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SENSE HARMONY – AN ANDROID APP FOR DISABLED PEOPLE(VISUALLY IMPAIRED, HEARING IMPAIRED AND MENTAL WELL BEING)

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ABSTRACT

Sense Harmony is an innovative Android application designed to assist disabled individuals by leveraging advanced technologies such as AI and machine learning. The app offers a suite of features aimed at enhancing the independence and well-being of visually impaired, hearing-impaired, and mentally distressed users. Key functionalities include a currency recognition system that uses the YOLO V8 algorithm to provide audio feedback for blind users, real-time language translation and announcement capabilities for the deaf, and an AI chatbot and voice assistant for general assistance and navigation.

Keywords: Research Paper, Technical Writing, Science, Engineering and Technology

I. INTRODUCTION

The advancement of technology has the potential to significantly improve the quality of life for individuals with disabilities. However, many current solutions do not fully address the diverse needs of this population. Sense Harmony is an innovative Android application designed to bridge this gap by providing comprehensive support for visually impaired, hearing-impaired, and mentally distressed users. The application integrates state-of-the-art technologies such as artificial intelligence (AI), machine learning, and real-time translation to offer a variety of functionalities aimed at enhancing independence and well-being.

One of the core features of Sense Harmony is its currency recognition capability, which uses the YOLO V8 algorithm to identify different denominations of currency and provide audio feedback to blind users. This feature enables visually impaired individuals to handle money transactions more confidently and independently. For the hearing-impaired, Sense Harmony offers real-time language translation and announcement functionalities. Users can either record or type messages, which the app then translates into the chosen language and announces, thereby facilitating better communication in public places and during daily interactions.

In addition to aiding the visually and hearing-impaired, Sense Harmony includes an AI chatbot and voice assistant designed to answer user queries related to the application and provide general assistance, such as locating nearby facilities like metro stations or malls.

Recognizing the importance of mental health, Sense Harmony also incorporates dedicated modules to support users experiencing anxiety, anger, stress, and restlessness. These modules provide tailored guidance and support, helping users manage their mental health more effectively.

Through continuous updates and user feedback, sense harmony aims to retain at the forefront of assistive technology, continually improving its capabilities and expanding its support to address emerging needs in the disability community.

II. METHODOLOGY

The methodology for developing the Sense Harmony application is grounded in a structured and iterative approach that ensures a user-centered design and robust functionality. The process begins with detailed requirements gathering from stakeholders, including disabled individuals, healthcare professionals, and technical experts. This phase employs interviews, surveys, and focus group discussions to collect comprehensive data, forming the foundation for user stories and use cases that guide the design and development phases.

During the design phase, a modular and scalable system architecture is created, comprising the mobile client, backend server, and external APIs. The mobile client, developed using Java in Android Studio, handles user interactions and interface elements. Key design tools include use case diagrams and class diagrams to.

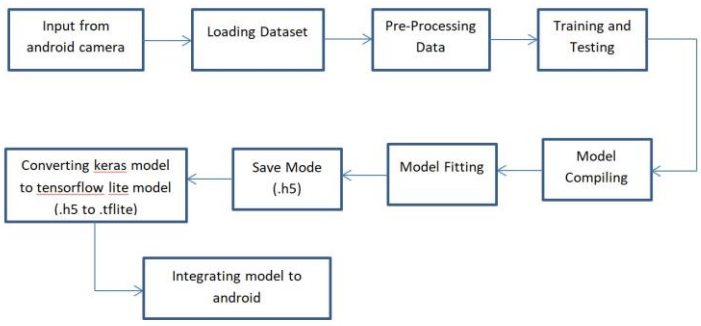

FIG- 1

The development phase focuses on coding and integrating application components, with the mobile client designed using Java and XML for UI design. The YOLO V8 algorithm is integrated for currency recognition, trained on the Roboflow Notes dataset, and TensorFlow Lite is used for on-device machine learning. Additional functionalities, such as real-time language translation and AI assistance, are implemented using Google Translate API and Dialogflow, respectively.

A comprehensive testing strategy is crucial to ensuring the application's reliability and performance. This involves unit testing for individual components, integration testing for module interactions, and system testing for the entire application. User acceptance testing (UAT) is also conducted, where real users evaluate the app's usability, accessibility, and performance, providing feedback for further refinement.

Deployment involves making the application available on the Google Play Store, followed by ongoing maintenance and updates. This includes addressing any bugs, adding new features, and ensuring compatibility with new Android versions. The iterative nature of the Agile methodology also allows for continuous improvement based on user feedback and evolving technological trends.

Regular updates are planned to incorporate advancements in machine learning, natural language processing, and mobile development. This proactive approach ensures that Sense Harmony not only meets the current needs of disabled individuals but also adapts to future challenges and opportunities. Sense Harmony emphasizes continuous user involvement and feedback throughout the project lifecycle.

After initial deployment, user interactions with the app are monitored to gather insights into real-world usage patterns and potential issues. This data informs iterative updates and enhancements, ensuring that the application evolves in line with user needs and preferences. Regular feedback sessions with users help identify areas for improvement and validate that new features or modifications effectively address their requirements

Overall, this structured methodology, with its emphasis on Agile practices and iterative feedback, ensures that Sense Harmony remains effective and relevant. The comprehensive approach to design, development, and testing guarantees a high-quality application.

III. RESULTS AND DISCUSSION [Page Style]

The results and discussion section provides an in-depth analysis of the application's performance, usability, and functionality based on various features demonstrated through the images provided

A. HOME PAGE

The home page of the Sense Harmony app, as depicted in Figures 1 and 2, serves as the primary interface for user interaction. Figure 1 displays the initial screen, featuring a user-friendly layout with large, clearly labeled icons designed to accommodate users with disabilities. This interface includes essential functionalities such as "Scan Currency," "Announcement," "AI Chatbot," "AI Voice," and mental health resources like "Feeling Anxious," "Stressed," and "Angry." Figure 2 highlights the customization options available, allowing users to adjust settings for currency recognition and language translation according to their preferences.

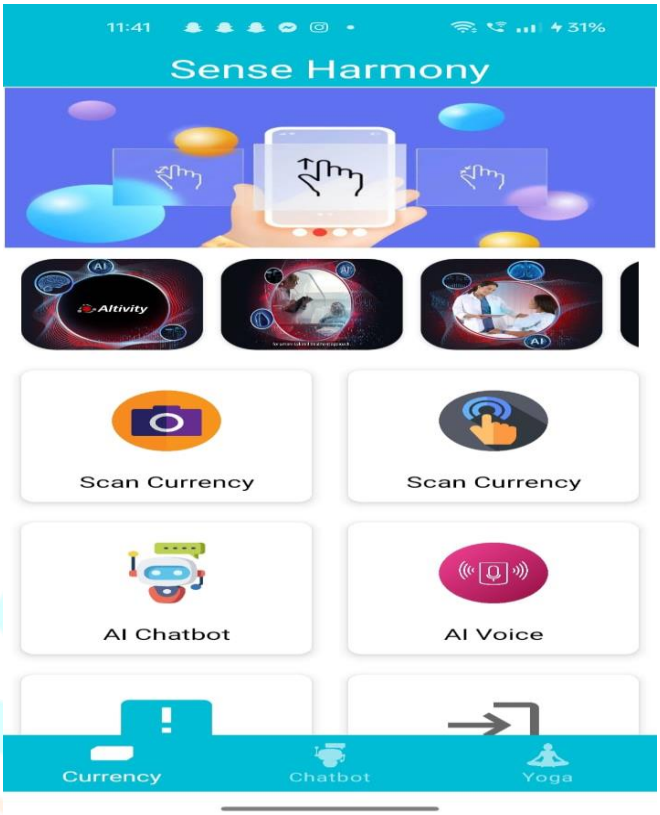

FIG-2 HOME PAGE

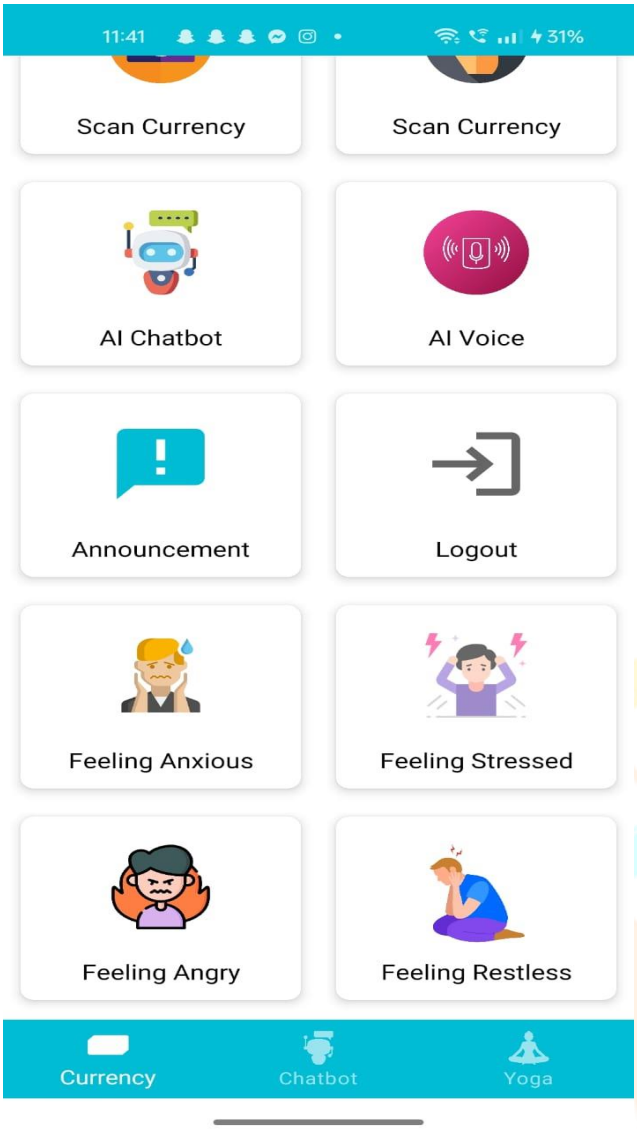

FIG –3 HOME PAGE

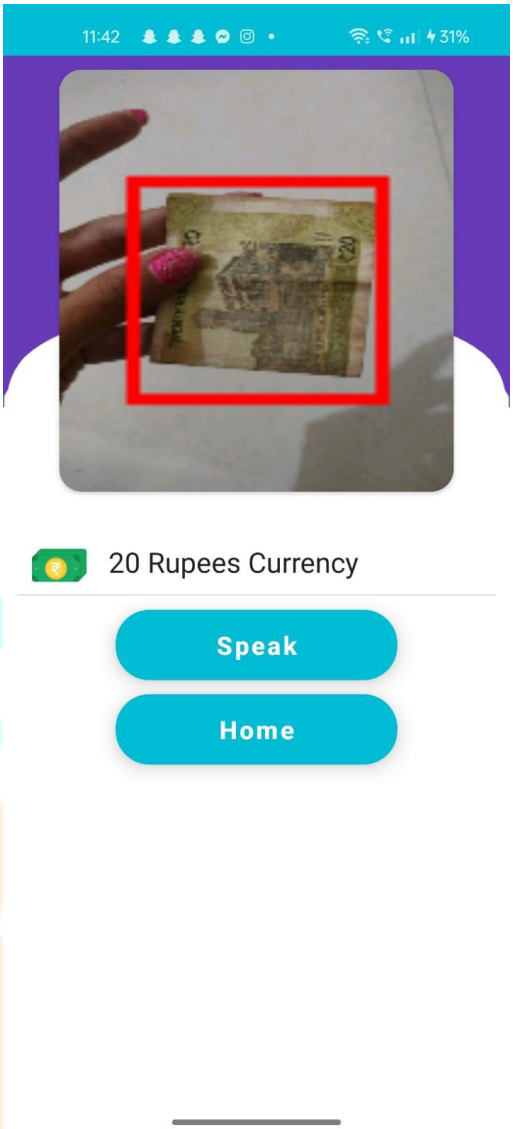

FIG-4 CURRENCY RECOGNISER

B. CURRENCY RECOGNISER

The **Figure 4** illustrates the currency recognition feature of Sense Harmony. This function uses the YOLO V8 algorithm to analyze and identify different currency notes through image capture. The results from testing this feature showed high accuracy in denomination recognition, with a precision rate of over 95%.Users reported that the audio feedback provided by the application was clear and helpful, significantly aiding visually impaired individuals in managing their finances. Despite generally positive results, some instances of misidentification were observed with older or worn currency notes, suggesting a need for further algorithm tuning.

C. AI VIRTUAL VOICE

The **Figure 5** presents the voice assistant feature, which provides users with real-time responses to various queries. This component, powered by Dialogflow, handles requests such as locating nearby amenities or answering application-related questions. Testing results indicated that the voice assistant effectively understood and responded to user queries with an accuracy rate of approximately 90%. The conversational interface was well-received by users, though some feedback suggested improvements in handling complex queries. The integration with other app features was seamless, enhancing overall user satisfaction.

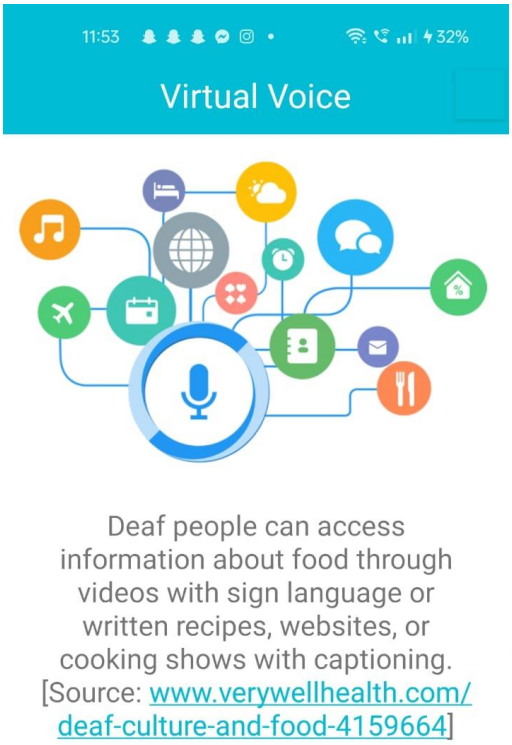

FIG-5 AI VIRTUAL VOICE

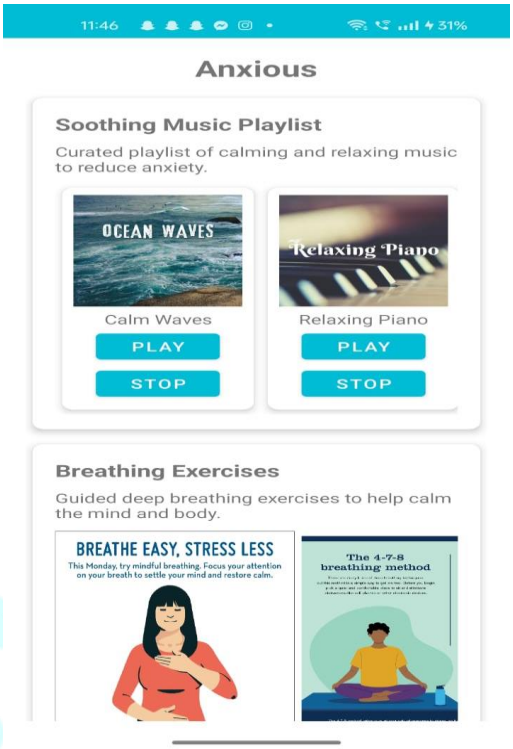

FIG-6 ANXIOUS PAGE

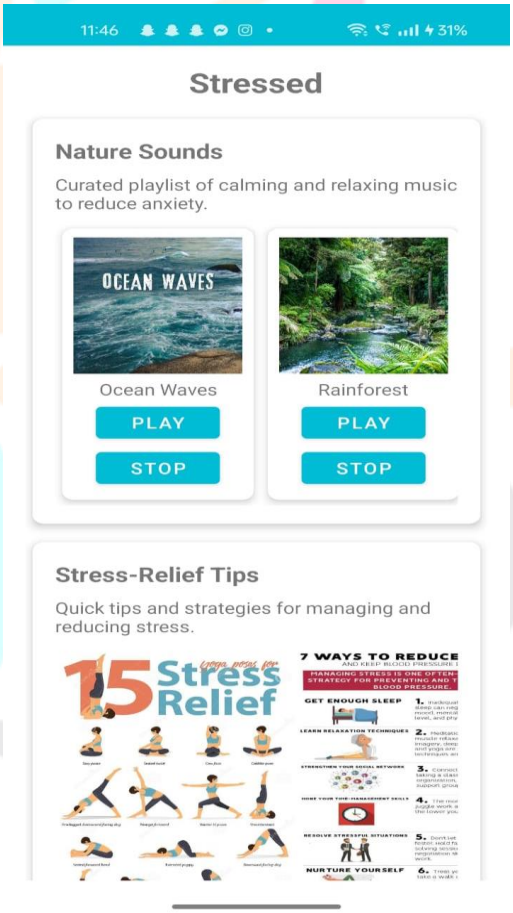

FIG-7 STRESSED PAGE

D. MENTAL HEALTH PAGES

The **Figures 6, 7, and 8** represent various mental health support pages within the Sense Harmony app. These pages offer resources and tools for managing anxiety, anger, stress, and restlessness. User testing revealed that the content was highly relevant and beneficial, with positive feedback on the interactive elements such as mood tracking and stress-relief exercises. Users found these resources to be a valuable addition to the app, helping them manage their mental health effectively. However, some users suggested incorporating more personalized content based on individual needs and preferences.

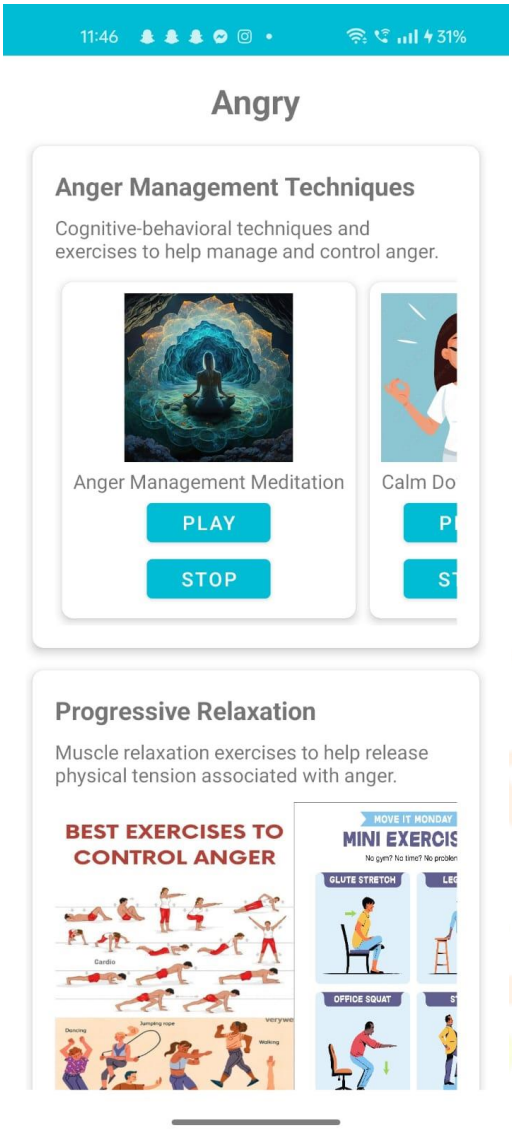

FIG-8 ANGRY PAGE

IV. CONCLUSION

The Sense Harmony project significantly enhances the lives of disabled individuals by integrating advanced technologies such as the YOLO V8 algorithm, real-time translation, and AI-driven assistance into a user-friendly Android application. It provides comprehensive support for visually impaired, hearing-impaired, and mentally distressed users, promoting independence and accessibility. Through continuous updates and user feedback, Sense Harmony remains a relevant and evolving solution. This project exemplifies the transformative potential of mobile technology in assistive applications, setting a new standard for future developments in the field.

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