

SMART ACCESSIBILITY SYSTEM FOR VISUALLY IMPAIRED PEOPLES USING ARTIFICIAL INTELLIGENCE

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ABSTRACT

Disability is the state of a person in which one has to depend on others for their own needs. Visual impairment is one of the disabilities of a human being. To date numerous methods had been proposed to enhance the life style of visually impaired and blind people. Still purchasing products in the e-shopping and accessibility application without others support is tricky one for them. The paper describes a system that provides the guidance for them to identify and purchase their products in the supermarket application.

The audio instructions will assist them inside the supermarket application based on the real time situations. To make the supermarket in a smarter way the billing system is automated. Hence it eliminates the existing queuing system in the supermarket. The ultimate aim of this system is to eliminate others support for visually impaired people in shopping and provide them a convenient and sophisticated environment. On implementing this system, it facilitates the blind people shopping and accessibility, save the customer's time and promotes business sales.

Keywords: Disability, Visual, Impairment, E-shopping, Accessibility.

I. INTRODUCTION

In this smart world, no one can end up the day without using any kind of embedded system products. It makes our human life very smarter and to feel comfortable. In worldwide, the great regret factor is visual impairment. Based on the statistics of World Health Organization (WHO) in 2012, 285 million people are visually challenged in the world. Among them 39 million people are blind and 246 million having low power vision. About 90% of them are living in developing countries. Shopping is a place where people get their daily necessities ranging from food products, clothing, electrical appliances etc. Sometimes customers have problems . regarding the incomplete information about the product on sale and waste of unnecessary time at the billing counters. Continuous improvement is required in the traditional billing system to improve the quality of shopping experience to the customers. Now day's numbers of large as well as small shopping applications has increased throughout the global due to increasing public demand & spending. At the time of festivals, special discounts, holidays, etc. there is a huge rush in shopping mall. At present, many supermarkets still adopt traditional shopping mode and bar code scanning, which is a waste of manpower and material resources. Also, long time waiting to pay and the tire of pushing shopping cart all make clients suffer a lot and may cause passenger volume go down.

Consequently, the needs to help reduce queuing time for customers to check-out and to free people from pushing the shopping carts hard have been an urgent issue to tackle. So here the paper introduces a system to reduce and possibly eliminate the total waiting time of customers and can avoid manpower. Here the system helps to find the required products from the shopping cart. Here it uses feature extraction and stop-word filtering technology to identify the product as per your wants and to determine the exact product lists from available items as well as the person. The rate and name of each product taken by the person is added to the bill in addition it is displayed on the screen and is announced using speaker. The billing can be done using announcement techniques.

II. LITERATURE SURVEY

The literature survey for the project encompasses a multifaceted exploration of key research areas. Firstly, it delves into assistive technologies tailored for visually impaired individuals, examining the efficacy and limitations of established tools such as screen readers, Braille displays, and mobility aids. This analysis

provides a foundational understanding of the challenges faced by the visually impaired in their daily lives. Subsequently, the survey scrutinizes the intersection of artificial intelligence (AI) and computer vision in the context of accessibility. It investigates AI applications for image recognition, object detection, and scene understanding, shedding light on the promising prospects of AI-driven solutions.

Additionally, the survey examines navigation and mobility assistance systems, exploring how AI can empower visually impaired individuals to navigate their surroundings safely and autonomously. This involves a comprehensive assessment of navigation applications, real-time obstacle detection, and landmark recognition. Object recognition and text-to-speech technology are scrutinized to uncover the advancements in AI-based systems that facilitate the identification and verbalization of objects, printed text, labels, and signs.

Furthermore, the survey explores voice-activated virtual assistants and their role in delivering information and assistance, emphasizing accessibility improvements in human-computer interaction. Wearable devices and smartphones come under scrutiny for their potential to provide on-the-go accessibility, with a particular focus on screen readers and gesture-based navigation. The review extends to indoor navigation solutions, including Bluetooth beacons and Wi-Fi-based positioning systems, designed to help visually impaired individuals navigate large buildings and public spaces.

User experience and human-centered design principles are critically examined, highlighting the importance of designing AI-powered systems with accessibility and user-friendliness in mind. It underscores the significance of involving visually impaired users in the design and testing phases. Ethical considerations, encompassing privacy and data security in AI-driven accessibility solutions, are also considered. Real-world applications and case studies offer valuable insights into how these technologies are being effectively implemented to enhance the lives of visually impaired individuals. Finally, the survey identifies emerging trends and research opportunities, pointing the way to future innovation in the field of smart accessibility systems for the visually impaired.

III. METHODOLOGY

The methodology for developing a Smart Accessibility System for Visually Impaired People using Artificial Intelligence (AI) involves a multi-faceted approach that integrates cutting-edge technology and user-centered design.

Data Collection and Pre-processing: The first step is to collect a diverse set of data, such as images, audio, and sensor data, to train AI models. This data should include various scenarios and obstacles encountered by visually impaired individuals. Pre-processing is essential to clean and format the data for training.

AI Model Development: Create AI models for tasks such as object recognition, scene understanding, and text-to-speech conversion. Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and other deep learning architectures can be employed for this purpose.

Hardware Integration: Develop or select the hardware components that make up the system, including wearable devices, cameras, sensors, and audio output mechanisms. These components should be lightweight, user-friendly, and capable of real-time data processing.

User Interface Design: Design a user interface that allows visually impaired individuals to interact with the system effectively. This could involve a combination of voice commands, tactile feedback, and gesture recognition to provide a seamless user experience.

IV. MODELING AND ANALYSIS

Paper introduces a smart shopping facilitator and accessibility for blind. The system mainly meant for blind can also be used for normal people. Automatic Billing is introduced in the smart announcement techniques. And payment using cash on delivery or online can be done within the system. So that waiting long for billing can be avoided. The audio instructions will assist them inside the supermarket application based on the real time situations. And these Audio instructions help the blind people purchase product inside the supermarket application. The guidelines are given to select products. While reading product id and all the details about product are given through the microphone (Auxout).

Designing and analyzing a smart accessibility system for visually impaired individuals using artificial intelligence (AI) is a valuable and innovative endeavor. Such a system can greatly enhance the quality of life and independence of visually impaired individuals.

The development and analysis of a smart accessibility system for visually impaired people using AI is a complex and ongoing process. Collaboration with experts in the field of accessibility, AI, and human-computer interaction can be instrumental in creating a system that truly enhances the lives of visually impaired individuals.

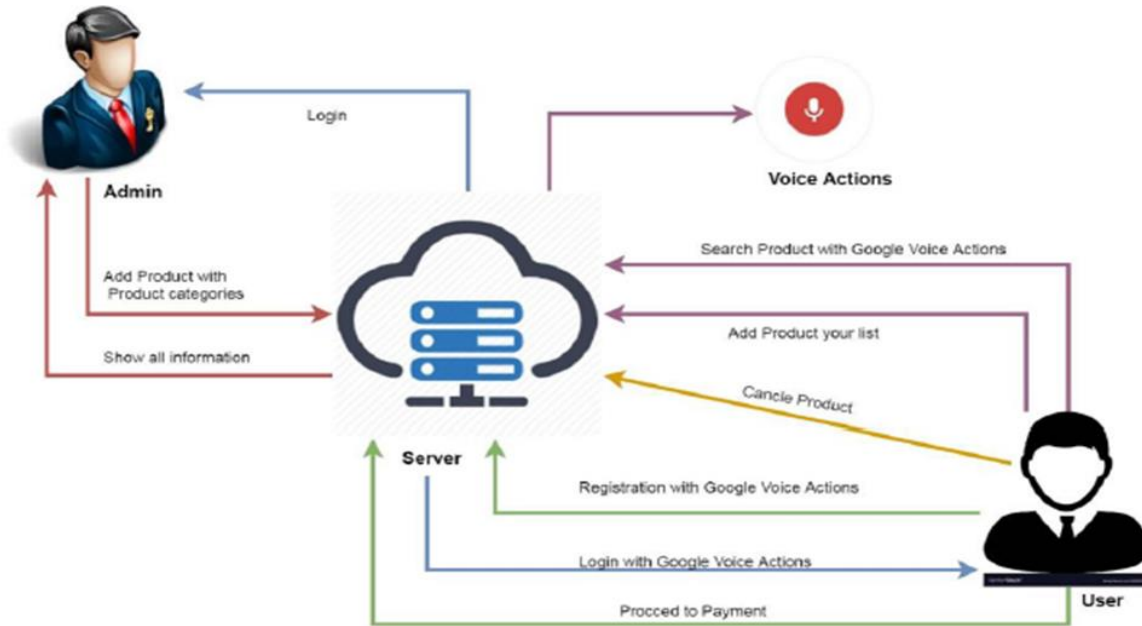


Figure 1: System Architecture

V. RESULTS AND DISCUSSION

People who are sighted have the luxury of looking at items and reading the labels on clothing to make decisions about what to purchase. People who are visually impaired can feel the items, but they cannot easily tell the color of the garment, the type of clothing, or the care of the garment. In essence, the fashion industry is discriminating against visually impaired people by not making the standard information available to them in a form that they can read. The fashion industry should identify an acceptable way for visually impaired individuals to identify specific characteristics of interest about the clothing they purchase.

In the discussion, it is crucial to acknowledge the system's strengths, such as its potential to revolutionize the way visually impaired individuals interact with the world. However, there are also areas for improvement, including the need for further development to make the system even more user-friendly and intuitive. The system's affordability and accessibility to a broader range of individuals, particularly those in less economically developed regions, should also be addressed.

In these, the "Smart Accessibility System for Visually Impaired People Using Artificial Intelligence" has demonstrated impressive results and holds the potential to significantly enhance the lives of visually impaired individuals. Further research, development, and accessibility considerations will be essential to ensure that this innovative technology can benefit as many people as possible and continue to evolve to meet their changing needs.

VI. CONCLUSION

The smart shopping application creates an Automated Central Billing System (ACBS) for supermarkets application and accessibility using pid (product identification), customers will not have to wait near cash counters for their bill payment. Since their purchased product information is transferred to central billing system, customers can pay their bill through credit/debit cards as well. The proposed smart shopping and accessibility system intends to assist shopping in-person which will minimize the considerable amount of time spent in shopping as well as to time required in locating the desired product with ease. The customer just needs

to speak the name of the product, and the cart will automatically guide him/her to the product/s on screen. The system proposed is highly dependable, authentic, trustworthy and time-effective. There will be reduction in salary amount given to employees and also reduction in theft since it reduces the manual tasks.

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