

Chapter 22

Advancements in Guidance Systems and Assistive Technologies for Visually Impaired Individuals

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ABSTRACT

Visually challenged people form a large population segment, with estimates starting from tens of millions to hundreds of millions worldwide. Integration into society is a major and current goal for them. A substantial attempt has been taken into ensuring a healthcare system. To aid visually impaired people to live a usual life, several guidance system strategies are created. These systems are oftentimes created for a single purpose. The internet has become a necessary means for people to acquire knowledge and information. Today, unfortunately, the advantages of this mighty tool are still away from visually impaired people, and they find difficulty in accessing the web. Over the years, people built different technologies and tools that can help the visually impaired in reaching out to the outside world.

INTRODUCTION

This proposed work describes a self-innovative system that aims to assist visually impaired people in accessing web pages and advanced technology with the help of voice assistance (Kaur & Gupta, 2019; Manjula et al., 2021). The system utilizes three technologies: Speech-to-Text (STT), Text-to-Speech (TTS), and screen tapping to reload the main page. The proposed architecture emphasizes reliability and user-friendliness, with features such as weather forecasts, location, date, time, emergency SMS, and e-mail notifications. The system is built using several Python libraries, including Beautiful Soup, GTTS,

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Speech Recognition (Abujarad & Al-Sayed, 2017), Open Weather API, and Twilio. The system also incorporates Geo IP Lite and express.js for better assistance. The proposed system can be a significant aid for blind people who struggle with the current technology.

Lately, communication have become uncomplicated due to the internet and advanced technologies. Though there are many improved technologies, sightless people notice it very difficult to utilize this technology because these facilities have need of visual perception (Arakeri et al., 2018; Brindha et al., 2020; Harshasri et al., 2021; Tiwari et al., 2020). Anyhow, various new inventions are Implemented to assist them use the communication competently, so no user who is visually impaired can use this technology as competently as any native user can do. Unlike normal users, this technology requires a few special tools to use the existing technologies. This project has enabled the blind people to interact in an audio feedback based virtual environments like screen readers which assist them to access web applications vastly and also to send and receive voice-based email messages in English language with the help of a computer (Craven, 2006; Ferati et al., 2016; Khedekar & Gupta, 2019).

In the projected system, GUI is setup against the GUI of a conventional mail server. The architectural vies is illustrated in Figure 1. It is also established that the developed system performs more efficiently than existing GUI's. Here, we tend to use voice-to-text and text- to-voice technique that helps to access by visually impaired people.

BACKGROUND

The developed system is a self-innovative idea that aims to assist visually impaired people in accessing web pages and advanced technology with the help of voice assistance. The system is different from the email and web pages currently in use and emphasizes reliability and user-friendliness as key features of the proposed architecture. The authors have identified that visually impaired people have trouble using the current systems, and the proposed system can be beneficial for them.

The system utilizes three different technologies: Speech-to-Text (STT), screen tapping to reload the main page, and Text-to-Speech (TTS). The authors have included features such as weather forecasts, location, date, time, emergency SMS, and e-mail notifications to enhance the system's usefulness for visually impaired users.

The authors have used several Python libraries to build the system, including Beautiful Soup, gtts, speech recognition, Open Weather API, Twilio, and Geo IP Lite. Beautiful Soup is a Python library used for pulling data out of HTML and XML files and works with parser algorithms to provide various ways of navigating, searching, and modifying the parse tree. Other libraries like ffmpeg are also used to extract the voice and convert it into a text format. The system also uses express.js for better assistance.

The authors have used audio.py as a tool for voice recognition, and the developed system can notify visually impaired users about weather broadcasts using the open weather API. Twilio is used to initiate an emergency SMS, and Geo IP Lite is used to discover the location of an IP address in the real world.

PROPOSED SYSTEM

The self-innovative idea is the sole source of the developed system, which is very different from the email and web pages currently in use. Reliability and user-friendliness are key features of the proposed

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