How AI can help blind people to be independent

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Introduction

Background

In today world people are wanting to live a happy independent life in the case of visual impaired facing issues related to social restrictiveness. When the sensory system is what visually impaired individuals need the most, they face trouble and are at a disadvantage as a consequence of the lack of critical information in their environment. The blind can be aided with the use of cutting-edge technology. An Android smartphone app that aims on a voice assistant, image recognition, currency recognition, e-books, chatbots, and other features carries out the concept. The application can use voice recognition to help you identify adjacent items while also employing text analysis to help you read the data in a hard-copy document. It might be an useful approach for blind people to communicate with others and might support their independence. People who are entirely or partially blind are termed visually impaired (Lee, Reddie, & Carroll, 2021).

According to a World Health Organization (WHO), estimate, 285 million people around the world have low vision, 39 individuals have gone blind, and about 3% of people of all ages live in countries with visual impairments. Cataracts, trachoma, and glaucoma, as well as impairments such as a lack of vitamin A, onchocerciasis, and leprosy, are the main causes of blindness. People with visual impairments go through a lot of pain and battle with many daily tasks, such as getting around and finding their way to unfamiliar places (Qureshi et al., 2021).

The significant effects that visual impairment has on tailored properties associated with visual function:

- Effective workouts that requires to have an average distance vision

- Communicating, reading, and composing consist a precise vision.

- Area and displacement estimations contains far vision

- For tracking activities, continuous optical observing is necessary (Qureshi et al., 2021).

Social Relevancy of Problem

Blind individuals have several obstacles in daily life, from reading a novel to walking across the street. There are several instruments in their hands to deal with the challenges they experience, but they are enough. Vision is the most vital thing a human owns as individual, and it is crucial to a person's existence whether they're able to see or not. Someone who is

an object. an object requires help to accomplish daily tasks. We have talked about the difficulties that blind people encounter and have put forth the effort to give them a viable solution for everyday living.

Aim

The aim of the study is based on the investigating how AI helping blind people to be independent.

Objectives

- To define the technologies of AI that benefit blind people.

- To evaluate the challenges faced by the blind people to be Independent.

- To investigate the AI theories that helps in overcoming the blind people challenges

Literature Review

According to Joshi et al. (2020), artificial intelligence is very helpful for visually impaired people as with the help of this technology automatic assistance technology can be developed with the help visually impaired people can identify different objects. As per the author, different auditory inputs can also be provided to blind people to get independent. Blindness is dependent on distance and it can be near and distance vision impairment and it will be due to age or due to glaucoma, diabetic retinopathy, trachoma, and so on. In the present time, there are many methods that are used by blind people for survival such as white cane, dogs, medication, and braille but all these have limitations. For example, braille is not known by all on the other hand dogs can be helpful in most cases but in complex direction cases dogs are not helpful. Joshi et al. (2020) say that electronic travel aids can be used by blind people as this robotic cane is used that provide assistance in walking because it has an omnidirectional wheel in which a LAM-based linearization system is used that to get the knowledge of a non-linear disturbance. In electronic mobility cane detection of the object is easy and the logical map is also constructed in this technology with the help of artificial intelligence so that information regarding the surrounding environment can be provided (Hu et al, 2019). In this device, these all are working as input and there will be some output according to which blind people are going to respond, and that output will be in the form of vibration, voice, and audio. According to those outputs, blind people respond. In this device to detect the obstacle a haptic device is provided so that information regarding the obstacles can be provided (Islam et al., 2020). This device is made with the help of artificial intelligence by covering all aspects. To use the ultrasonic sensors and depth sensors, a multi -sensor device is used so that a navigational guide can be provided to blind people. In addition to this, a cane robot is also used in this device so that blind people can be prevented from getting falling on the floor.

According to Walia (2022), artificial intelligence can be used for blind people so that information regarding the surrounding can be known in reference to this Microsoft has developed its People Lens concept in which a computer vision algorithm is used to get information about the surroundings.

Figure 1: PeopleLens

(Source: Walia, 2022)

This device is helpful for blind people because, with the help of this device, they can interact socially and identify things. With the help of this device, the conversation can be by blind people and navigation can be provided to people. As per the view of Thadani (2022), in the given image there is a difference of color in the text and due to this difference, some people can see the upper one on the hand color blind people are not able to see this image.
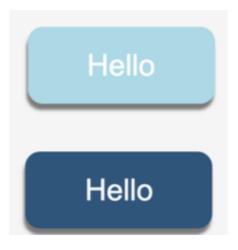

Figure 2: Image color difference

(Source: Thadani, 2022)

The intelligent designers have this knowledge and design according to that and chose the pixel value according to the need of the hour but this problem can be resolved easily with the help of artificial intelligence as with the help of this data can be analyzed and with the help of this text summarization work can be done easily. This technology is useful for visually impaired people because with the help of AI facial recognition can be done in real-time.

Machine learning is helpful in analyzing the design of a website and with the help of this speech recognition, keyboard navigation, audio translation, and so on can be done by adjusting the image elements.

According to Kelley (2021), artificial intelligence is used in developing applications and software that can be used for visually impaired people. According to the author, Microsoft has developed an application on the ios operating system with the name of seeing AI which is very useful for visually impaired people. In this application, there are many channels for short text, documents, persons, and scenes and every channel has different software and blind people can work easily on it. In this application, there is a feature of optical character recognition that is very helpful for visually impaired people. This application is developed with the help of artificial applications. In this application, one can take a picture of a magazine or any article. This application will read out the article that is captured. This was available on some device that was too much costly at that time but now with the help of the application it is available for free and any person can use it for free. In addition to this, Prizmo is also an application that speaks aloud so that documents can be placed in the right position just below the camera. Other applications, AIRA is also an application that can be used for object recognition with the help of a video camera and speaker. This pair of glasses are mounted and connected to a smartphone. With the help of the application, users can look at things in real-time with the help of a video camera and scenes can be described. It can be seen that with the help of artificial intelligence, many applications has been developed that can be used for visually impaired people.

Methodology

Research Method

In this research method the selection of the Qualitative research method, is done which focus on the evaluation of the study through the journals, magazine and articles. The secondary data shows how the AI technologies helps in improving the blind people lives. The low-cost assistive technology system of AI helps in improving the communication and navigation strategies. The idea of the AI is based on the research of providing the three different types of assistance. These can be described as per the scenarios of work, home and restaurant. It is studying that AI provide the assistive system through which identification of the objects , reading and visual crowd-sourcing can be done (Qureshi et al., 2021).

In this it is stated by various researcher that a camera are fitted as a assistive solution so that they can be helpful in providing the accessibilities. The wearable augmented devices helps in driving more force so that generation of the high-quality images and ample light can be provided. Through the user can effectively communicate with other people. It is seen that the quality of life depends on the inability of the technology in creating more opportunities for the people with disabilities (Qureshi et al., 2021).

Research Approach

In this approach the selection of the systematic literature review, which shows how the AI technologies helps in providing the assistance for the visualization of conditions. The gadgets develop with the AI provide the assistance through which user can communicate and navigate. In this approach the selection of the participate is done through which it is recorded whether the AI gadgets are known to them or not. The research approach shows the issues that a visually impaired person face like the navigation and communication. AI provide an assertive programming solution through which they can easily communicate the requirements (Akter et al., 2020).

The study will help in evaluating the conditions that are improved with the helps of AI solutions. The solution focus on providing the in-depth understanding of how the technologies are changing the way of living for blind people. The visually impaired person must provide the structure through which the challenges can be easily removed.

Technologies like AI and machine learning considerably aid in the expansion of the IT industry. They used these technologies to make it conceivable for blind people to lead a normal, honest life alongside everyone else. The smart chatbot helps individuals who are blind distinguish between products and their environment. Recognizing currencies makes

clear and simple payment easier. Text recognition aids in reading and comprehending printed work. When the first phase of the proposed system is finished, it should be able to give people who already are legally blind better assistance (Akter et al., 2020).

Data collection

The collection of data is done using the secondary research method that focus on the evaluation of AI technologies that help in providing assistance to blind people. Here the data is collected on the basis of the various countries like India and UK utilizing the AR and VR technologies. It is seen in the research conducted that the shows the evaluation of the AR and VR technology to reduce the impact of the visually impaired people. The people experience the challenges like navigation, communication and reading. These experiences can be improved with the helps of alarming them to navigate properly. The applications are designed that helps people in navigating properly like when the dog are their in the street the application will helps in restricting them to go (Qureshi et al., 2021).

Analysis

Based on the government of the United Kingdom, there are over 11 thousand people who have a limiting long-term ailment, impairment, or disability. The rate of disability increases with age, continuing to rise by 16% for people who are working-age adults and by 45% for those who are past the state pension age. Disabled persons far more commonly live in poverty than non-disabled people, are less likely to be employed, are three times more likely to lack qualifications, and are only half as inclined to have a degree-level level qualification (Wald, 2021). The capability of artificial intelligence to recognize things and faces, such as seeing AI, is increasing. Although brilliant people with deep knowledge and awareness of the needs of visually impaired people are generating such useful technologies, most of the technology developers do not possess such a deep real understanding and do not discover mental disorders and accessibility in their university courses. This application was developed by a blind developer. Numerous researchers have investigated independence via the prism of an individual's different self-perceptions, covering emotions like soul, self-efficacy, power, and autonomy. They can provide a summary of these findings and explain how researchers related them to technological developments and humanitarian aid (Wald, 2021).

Microsoft's annual Ignite conference saw the release of several number of brand-new Artificial intelligence. The "PeopleLens" AI system is among the most intriguing.

Figure 3 PeopleLens Assistance

Source: (Morrison et al., 2021)

PeopleLens is a platform that allows blind individuals to interact with their social settings by using computer vision algorithms. The system is built to recognize and understand items in the user's environment and then transmit those data back to him or her in an understanding way. For blind people, who until now have been completely shut off from social interaction, this opens up a world of possibilities (Morrison et al., 2021). "PeopleLens," a new AI

technology from Microsoft, is intended to enhance eyesight for the blind. To support blind individuals in perceiving their society, the system makes use of computer vision methods. PeopleLens first recognizes individuals in a scene and then displays details about them, such as their identity and position. Wearable hardware and a cloud-based application make up the PeopleLens platform. Images of the direct vicinity are collected by the devices and uploaded to the cloud-based platform, where machine learning algorithms are applied to them. The wearable sensor is then presented with descriptions of the surroundings and uses this information.

Multiple elements in an environment, such as a couch or a table, can also be identified by the system. A Braille or audio representation of this information is shared the quotation to the blind person (Morrison et al., 2021).

Conclusion

The expansion of the IT market is greatly aided by techniques like AI and machine learning. To enable persons who are blind to live a normal, independent life alongside everyone else, we have utilized these technologies. The handy chatbot aids the sight challenged in distinguishing surroundings and items. Recognizing currencies simplifies simple payment. Reading and interpreting texts are made easier by text recognition. If the proposed system's phase is completed, it will be able to provide persons who are legally blind with a better helper.

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