

# Helping People with Visual Disability Using AI

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## Summary

Artificial Intelligence (AI) technology has evolved rapidly in recent years and is used in everything from banking to email management to surgery, but without the help of the visible, most of the fun features of the Internet include visual impairment. It benefits people with disabilities. The main purpose of this study is to find ways to help people with visual impairments using AI technology. A visually impaired request is made for the visually impaired. For example, when a message arrives that the program will notify you by voice (reads the sender's name, read the message, and replies to it if necessary), this is a special program installed on your mobile phone. This program uses a customized algorithm developed in Python to convert written text to voice, read text, and convert voice to written text on a message when a visually impaired person wants to respond. Then it sends the response in the form of a text message. Therefore, the research should lead to programs for people with visual impairments. This program makes mobile phones easier and more comfortable to use and makes the daily life easier for visual impairments.

## Keywords:

*Visual impairments; Disabilities; Artificial Intelligence, Voice recognition.*

## 1. Introduction

Technology has changed the way we work, live and communicate. Only with a complete understanding of artificial intelligence can people with visual impairments take advantage of the potential offered by artificial intelligence to access many websites and use their mobile phones. Without the help of, most of the internet features are what we enjoy. Not available to the visually impaired [1]. AI can read documents and understand structural elements such as headings, paragraphs, and lists, allowing users to quickly navigate documents using voiceovers. It can also recognize photos from other applications. As AI matures, it becomes increasingly important to understand what the visually impaired want as part of the technical toolbox. There is increasing literature on what people today perceive as a challenge [2].

Certainly, the maximum distinguished improvements of the twenty-first century will consist of self-riding motors and automatic vehicles, to permit the blind to transport round and use technical gadgets on their own. These improvements are supported via way of means of the superior degree of AI and system gaining knowledge of era that has the capacity to feel, process, react and adapt to outside factors, much like humans. When it involves safety,

AI cannot best count on and count on responses however additionally save you and mitigate the results of collisions and roadblocks. It is predicted that the coincidence charge will lower significantly, growth human productiveness and enhance the same old of residing in society in fashionable and for the visually impaired and their households in particular. [3].

AI simulates human conduct without the capacity to grasp it, and that is frequently performed via trial and error. As a computer machine, it learns the right manner to carry out a task, it constructs on that newly found expertise to obtain human-like behaviors and responses to a given task. It is carried out to correctly understand the surroundings and make a correct selection based on human actions.

### 1.1 Problem Statement

Visual impairments considered big snags that affect the lives of many people globally. The patients of visual impairments are in big need for help and assistant. With the enhancement of Today's technologies in general, and AI in specific, those patients deserve extra efforts and attention to develop new techniques that could facilitate their lives. Visually impaired people have difficulty finding paths in familiar environments, walking down the streets, using mobile phones, reacting to them, and even communicating with others. This study seeks the development of a customized program that converts written text to voice, read text, and convert voice to written text on a message when a visually impaired person wants to respond

## 2. Literature Reviews

It is generally accepted that AI represents a large area of computer science involved in building intelligent machines that can perform functions in which they normally require human intelligence. It is considered an interdisciplinary science with multiple methods. However, the evolution of machine learning and deep learning is causing a paradigm shift in almost every area of the technology industry, helping doctors and patients at the same time, and its clearly easier [4]. Most people are not very familiar with the convention of AI and its ability to transform and make our daily lives easier. People with disabilities often turn themselves negatively and freely. People with disabilities are often treated unequally and face stereotyped negative behavior. In addition, they are often

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treated with fear, compassion, discomfort, and/or guilt [5]. Visual impairment is a condition of impaired vision that limits the ability of an individual's (eye) vision to be used effectively, properly and competently, adversely affecting growth and performance. This impairment includes central vision and Includes weaknesses and defects in visual function, which is the peripheral vision. This is the result of anatomical deformities, illnesses, or wounds in the eye [6]. Researchers have found that visually impaired people lead their daily lives. Many research works had been done, and experimentation with the aim of traveling with smartphones, eyeglasses and tablets that are used to assist the visually impaired in finding ways and means to help. Reading, writing, and even seeing. According to the World Health Organization (WHO), a disability is a dysfunction that leads to a loss of function, and the patient cannot perform it normally, or is dysfunctional or incapacitated or unable to work properly. It is a limitation due to it, which can be physical, mental, or both [7].

**2.1 Related Studies**

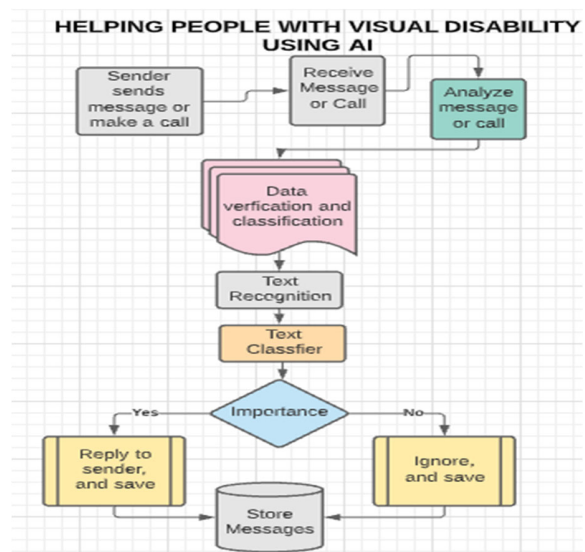
Some new technologies have been proposed for working with visually impaired people to envision new technologies that meet their needs and needs. Based on the researcher's experience, they provided various social aspects to consider when designing new AI technologies: social participation, social protection, social independence, and social navigation. They provided these social aspects as a starting point to bring social needs and desires of users so that they can more consciously consider the design of assistive technologies [8]. Another study by [9] aimed to measure the impact of empowering people in need of special needs through information and communication technology. Using an analytical descriptive approach and a Social Package Analysis (SPSS) program, this study showed the following results: Empowerment (motivation, training) in that dimension has a positive effect on the level of information and communication technology in that dimension (computer operation, global network resources for people with special needs (Internet). A related work by [10-12] aimed at exploring the relationship between AI, disability, and the ethical dilemmas it raises. To do so, narrative accounts, in the form of diaries as two disabled people, have been used to analyze how AI is being used as part of our daily lives, and the promises, support and frustrations that this brings. The methodology employed in this thought piece is a mixture of auto ethnography and reflection. The main lesson to be learned from the literature, and from our own experiences, is the importance of involving disabled people in the design of AI software and technology which is intended for use by those with disabilities.

It is no good waiting until the testing or evaluation stage to involve disabled people. This needs to happen as soon as design begins. What is needed is true co-design, where disabled people are part of the design team and the process of design.

**3. Methodology**

Educational techniques are used for disabled people relied primarily on the degree of disability. If the degree of visual impairment is low, visual aids can be used in a variety of ways, including magnification and techniques that provide the sound that accompanies the visual material. However, when the level of disability reaches the highest level to achieve severe visual impairment, the use of assistive voice technology is the best solution to achieve communication and electronic device use, among which. Most importantly, the ease of use and effectiveness of mobile phones, and the importance of their application, help reduce dependence on others, integrate these children into their society, and participate in social activities. It is demonstrated by communicating with it through the development of their life skills. Figure 1. Illustrate this method.

Figure 1. The proposed approach structures



**3.1 Features of the application**

The proposed application has some features:

1. *Sender message:*

The person delivers a message or a call to the visually impaired person.

2. *AI device:*

- When the message or call reaches the phone of the visually impaired person, the program installed on the device reads it using Weka 3.8.3 / 3.9.3 Development.
- Data verification and classification.

3. *Text recognition:*

- Text recognition is a technology that will be used in the app to assist the user by reading the data. Optical Character Recognition or Optical Character Recognition (OCR) is the electronic or mechanical conversion of images of written, handwritten or printed text into machine text, whether from a scanned document, a document image, a scene image, or from a translated text superimposed on an image.
- Widely used as a format for entering information from printed paper records such as passport documents, invoices, bank statements, computerized receipts, business cards, mail, hard data leaflets, or other suitable documents. It has been. This is a common way to digitize printed text, electronically edit, search, store, make it more compact, display on the internet, cognitive computing, machine translation from text to speech. Used in automated operations such as (extract) and base. Data and text exploration.
- OCR is a research area in the fields of pattern recognition, AI, and computer vision.
- Enable text recognition. Click on a text image to recognize the text using Optical Character Recognition (OCR) available on Android phones. Then use Android's text-to-speech engine to read the recognized text aloud. This will improve the functionality of the app and make it readable by the user.

4. **Discussions**

Data mining is a concept of data analysis using various algorithms such as data preprocessing, pattern recognition, clustering, classification, and correlation rule mining. WEKA contains a "set" to find groups of similar cases in your dataset. The implemented diagram is as follows: kMeans, EM, Cobweb, X mean the farthest first. You can visualize the cluster and compare it to the "real" cluster (if available). Scoring is based on the logical probabilities when the clustering scheme produces a

probability distribution. After running the J48 algorithm, you can write down the results in the classifier output section. The algorithm was run using 8-fold cross-validation. This means that we were given the opportunity to make predictions for each instance of the dataset (using different training convolutions), and the results presented are a summary of these predictions. These results are as follows:

- In terms of classification accuracy, it is shown that the model yielded a correct 63.63 % result, which looks a lot better than the 33% baseline.
- However, training set evaluation can be described as follow:

Correctly classified instances	7	63.63%
Incorrectly classified instances	4	36.37%
Kappa statistics	0.5556	
Mean absolute error	0.1039	
Root mean squared error	0.2279	
Relative absolute error	42.85%	
Root relative squared error	65.59%	
Total number of instances	11	

In addition, the detailed accuracy by class for the developed classifier is shown in table 1 below.

Table 1. Detailed accuracy by class

	TP Rate	FP Rate	Precision	Recall	F-Measure	MC	ROC Area	PRC Area	Class
	1.000	0.444	0.333	1.000	0.500	0.430	0.889	0.667	Facebook
	0.500	0.000	1.000	0.500	0.667	0.671	0.889	0.667	Contact
	0.000	0.000	?	0.000	?	?	0.800	0.200	Camera
	1.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	Message
	0.000	0.000	?	0.000	?	?	0.800	0.200	Inbox
	0.000	0.000	?	0.000	?	?	0.800	0.200	Mail
	1.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	phone
Weighted Avg	0.63	0.081	?	0.63	?	?	0.905	0.661	

5. **Conclusions**

This program uses a customized algorithm developed in Python to convert written text to voice, read text, and convert voice to written text on a message when a visually impaired person wants to respond. Sends the response in the form of a text message. that. Research should lead to programs for people with visual impairments. This program makes your mobile phone easier and more comfortable to use and makes your daily life easier. The developed model achieved 63.63 correctly classified instances, and 36.37

incorrectly classified instances. It also achieved an acceptable mean absolute error of 0.1039.

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