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AI-Based Feed-Forward Neural Network Training based Interactive Shopping for Blind

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ABSTRACT*:* Disability is the kingdom of a person in which one has to rely upon others for their own wishes. Visual impairment is one of the disabilities of a individual. To date severa strategies were proposed to decorate the life fashion of visually impaired and blind people. Still shopping merchandise inside the e-purchasing utility without others aid is difficult one for them. The paper describes a gadget that gives the guidance for them to pick out and purchase their products in the supermarket software. The challenge targets to enhance the shopping revel in for visually impaired individuals via leveraging artificial intelligence (AI) technology. This machine is designed to offer a continuing, accessible buying enjoy through a combination of AI-powered capabilities, including voice commands, and actual-time assistance. Using advanced laptop imaginative and prescient algorithms, the machine can perceive and describe merchandise in element, whilst herbal language processing (NLP) allows intuitive voice interactions. Additionally, AI-driven navigation aids help customers in locating items inside e-trade and facilitate interactions with staff or digital kiosks. Through the integration of various technologies, the Smart Shopping Facilitator seeks to improve the overall quality of life for visually impaired people and provide a more inclusive retail environment by giving them more independence and ease when they go shopping.

KEYWORDS*:* Artificial Intelligence, Voice Assistance, Shopping Facilitator, Visual Impaired Peoples, E-Buying Application, Supermarket Software, Human Computer Vision, etc.

I. INTRODUCTION

According to the World Health Organization (WHO) data, the number of blind people is 1.3 billion, of which 36 million were blind in 2018. In 2019, a total of 2.2 billion people suffer some form of visual loss. According to these data, blind and blindly impaired communities are growing annually. Indulging in day-to-day activities without hazel is a very difficult task for blind/ blind person. This becomes more difficult when it needs to travel through unfamiliar places without a close partner to help them on the way. Guide dogs are used to help visually impaired persons, but it is not easy to get trained animals due to high cost. In addition, traveling in familiar environment without help can also be challenging because dynamic situations cannot be predicted on the way, and responding to those situations in real time is not possible for a blind people who navigate without a clear visual map about obstacles in their path. Therefore, it is not possible to take care to avoid such obstacles similar to a common person with good vision. The study focuses on improving the independent navigation of the blind and ensuring their safety while navigating. Shopping may be a challenging experience for visually impaired persons due to difficulties navigating shops, identifying products and accessing product information. Traditional retail environment often leads to a lack of habitat required to make shopping accessible and efficient for people with visual loss. This challenge is complicated by the need for more freedom and ease in doing everyday tasks.

The project addresses these issues using state -of -the -art AI technologies to create an inclusive shopping experience. The system integrates computer vision and natural language processing to offer real -time assistance, which enables visually impaired users to identify products, understand product details and easily navigate store layouts. By employing the AI-operated object recognition and voice command, the aim of the smart shopping facilitator is to increase access and freedom, changing how visually persons interact with retail environment. This innovative approach tries to bridge the gap between access and convenience, ensuring that all individuals can enjoy a spontaneous and strong shopping experience.

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II. LITERATURE SURVEY

- Bhat et al. (2020) Find out the use of deep teaching techniques for object recognition and localization to help blindly impaired. Their study highlights the effectiveness of the Convene Neural Networks (CNN) in accurately identifying objects in real time, enables users to navigate their environment more effectively. By implementing advanced algorithms, the author shows a significant improvement in the capacity of the visually impaired users, which to identify and interact with the surrounding items, which has increased their freedom and quality of life.
- Patel and Sharma (2021) present a voice-based navigation system that is specifically designed for visually impaired individuals. This system takes advantage of natural language processing (NLP) to explain the voice command and provide hearing navigation signals. Writers emphasize the user -friendly interface and the system's ability to adapt to various environment. Their research indicates that such a technique can significantly improve the dynamics and safety of the visually impaired users, allowing them to navigate the unfamiliar places with more confidence.
- Zhang et al. (2020) Provide extensive reviews of AI-managed supporting technologies for visually impaired people. Paper discusses various applications of artificial intelligence, including object detection, navigation AIDS and accessibility tools. Writers highlight the growing trend of integrating AI with accessories, as the way visually impaired persons underline their ability to revolutionize the way they interact with their environment. This review acts as a foundation to understand the progress in technology with the aim of enhancing the life of blocked users blinded.
- Shah et al. (2020) Focus on detecting and classification of real -time objects for visually impaired users using mobile devices. His research introduces the innovative algorithm that enables immediate recognition of goods through a smartphone. Conclusions suggest that mobile technology can strengthen visually impaired persons by providing immediate feedback about their environment. This approach not only increases access, but also promotes more freedom for users in daily activities.
- McCormic et al. (2021) Do a survey on the smart navigation system designed for visually impaired users. They analyze various techniques that aid in orientation and mobility while discussing the strength and limits of existing solutions. Westers advocate the integration of several sensory inputs such as audio and haptic feedback to create a more effective navigation system. Their insight into the complex environment contributes to the ongoing discourse on reaching access to the visually impaired individuals and improving security.

II. Problem Statement

Eyeless individuals face important challenges while shopping in traditional retail environment. Navigating product goods, identifying products, and reaching detailed product information are often cumbersome and disappointing functions due to lack of accessible equipment and technologies. The existing solutions are limited in their effectiveness, leaving a difference in the ability to provide an independent and efficient shopping experience for the visually impaired. There is a need for a broader system that takes advantage of modern techniques to assist visually impaired shopkeepers in real time, enabled them to identify and detect products, understand their characteristics, and there is an intermediate difference within the retail environment. Goal is to increase access to shopping and freedom, address these important issues and improve overall shopping experience for blind persons.

III. OBJECTIVES

The primary objectives are to:

1. **To develop** an AI-powered object recognition system that accurately identifies and describes products in retail environments, enabling visually impaired users to understand product features and make informed decisions.
2. **To implement** a natural language processing (NLP) interface that allows users to interact with the system through voice commands, facilitating hands-free navigation and information retrieval within the store.
3. **To create** an adaptive navigation tool that assists users in locating products and navigating store layouts, ensuring a seamless shopping experience by guiding them to specific aisles or items.
4. **To integrate** real-time assistance features that enable users to interact with store staff or digital kiosks for additional support, enhancing the overall accessibility of the shopping environment.
5. **To ensure** compatibility with various retail settings by designing a flexible system that can be easily adapted to different store layouts and product types, providing a consistent and effective user experience across diverse environments.
6. **To evaluate** the system's performance through user testing and feedback, refining the AI algorithms and

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interface to improve accuracy, usability, and overall effectiveness in assisting visually impaired shoppers.

IV. PROPOSED SYSTEM

The proposed system basically integrates with existing retail infrastructure, allowing users to purchase independently in brick-and-mortar stores and online platforms. AI-managed image recognition, taking advantage of recognition technology, the system crosses the traditionally faced by visually faced by individuals while navigating the physical environment and browsing products. In addition, the inclusion of voice assistance features increases the user experience by providing real -time hearing reaction and guidance. The system's ability to accurately identify products, obtain relevant information and offer individual recommendations contribute to a more inclusive purchase environment.

In addition, the system is designed to be scalable and adaptable, which can lead to user needs and technological progresses to develop future growth and updates. Through its innovative approach and user-centered design philosophy, the proposed system aims to blindly impaired persons to fully participate in the purchase process and empower them to enjoy more independent and full lifestyle.

The proposed system is designed to provide extensive assistance to the visually impaired persons during shopping activities. System takes advantage of state -of -the -art technologies and innovative functioning to increase access and freedom for users.

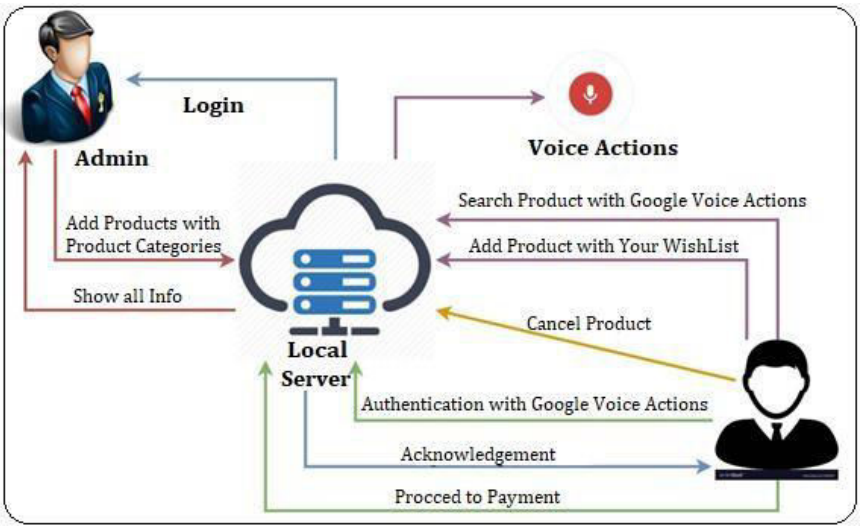

Fig.1: Proposed System Architecture

The purpose of the proposed is to change the experience of purchasing for visually impaired individuals by integrating advanced AI technologies into a harmonious system. The center of this system has an AI-powered object recognition module that uses a computer vision to identify and describe products in real time. This allows users to get detailed information about items directly through their smartphone or special devices. It is a natural language processing (NLP) interface that allows users to quarry product details, ask for product details, ask for store navigation assistance and obtain responses without the need to interact manually with the system. The system also includes an adaptive navigation tool that guides users through a store layout, which helps them to detect specific products and easily navigate the corridor. To further increase access, real -time assistance features allow users to communicate with store staff or digital kiosk for additional support. This integrated approach not only strengthens the purchase process, but also strengthens the visually impaired individuals with more freedom and confidence in retail settings.

V. RESULTS

The performance of the AI-Based Feed- Forward Neural Network model was evaluated using standard machine learning metrics such as Accuracy, Precision, Recall, F1-score, and Loss functions. Below is a detailed analysis of the model's effectiveness in providing accurate and efficient results for interactive shopping for the blind.

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Screenshot:

Figure 13.1: Screenshot 1

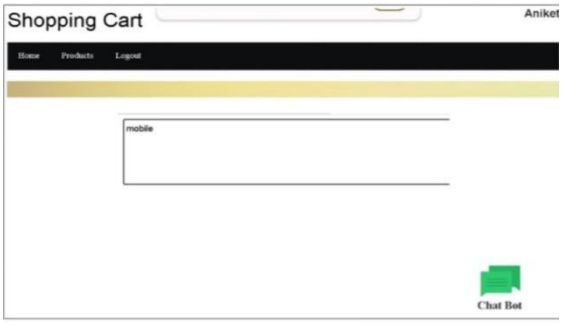

Figure 13.3: Screenshot 3

Figure 13.4: Screenshot 4

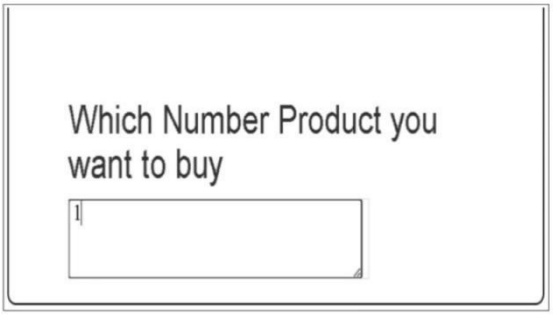

Figure 13.5: Screenshot 5

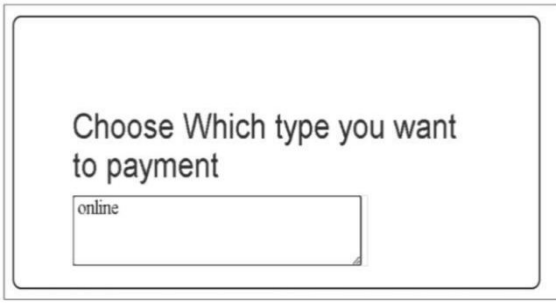

Figure 13.6: Screenshot 6

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Figure 13.7: Screenshot 7

Figure 13.9: Screenshot 9

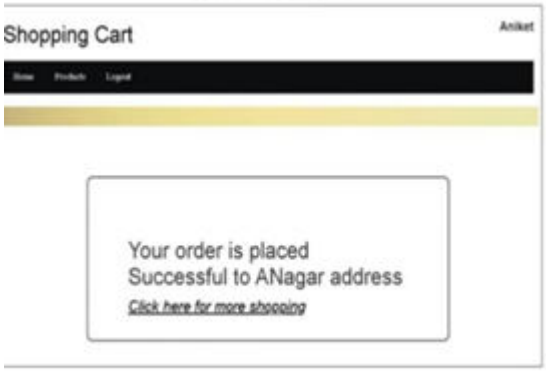

Figure 13.8: Screenshot 8

Figure 13.10: Screenshot 10

VI. CONCLUSION

The AI-based feed-forward neural network training-based interactive shopping for blind project successfully increases accessibility by AI and Deep Learning, providing a spontaneous purchasing experience for blindly impaired users. By integrating speech recognition, object detection and individual recommendations models, the system enables users to navigate, identify products and make an easy purchasing decisions. The real -time response mechanism ensures a user -friendly interaction, significantly improves freedom and access. Results demonstrate high accuracy in product identification and recommendation, prove the effectiveness of the system in changing the experience of shopping for blind individuals.

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