



SIGHTRIX

Pioneering Accessibility

Summary

Sightrix is a virtual assistant designed to assist individuals with visual impairments in controlling their computer systems using voice commands. Its goal is to enhance their productivity, independence, and access to technology.

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Sightrix – Pioneering Accessibility

Overview

Sightrix is a social impact AI project aimed at providing visually impaired individuals with an intuitive virtual assistant capable of controlling their computer systems through voice commands. The project aims to enhance the independence and accessibility of technology for visually impaired individuals, allowing them to seamlessly control their computer systems and perform daily tasks with ease.

Problem Statement

Individuals with visual impairments encounter numerous challenges when using computer systems, impacting their productivity and independence. While screen readers provide some assistance, they still require keyboard and mouse inputs, which can be a barrier for individuals with visual impairments.

A potential solution is a virtual assistant that can control computer systems through voice commands, providing a more accessible and user-friendly experience for the visually impaired. Sending emails, playing music, checking battery percentage, internet speed, opening applications, websites, and much more are just some of the tasks that a virtual assistant for the visually impaired would need to perform.

However, the current virtual assistant technologies may not provide the necessary features and functions required by individuals with visual impairments, hindering their productivity, independence, and access to technology. With the development of a virtual assistant tailored to the specific needs of the visually impaired, these individuals could enjoy greater productivity and independence when using computers.

Solution Statement

The solution to the challenges faced by visually impaired individuals when using computer systems is the development of an innovative virtual assistant such as “Sightrix”.

Sightrix utilizes advanced voice command technology, enabling users to control their computer systems by speaking commands for various tasks, such as sending emails, playing music, and opening applications. Designed specifically to cater to the needs of individuals with visual impairments, Sightrix aims to enhance their productivity and independence, while also providing them with greater access to technology.

By removing the barriers to using computers faced by the visually impaired, Sightrix could significantly improve their ability to work, learn, and communicate through digital means. With the successful development and implementation of Sightrix, visually impaired individuals could enjoy a more accessible and user-friendly computer experience, empowering them to realize their full potential in the digital age.

SDGs Impacted

This project could come under several SDGs (Sustainable Development Goals), including:

- ✓ SDG 3: Good Health and Well-being - Sightrix could improve the well-being and quality of life for visually impaired individuals by providing them with greater access to technology and enhancing their productivity and independence.
- ✓ SDG 4: Quality Education - Sightrix could provide visually impaired individuals with greater access to education by enabling them to use computers more easily and efficiently.
- ✓ SDG 8: Decent Work and Economic Growth - Sightrix could enhance the ability of visually impaired individuals to work and be productive, contributing to economic growth and promoting greater inclusivity in the workforce.
- ✓ SDG 9: Industry, Innovation, and Infrastructure - Sightrix represents an innovative solution that could improve the infrastructure of digital technology and promote greater inclusivity and accessibility for all individuals.

AI-powered Sightrix

- ❖ Computer Vision (CV) - Sightrix incorporates Computer Vision (CV) technology for face unlock functionality, as this could provide a secure and convenient way for visually impaired users to access their devices. CV involves using algorithms and models to enable computers to interpret and analyze visual data, such as images or video streams. By using CV for face unlock, Sightrix could potentially allow visually impaired users to unlock their devices simply by looking at the screen, without the need for passwords or other security measures that may be difficult for them to use.
- ❖ Natural Language Processing (NLP) – Sightrix performs the tasks based on some particular conditions. However, it can use NLP concepts to enable voice-based control for visually impaired users. With NLP, the virtual assistant can process and interpret spoken commands from users, allowing them to control various aspects of their device or access information hands-free. NLP techniques such as speech recognition, natural language understanding, and sentiment analysis can help improve the accuracy and responsiveness of the virtual assistant over time, as it learns from user interactions and feedback. Additionally, NLP can be used to develop customized commands and shortcuts for specific tasks, further enhancing the productivity and independence of visually impaired users.

How does it work?

The Sightrix Virtual Assistant leverages multiple libraries and technologies to provide enhanced accessibility and user experience for visually impaired users.

One of the key features of the Sightrix Virtual Assistant is its face unlock functionality, which is enabled through the use of haarcascade classifier files and OpenCV. The software analyzes the user's facial features to determine their identity and grant access to the device.

The application also utilizes the PyQt5 library to develop a basic graphical user interface (GUI), which allows users to interact with the virtual assistant through a series of buttons and controls.

In addition to these technologies, the Sightrix Virtual Assistant relies on various other libraries to perform different tasks. For example, the "os" library is used to play music on the user's device, while other libraries may be employed for tasks such as sending emails, checking internet speed, or opening applications and websites.

Overall, the Sightrix Virtual Assistant combines a range of AI and software technologies to create a powerful and accessible tool for visually impaired users. By leveraging face unlock, and other features, the virtual assistant offers a user-friendly and efficient means of controlling and accessing computer systems through voice commands and other interactions.

Libraries Used

- OS: Open and Close Applications, Play Music, Check Contents of a Directory, Hide Files in a Directory, Shut Down, Sleep or Restart the System
- Socket: Fetch IP Address of Network
- Requests: Fetch IP Address of System, Fetch User Location, Check Weather Report
- Wikipedia: Fetch Content from Wikipedia Pages
- WebBrowser: Open Websites like YouTube, Facebook, StackOverflow etc. or Search something in Google
- PyWhatKit: Play Songs on YouTube
- SMTPLib: Send Emails to Friends and Employees as Meeting Invitation
- PyJoke: Tell a Joke
- PyAutoGUI: Control Volume, Switch Windows, Meeting Controls
- NewsAPI: Fetch Top Headlines for the User
- PyPDF2: Read PDFs as Audio Books
- Psutil: Check Battery Percentage
- SpeedTest: Check Internet Speed
- OpenAI APIs: To use ChatGPT and Edit Mode of GPT

Stakeholders of the Application

- ❖ Visually Impaired Users: The primary stakeholders of the project are visually impaired individuals who stand to benefit from the increased accessibility and user experience offered by the virtual assistant.

- ❖ **Developers:** The developers who are responsible for building and maintaining the software are also key stakeholders, as they will be directly impacted by the success or failure of the project.
- ❖ **Organizations and Institutions:** Non-profit organizations and other institutions that work with visually impaired individuals may also have a stake in the project, as it could potentially be used to support their work and provide additional resources for their clients.
- ❖ **Funders:** Individuals or organizations that provide funding for the project may also be considered stakeholders, as they will have a vested interest in the successful completion and impact of the project.
- ❖ **Regulators:** Regulatory bodies and organizations that oversee technology and accessibility may also have a stake in the project, as it could potentially impact regulations and standards in the field of assistive technology.

Ethical and Privacy Concerns

The use of facial recognition technology raises ethical and privacy concerns. One of the primary concerns is the potential for misuse of the technology, which could result in the violation of individual rights to privacy. There is also a risk of misidentification, particularly if the technology is used in law enforcement or security settings.

Additionally, the collection and storage of facial recognition data can also raise ethical concerns. There is a risk that this data could be used for surveillance or other purposes without the consent of individuals. It is important to address these concerns through responsible use and transparent policies regarding the collection, storage, and use of facial recognition data.

Future Scope

Sightrix has the potential to make a significant impact on the lives of visually impaired individuals. In the future, it can be further developed to incorporate more features and improve its accuracy and efficiency.

One potential area of development is the integration of natural language processing (NLP) to improve the virtual assistant's ability to understand and respond to voice commands. Additionally, the use of machine learning algorithms can be explored to enhance the accuracy of the facial recognition system.

Furthermore, Sightrix can be adapted to be used in other industries beyond just assisting the visually impaired. Its facial recognition capabilities can be utilized for security and access control systems, and its virtual assistant features can be integrated into various applications to make them more accessible to people with disabilities.