing devices for the guidance of visually impaired pedestrians and discusses the properties of the white cane and of conventional electronic travel aids. This paper also described the disadvantages of using a standard mobile robot for this purpose. So this novel idea is integrated in our work implementation increasing the scope of the work to the visually impaired persons.

“Automatic Human Guided Shopping cart with Smart Shopping System”.

Y. Leng Ng, C. Siong Lim, K. A. Danapalasingam, M. Loong Peng tan and C. Wei Tan-

February 2017

This paper gave us the idea of the shopping cart following a person with the help of remote sensing. There are also shopping cart safety issues such as sliding down from an escalator. It is known to be an inconvenience and time wasting for customers who are in a rush to search for desired products in a supermarket. Therefore, an automatic human and line following shopping cart with a smart shopping system is developed to solve these problems. The result of the testing on the used sensors like ultrasonic are presented in this paper for due reference. Users can then enjoy shopping without pushing the shopping carts themselves. Meanwhile, the smart shopping system allows users to access the location of items that they plan to purchase in the supermarket by using their Android application and calling the shopping cart to move automatically. Thus, the shopping cart can lead the users to their desired location of items that they plan to buy.

Comparison Table

Title of the paper	Author	Year of publish	Journal	Inference
Smart Shopping Cart for visually impaired individuals	Rhea Sawant	August 2022	Research gate	Navigation buttons, IR sensor
Smart Shopping Cart for Physically challenged	Sanchit Pandey, K.G. Sawarkar	November 2022	IJERT	Load cell
Shopping by blind people	Snigdha kesh, Vasanti Venkateshwar, Ananthanagu	February 2017	IJWCNT	GPS and Audio

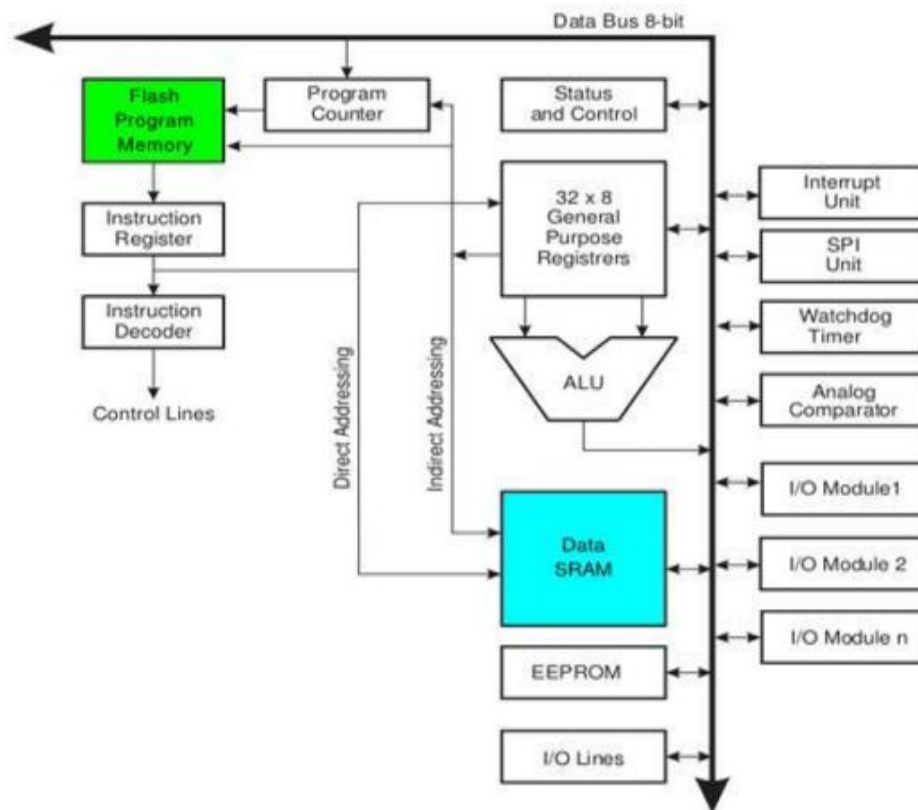
Chapter 5

Design Methodology:

Before designing a model, it is essential to consider the different types of challenges that are encountered by the visually impaired. The location or shelf where a product is placed in a shopping mall is repeatedly changed according to the supply and demand of the item. For those of us who can see, searching for anything in such an environment becomes a time-consuming process, so we can empathize and appreciate how difficult it would be for those who can't. They require assistance for nearly all tasks, from navigating through the store to searching the shelves and checking the product's details to reaching the billing counter for checkout. The entire process is stressful and, to top that, the limited support from the shop assistants adds to their difficulties.

We are proposing a system that will help ease these problems and model a better shopping experience for those struggling with it by designing a shopping cart that enables the visually impaired to explore stores independently using auditory and haptic feedback technology, rather than relying on others for assistance. This product/idea would reduce the dependence of the blind and visually impaired on others, moreover, helping them gain more confidence.

Arduino Architecture:

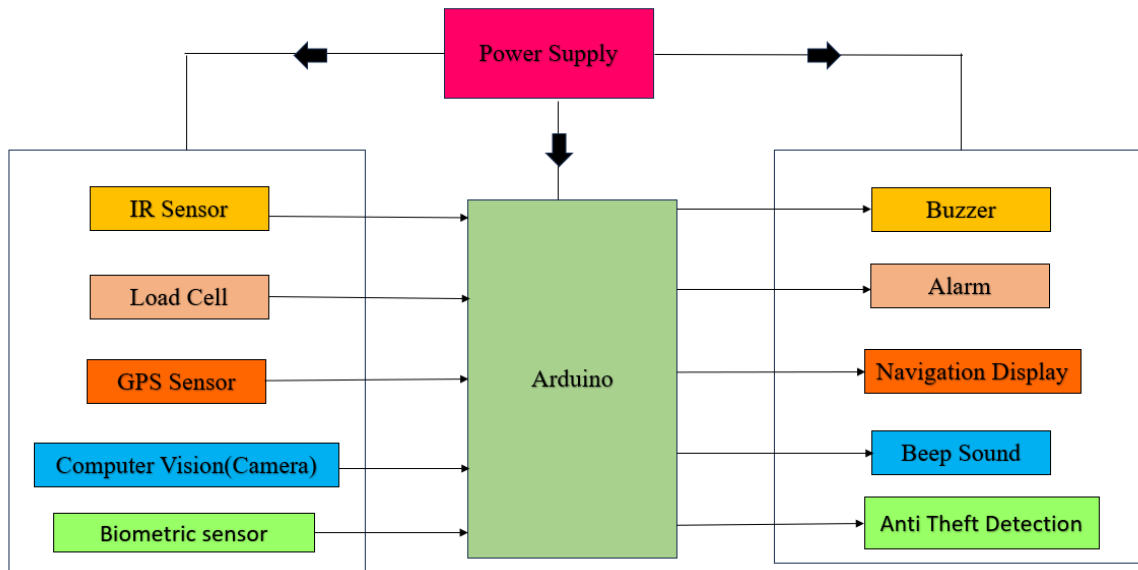


Few of basic Arduino functions are:

1. Digital Read(pin): Reads the digital value at the given pin.
2. Digital Write (pin, value): Writes the digital value to the given pin
3. Pin Mode (pin, mode): Sets the pin to input or output mode.
4. Analog Read(pin): Reads and returns the value.
5. Analog Write (pin, value): Writes the value to that pin.
6. serial. Begin(baud rate): Sets the beginning of serial communication by setting the bit rate.

Chapter 6

Simplified Block Diagram:



System requirements:

- Arduino
- IR Sensor (Infrared)
- Load Cell
- Global Positioning System (GPS)
- Computer Vision (Camera)
- Navigation Display
- Buzzer
- Alarm
- Power Supply (Batteries)

Chapter 7

Conclusion:

Today, businesses are motivated by IoT and AI and prospects of reducing human labour and operating costs thereby increasing profits IoT based shopping trolley system utilizes voice commands and distinct buttons that make shopping and navigation through the shopping area an easier process for visually impaired customers and as well as anyone else who require assistance. This shopping cart digitizes the process of shopping while solving social problems of dependency of a person with a disability on either a friend, family member or the shopping centre staff. Each of these trolleys can be specially designed for the designated shopping centre while also customizing them as for the kind of store it is used in and the inventory list. The scope of improvement for this project could be implementing vigorous AI algorithms to tell the difference between two or more types of items such as fruits, vegetables, or any other perishable categories of items. Artificial Intelligence can help us understand and identify and overcome the limitation to the current problem.

Chapter 7

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