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NAYAN BLIND PEOPLE CURRENCY IDENTIFICATION SYSTEM

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***Abstract*—** The "Nayan" Android application is designed to assist blind individuals in identifying Indian currency notes, performing currency summation, and providing text-to-speech conversion. The application utilizes an algorithm for currency identification. Upon launching the application, users are provided with procedure on how to work on it using swipe gestures. Swiping to the right allows for currency summation, swiping to the left triggers text-to-speech conversion, and swiping up initiates the currency identification process. The CNN algorithm plays a vital role in recognizing and distinguishing between different Indian currency notes. Overall, the Nayan application aims to empower visually impaired individuals by providing them with the ability to independently handle currency transactions and access relevant information.

KEYWORDS*—personalize learning mobile application: voice assistant, chat bot;*

I. INTRODUCTION

The Nayan Android application is a groundbreaking innovation that aims to improve the accessibility and independence of blind individuals in India. Managing currency and accessing information from printed materials are significant challenges faced by visually impaired individuals. This application specifically addresses these challenges by providing functionalities such as currency note identification, currency summation, and text-to-speech conversion.

The primary objective of the Nayan application is to empower blind individuals to identify Indian currency notes accurately. The application utilizes a CNN algorithm, which has deep learning technique proven to be highly effective in image recognition tasks. By leveraging the power of machine learning, the application can analyze the images of currency notes captured by the smartphone's camera and provide real-time feedback to the user.

Furthermore, the Nayan application enables blind users to perform currency summation effortlessly. By swiping to the right, users can access a feature that recognizes and adds up the values of multiple currency notes. This functionality eliminates the need for assistance when counting money, enabling visually impaired individuals to implement financial transactions easily with confidence and independence.

In addition to currency identification and summation, the Nayan application incorporates a text-to-speech conversion feature. This feature allows users to capture printed text using the smartphone's camera and convert it into audible speech. By swiping to the left, the application processes the image, extracts the text content, and converts it into spoken words. This capability opens up a world of possibilities for blind individuals to access printed materials, such as books, labels, and documents.

Overall, the Nayan application addresses the specific needs of blind individuals in India, providing them with an intuitive and efficient tool for currency identification, summation, and text-to-speech conversion. By leveraging advanced technologies, this application enhances independence, accessibility, and inclusivity for the visually impaired, facilitating their participation in daily activities and empowering them to lead more fulfilling lives.

II. LITERATURE REVIEW

The literature survey conducted on adaptive technologies for visually impaired individuals encompasses a range of topics and research papers. Here is an overview of the key findings and themes explored in the survey:

Assistive Technologies: The survey highlights the significance of assistive technologies in improving the lives of blind and visually impaired individuals. These technologies aim to enhance independence, accessibility, and inclusion in various aspects of their daily lives.

Currency Recognition and Identification: Several papers focus on the aiding of mobile applications and systems for currency recognition and identification. The benefits of image processing techniques, pattern recognition algorithms, and machine learning approaches enables visually impaired individuals to identify and differentiate currency notes independently.

Navigation Systems: The survey discusses smartphone-based navigation systems for visually impaired people. These systems utilize GPS, motion sensors, and audio feedback to provide real-time guidance and obstacle detection, thereby facilitating safe and independent navigation in outdoor environments.

Accessing Printed Materials: The review papers examine various technologies for accessing printed materials. This includes OCR to modify printed text to digital format, text-to-speech conversion techniques to provide audible information, and Braille display

systems for tactile feedback, enabling visually impaired individuals to access and comprehend printed content.

Text-to-Speech Conversion: Text-to-speech conversion techniques play a vital role in providing accessible information to visually impaired individuals. The review papers explore different algorithms and approaches used for converting written text into audible speech, emphasizing the need for naturalness and accuracy in the conversion process.

Challenges and Future Directions: The literature survey highlights some challenges and areas for future improvement in assistive technologies. These include the need for enhanced accuracy, real-world applicability, affordability, and user-friendly interfaces. Additionally, continuous research and development, as well as user feedback, are essential for further advancements in the field.

Proposed System:

The Nayan Android application, aims to address the limitations of the existing system by providing a comprehensive solution for blind individuals. The application utilizes advanced technologies, including image recognition algorithms and text-to-speech conversion, to empower visually impaired individuals and enhance their independence.

The primary objectives are to enhance the independence and accessibility of blind individuals in handling currency transactions, provide a convenient method for currency summation, and enable access to written text through text-to-speech conversion.

The project aims to help visually impaired individuals in identifying currency notes and accessing printed information. By leveraging the capabilities of mobile devices and advanced algorithms, "Nayan" strives to empower blind users and improve their overall quality of life.

The Nayan application incorporates a CNN algorithm for accurate currency note identification. By leveraging the smartphone's camera, users can capture images of currency notes, and the application will analyze and classify them in real-time. This functionality allows blind individuals to independently determine the denomination of Indian currency notes without external assistance.

Additionally, the Nayan application offers currency summation capabilities. By swiping to the right, users can input multiple currency notes, and the application will accurately calculate the total value. This feature eliminates the need for manual counting and enables blind individuals to handle financial transactions confidently.

Moreover, the Nayan application includes a text-to-speech conversion feature. By swiping to the left, users can capture images of printed text, and the application will convert it into audible speech. This functionality allows blind individuals to access printed materials such as books, labels, or documents independently, enhancing their ability to acquire information.

III. PARTS

The project, "Nayan," is an Android app designed particularly for blind people to assist them in identifying Indian currency notes, summing notes, and performing text-to-speech conversion. The application utilizes a CNN algorithm for currency note identification, providing real-time feedback to the user through audio prompts or accessible display.

The primary objectives are to enhance the independence and accessibility of blind individuals in handling currency transactions, provide a convenient method for currency summation, and enable access to written text through text-to-speech conversion.

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System design is the method to of define the architecture, components, and interactions of a software system. With reference to context of your project, "Nayan" - the Android application for blind people, the system design can be described as follows:

Architecture: The system follows a client-server architecture, where the Android device acts as the client and communicates with the server for currency identification and text-to-speech conversion.

Components: The major components of the system include:

- User Interface: This component handles the user interaction through gestures or voice commands. It provides the necessary controls and feedback to perform currency identification, summation, and text-to-speech conversion.
- Camera Integration: This component take image of currency notes using the device's camera. Those image will be processed for currency identification using the CNN algorithm.
- Currency Identification Module: This module employs the CNN algorithm to analyze the captured images and identify the denomination of the currency notes.
- Currency Summation Module: This module handles the logic for summing the identified currency notes. It keeps track of the denominations and calculates the total sum.
- Text-to-Speech Conversion Module: This module converts written text, including currency denominations and other relevant information, into audible speech using the device's built-in Text-to-Speech (TTS) functionality or external TTS libraries.
- Server: The server component is responsible for hosting the currency identification algorithm and providing the necessary APIs for the Android client to communicate and process the captured images.

Interactions: The Android client interacts with various components of the system:

User Interaction: The user interacts with the application through gestures or voice commands, triggering actions like capturing images, initiating currency identification, and requesting text-to-speech conversion.

Camera Integration: The application captures images of currency notes using the device's camera and then proceeds with the currency identification module for processing.

Currency Identification: The captured images are sent to the server component for currency identification using the CNN algorithm. The server processes the images and returns the identified denomination to the client.

Currency Summation: The client keeps track of the identified denominations and calculates the total sum based on user inputs or predefined gestures.

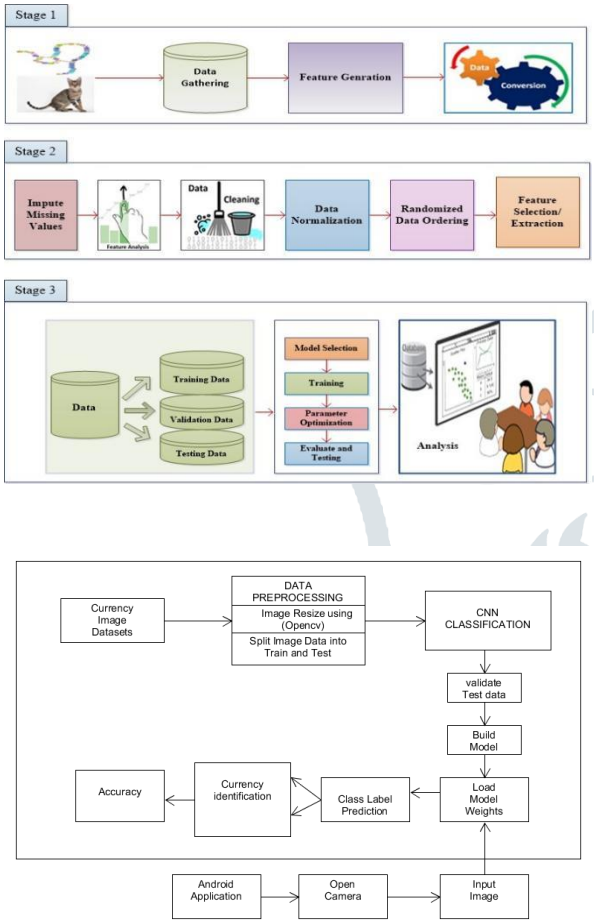
Text-to-Speech Conversion: The client sends written text to the text-to-speech module, which converts it into audible speech using the device's TTS functionality or external TTS libraries.

Data Flow: The data flow in our system can be described as follows:

Images which were taken by the camera are transmitted from the client to server for currency identification.

The server processes the images using the CNN algorithm and returns the identified denomination to the client.

The client stores the identified denominations and performs currency summation when requested by the user.
Written text is passed to the text-to-speech module, which converts it into audible speech and provides the output to the user. The system design described above provides an overview of the architecture, components, and interactions of the "Nayan" Android application. It outlines how the different modules collaborate to achieve currency identification, summation, and text-to-speech conversion, ultimately enhancing accessibility and usability to visually impaired users.



Data Collection: For the prediction task, we will collect datasets from Kaggle.com, which offers a wide range of datasets for various purposes. The selected datasets will contain multiple classes to ensure a diverse and comprehensive dataset.
Data Preprocessing: In the data preprocessing phase, we will apply image pre-processing techniques to the collected data. This involves methods such as image resizing to a standard size, dividing the data into training and testing sets. These steps help prepare the data for model training and evaluation.
Data Modeling: The training data, obtained from the split, will be used as input for the Convolutional Neural Network (CNN) algorithm. The CNN algorithm will be used to train the model using the currency image data. Following the training phase, the correctness of the model will be evaluated by providing the test data to algorithm. The accuracy rate will be calculated to assess the accuracy of the model.
Model Building: If our trained model demonstrates a high accuracy rate, indicating successful training, we will proceed with building the model file. The model file serves as a representation of trained model and helps in utilization of different purposes like predictions and deployment in applications.

IV FUTURE SCOPE AND IMPROVEMENTS

- • **Expanded Currency Support:** Currently, the application is designed for identifying Indian currency notes. However, it can be extended to support other currencies as well. By training the CNN algorithm on datasets specific to other currencies, the application can cater to a broader range of users.
- **Real-Time Currency Updates:** Implement a mechanism to update the application with new currency designs or denominations as they are introduced. This ensures that the application remains up-to-date with the latest currency variations, providing accurate identification for users.
- **Enhanced User Interface Customization:** Allow users to customize the user interface based on their preferences and specific needs. Provide options for adjusting font sizes, color contrast, gesture recognition sensitivity, and voice settings to enhance the user experience and accommodate individual requirements.

V. CONCLUSION

The conclusion of the "Nayan" Android application project would summarize the overall achievements, contributions, and potential impact of the project.The primary objective of the Nayan application is to empower blind individuals to identify Indian currency notes accurately. Here's an example of how the conclusion for your project could be structured:
The "Nayan" Android app was designed with the aim of assisting visually impaired individuals in identifying Indian currency notes, performing currency summation, and enabling text-to-speech conversion. Through the implementation and evaluation of the application, several key conclusions can be drawn:
Accurate Currency Identification: The integration of a Convolutional Neural Network (CNN) algorithm proved to be effective in accurately identifying the denominations of Indian currency notes. The achieved accuracy demonstrated the potential of computer vision techniques for aiding visually impaired users in day-to-day activities.Enhanced Accessibility and Independence: By providing real-time denomination identification, currency summation, and text-to-speech conversion, the "Nayan" application offers visually impaired individuals increased accessibility and independence in handling and managing currency.Overall, the Nayan application addresses the specific needs of blind individuals in India, providing them with an intuitive and efficient tool for currency identification, summation, and text-to-speech conversion. By leveraging advanced technologies, this application enhances independence, accessibility, and inclusivity for the visually impaired, facilitating their participation in daily activities and empowering them to lead more fulfilling lives.
The application empowers users to confidently identify and differentiate currency notes, perform quick calculations, and access important information through audible speech output.
Overall, the "Nayan" Android application represents a significant step towards enhancing accessibility and independence to the visually impaired in managing Indian currency. By leveraging computer vision, currency identification, and text-to-speech technologies, the application provides a useful way for individuals with visual impairments to interact with currency, perform calculations, and access essential information. The project has the potential to make a meaningful impact on the lives of visually impaired individuals, promoting inclusivity and improving their quality of life.

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