BeMyEye Application

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Abstract*: Our project aims to help a visually impaired or a blind person in their everyday life tasks such as Recognizing Currency Notes, reading text from live images, and sharing their live locations with their loved ones. Problems faced by visually impaired in performing daily activities are in great number. They are unable to recognize the paper currencies due to similarity of paper texture and size between different categories. Navigation and text reading (book reading, newspaper reading, etc.) are some of the other major problems faced by them. Therefore, a system could be designed that could take in live video input from the person and conveys the corresponding audio output for the visually impaired, which will really help them in their day-to-day chores.*

Keywords: Recognizing Currency Notes

I. INTRODUCTION

The challenges faced by blind people and visually impaired in their everyday lives are not well understood. They confront several visual challenges every day – from reading the denomination on a currency note to reading books for education or any other content in their day-to-day life. There is very limited braille printed books in public libraries and in schools/colleges, which poses a great issue as it puts a constraint on them being educated. Further, the lack of support for them, the limited accessibility to activities and information, the societal stigma and the lack of unemployment, are all factors frequently leading blind or low vision individuals in isolation. We aim to make this world a better place to live in for the blind and the visually impaired. Our project aims to help a visually impaired or a blind person in their everyday life tasks such as Recognizing Currency Notes, reading text from live images, and sharing their live locations with their loved ones.

II. LITERATURE SURVEY

Banknote Object Detection for the Visually Impaired using a CNN: Maria Thomas, Kevin Meehan, 01 July 2021. Computer Vision (CV) is an area within the field of Artificial Intelligence (AI) which analyses images and video and attempts to identify and interpret the data contained in these. It aims to match or better the results a human could achieve given the same dataset. CV technology has major applications within the area of assistive technology. It has the potential to make the lives of disabled people easier by making the objects and systems they interact with more accessible. The aim of this project is to create a Convolutional Neural Network (CNN) suitable for use in a mobile bank note recognition application which can alleviate the struggle visually impaired people experience when trying to identify different bank note values. Limited previous studies have attempted to tackle this problem using a CNN. Additionally, these past studies have often neglected to include partial currency images in their datasets. This study uses data augmentation techniques to simulate partial currency images resembling those a blind or visually impaired person would take. The model created for this study achieved an average accuracy rate of 94

Vibrotactile Guidance for Wayfinding of Blind Walkers: German Flores, Sri Kurniawan, Roberto Manduchi, Eric Martinson, Lourdes M. Morales, Em- rah Akin Sisbo, 13 March 2020. We propose a vibrotactile interface in the form of a belt for guiding blind walkers. This interface enables blind walkers to receive haptic directional instructions along complex paths without negatively impacting users' ability to listen and/or perceive the environment the way some auditory directional instructions do. The belt interface was evaluated in a controlled study with 10 blind individuals and compared to the audio guidance. The experiments were videotaped and the

participants' behaviors and comments were content analyzed. Completion times and deviations from ideal paths were also collected and statistically analyzed.

Assistive System for the Blind with Voice Output Based on Optical Char- acter Recognition: D. Dhinakaran, D. Selvaraj, S. M. Udhaya Sankar, S. Pavithra R. Boomika, 08 November 2022. Everyone deserves to live freely, even those who are impaired. In recent decades, technology has focused on empowering dis- abled people to have as much control over their lives as possible. The braille system, which allows the blind to read, is now the only effective system available. However, this approach is time demanding, and it takes a long time to recognize the text. Our goal is to cut down on time it takes to read. Our article created a ground-breaking interactive book reader for blind people based on optical character recognition. In artificial intelligence and recognition of patterns, among the most effective technology applications are optical character recognition. It is necessary to have a simple content reader accessible, inex- pensive, and easily obtainable in public. The framework is made up of a camera-based architecture that aids blind people in reading text on labels, printed notes, and objects. Text-to-speech (TTS), OCR, image processing methods, and a synthesis module are all part of our framework. Neuro-OCR deals with incorporating a complete text read-out de- vice suited for the visually handicapped. We used Google Tesseract as an OCR and Pico as a TTS in our work. After which, the voice output is sent to the Telegram application and noticed by the user.

III. EXISTING SYSTEM

The existing system for aiding visually impaired individuals often relies on separate tools or devices for specific tasks. For currency recognition, standalone devices or apps might exist, but they typically don't encompass a broader spectrum of functionalities. Sim- ilarly, Optical character recognition apps cater to text reading, while location-sharing apps serve navigation needs. Voice activation through assistants like Google Assistant exists but might not be seamlessly integrated into a unified app for visually impaired users. Overall, the current landscape involves a fragmented array of solutions, lacking the cohesion and comprehensiveness that the BeMyEye application aims to provide.

Problem Statement

Creating an application that integrates currency recognition, optical character recogni- tion (OCR), live location sharing, and voice-activated features is immensely beneficial for blind individuals. This multi-functional app aims to empower and enhance the daily lives of blind users by providing tools for currency identification, text reading, navigation assistance through location sharing, and easy access through voice commands, fostering independence and accessibility in various situations.

Proposed System

The proposed BeMyEye system integrates currency recognition, OCR, live location shar- ing, and voice-activated launch into a single, user-friendly application. The system em- ploys advanced algorithms for accurate currency identification, Optical character recog- nition(OCR) capabilities for reading various text formats, and GPS technology for real- time location sharing. Additionally, the app interfaces with Google Assistant for voice- activated commands, ensuring a holistic and cohesive experience. The proposed system aims to consolidate these diverse functionalities into one intuitive platform, catering specif- ically to the needs of visually impaired individuals, offering convenience, accessibility, and independence in their daily lives.

Objectives

- **Currency Recognition:** Created dataset for Currency Note Recognition for Indian Rupee (INR). Trained Currency note recognition model using Convolutional Neural Net- works. Real time predictions giving currency denominations as output.
- **Optical Character Recognition:** Reading document (dense, well formatted text with consistent background) Reading no document (sparse, fancy text in no particular order) Created individual pipelines for both the use cases and applied different models for both the use Cases.

- **Live location sharing:** A feature that allows the loved ones to consistently monitor the live location of the visually impaired person.
- **Voice-Activated App Launch via Google Assistant:** Integrate the app with Google Assistant for effortless, hands-free access. Enable users to open the app using natural voice commands, enhancing user convenience. Provide a contemporary and ef- ficient way for users to initiate the app, aligning with current trends in voice-activated technology.

Model of Proposed Work

The proposed model aims to create a comprehensive, user-centric solution that caters specifically to the needs of visually impaired individuals, fostering independence and ac- cessibility in various aspects of their daily lives.

- **User-Centric Interface Design:** Develop an intuitive, accessible interface optimized for screen readers and simple navigation, ensuring ease of use for visually impaired users.
- **Currency Recognition Module:** 2. Implement machine learning models or com- puter vision algorithms capable of accurately recognizing and audibly identifying various currencies in real-time using the phone's camera.
- **Optical Character Recognition (OCR):** Integrate an OCR engine to process and audibly read text from images or documents captured by the device's camera, supporting various languages and formats.
- **Live Location Sharing:** Utilize GPS and mapping functionalities to enable live lo- cation sharing, allowing users to share their location or navigate to specific destinations, aiding in independent travel.
- **Voice Activation Integration:** 5. Interface with Google Assistant or similar voice- activated systems to enable seamless app launch and control through voice commands, ensuring accessibility for users with limited mobility.
- **Testing and User Feedback:** 6. Conduct rigorous testing with visually impaired individuals to refine the app's usability, accuracy, and overall user experience, incorpo- rating feedback for continuous improvement.
- **Security and User Privacy:** Implement robust security protocols to safeguard user data and ensure privacy, adhering to best practices and compliance standards.
- **Documentation and Support:** Develop comprehensive documentation and support resources to assist users in effectively utilizing all features of the BeMyEye application, providing ongoing assistance and updates.

IV. REQUIREMENTS

System Hardware:

- **Processor:** Intel Core i5 or equivalent
- **RAM:** 8GB or higher
- **Storage:** 10GB SSD
- **Network:** Gigabit Ethernet

Software Requirements:

- **Graph QL:** Query language for APIs, commonly used in web development.
- **React Native:** Framework for building mobile applications using React.
- **Python:** Versatile programming language used in various applications, including web development.
- **Flask:** Python framework for web application development.

V. CONCLUSION

Empowering Independence: A Solution for the Visually Impaired, a cutting-edge mobile application, embodies a commitment to leveraging deep learning techniques to empower individuals with visual impairments. At its core, the app integrates a highly sophisticated trained model for currency note recognition, enhancing the ability of blind and visually impaired users to independently manage financial transactions. This feature not only simplifies everyday

activities but also fosters a sense of autonomy by providing real-time, accurate identification of currency denominations through the seamless implementation of deep learning technologies.

Beyond currency recognition, Empowering Independence: A Solution for the Visually Impaired employs a specialized optical character recognition (OCR) pipeline designed to handle a diverse range of scenarios, including both documents and non-documents. This OCR functionality ensures that users can confidently navigate through printed materials and interpret text in various formats. The inclusion of user-friendly elements such as live location sharing and a voice output system further underscores the solution's commitment to accessibility. By prioritizing ease of use and comprehensive functionality, Empowering Independence: A Solution for the Visually Impaired stands as a beacon of innovation, offering a holistic solution to enhance the independence and daily lives of individuals with visual impairments.