

Forey: An Android Application for the Visually Impaired

Rutuja Vivek Jadhav¹, Retu Mishra², Chinmay Mhatre³, Deepti Lawand⁴

¹Student, Information Technology, Pillai College of Engineering, New Panvel

²Student, Information Technology, Pillai College of Engineering, New Panvel

³Student, Information Technology, Pillai College of Engineering, New Panvel

⁴Professor, Department of Computer Engineering, Pillai College of Engineering, New Panvel

Abstract - In their day to day lives, visually impaired people face many problems. They are completely dependent on other people for their work. They cannot use the internet and many of the facilities it offers. With the growth of wireless communication, the need for voice recognition technology has dramatically increased. Voice applications based on voice interfacing and voice discourse administration permit clients to center on their current work without additional exertion. The main goal is to provide visually impaired people with the ability to do their daily work. Visually impaired people depend on others. However, this application allows them to connect with each other using audio stories and take a step towards enjoying the unique benefits of the Internet. It is difficult for them to make financial transactions without outside help. Bank notes cannot be recognized by them because they are similar in texture and size. This app will help them recognize different currencies. The application allows the visually impaired to give input on their smartphone, which recognizes the note and tells the user the value of the note by voice output. This feature can be implemented using machine learning techniques. This way currency detection for new currencies is easy for the visually impaired. This application also helps them in recognising objects using a QR scanner.

Key Words: Currency Detection, QR Scanning, QR Generator, Audio Library, Machine Learning

1. INTRODUCTION

With the advancement of new technologies, mobile devices are becoming more and more popular and one of the most widely used consumer devices. Of the many different communication technologies. However, this method presents challenges for users with visual impairments (VIs).

For the visually impaired, this problem is more obvious. In everyday life, everyone has to operate their smartphone by themselves, but the visually impaired cannot use it efficiently. Again, they need someone's help to use it. So, overall, they can only use basic phones with a user-friendly spirit, rather than struggling with smartphones, but our application makes smartphones user-friendly. This application provides features such as currency detection, QR scanning and audio stories.

1.1 Currency Recognition System

The user provides the images as input through android mobile. Using the machine learning algorithm the image is recognized and it gives voice output of the result.[2]

1.2 QR Scanning

QR codes can encode messages in them and when scanned they can give output of the embedded message. The visually impaired people can use these QR code scanners to scan the QR codes on the items they use in their day to day activities and can get a voice output of the message about what item it is. This reduces their dependency and helps them to do their activities faster and independently.[1].

1.3 Audio Stories

It acts as a social corner. It is an easy and convenient way to share experiences with other people. The Forey audio stories will encourage users to share their different experiences and talents and to connect with others.

2. LITERATURE SURVEY

The summary of methods used in literature is given in

1. Be My Eyes: Android Voice Application for Visually Impaired People (JNEC 2017 Rucha Doiphode, Mayuri Ganore, Ashwini Garud, Tejaswini Ghuge).

The authors have developed a messaging and calling system using voice commands that has been developed for visually impaired people using text to speech.[3]

2. A Quick Response (QR) Code Generator with Mobile Scan Application for Mobile Network Recharge Operations.

(International Journal of Scientific and Engineering Research, July 2019, Ihekweaba Chukwugoziem, Aru Okereke Eze, Chiaghana Chukwunonso .E.)

The authors of this paper have developed a QR code

scanner and generator to encrypt secret files and passwords in QR codes and retrieve it when needed has been developed.[1]

3. Currency Recognition System for Blind people using ORB Algorithm

(International Arab Journal of -Technology, January 2018.Ahmed Yousry , Mohamed Taha and Mazen M.Selim)

The authors have developed an Oriented FAST and Rotated Brief (ORB) algorithm based currency detection system for blind and visually impaired people has been developed for Egyptian currency .[2]

4. Identification of currency denomination using image processing (IJARIIT, 2019, Gokul Ramasamy, Sakthi Subramanian)

They have developed a currency detection system with voice output of the result.The image captured is analyzed through various image processing algorithms and the correct match is passed through speech synthesis. [4]

5. Currency Recognition System For Visually Impaired

(IJARIE 2017 Snehal Saraf,Vrushali Sindhikar,Ankita Sonawane,Shamali Thakare)

A currency recognition system using the SIFT algorithm has been developed for the visually impaired people.[5]

3. PROPOSED SYSTEM

The application gives voice output to interact with the user. With the 3 distinct features in this application the visually impaired can detect currency, scan QR codes and share their audio stories. This application aims at making it easier for the visually impaired people to perform their day to day activities independently.

3.1 System Architecture

The architecture for the system which includes three main features: currency detection, QR scanner and audio libraries have been explained in detail below.

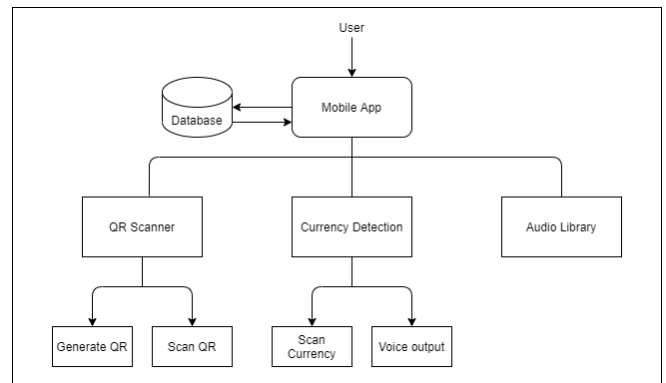


Fig -1: Proposed system architecture

A. Main App Description: The user signs-up in the application and the user details are saved in the database. Next time, the database verifies the user before login. The user navigates in the application using gestures. They can choose which feature they want to use simply by swiping, double tapping or single tapping. The main application consists of three features : QR Generator and Scanner, Audio stories and Currency Detection.

B. Audio Stories: It is a social media module that allows users to upload as well as listen to audio stories. The users can share their experience and interest with other people using this module.

C. QR Generator and Scanner: This module first helps to generate QR code according to the text provided by the user. This QR code is then printed and attached to different objects with the help of a sighted volunteer. Now using the QR scanner provided in this module the user can easily identify the objects.

D. Currency Detection Description: Currency detection module uses BFF KNN matcher algorithm.The user points the camera to the currency note and gets a real time reply about the currency using the machine learning model and the TTS library which converts the result into speech output.

E. Database Description: Firebase is used in the login system. It gives designers with an assortment of tools and administrations to assist them create quality apps, develop their client base, and gain profit. It is built on Google's infrastructure. It is also used in Audio stories to save audios.

F. Output Block Description: The TTS engine converts Text into Speech. Tts component provides the support of different voices and has listeners for each state as the reader started, finished, canceled.

4. REQUIREMENT ANALYSIS

The implementation detail is given in this section.

4.1 Software

React Native is an open-source mobile application framework created by Facebook, Inc. It is an open-source portable application system made by Facebook, Inc. It is utilized to create applications for Android, Android TV, iOS, macOS, tvOS, Web, Windows and UWP by empowering designers to utilize React's system at the side local stage capabilities. Firebase is a stage created by Google for making mobile and web applications. Google acquired the platform and it is now their flagship offering for app development.

BFF-KNN matcher: This project uses bff.knn matcher. It is a brute force technique for matching two images. The bff.knn function extracts the features from image and these features are used for matching similarity between two images. It is a traditional Computer Vision approach that selects key points within an image. The number of keypoints you specify it selects that amount. BFF KNN matcher works well even if two similar images have different dimensions and alignments. The knn algorithm finds the closest possible match.

Expo-barcode scanner: This is a react native component used to scan QR codes. The user can scan the QR codes using the camera on their mobile device and get the voice output of the message encoded in the Qr codes.

4.2 Hardware

An android device with a good internet connection and a camera will be an essential part in using Forey. The photos need to be taken with a good quality camera and good visibility for accurate results.

5. RESULT

After successful implementation of our project, the mobile application screens user interface views are given below:

QR Generator



Fig -2: QR code generator generates a QR code with the text encryption that the user needs.



Fig -3: The currency detector helps the visually impaired people to recognise various indian currency notes and gives the voice output for the user.

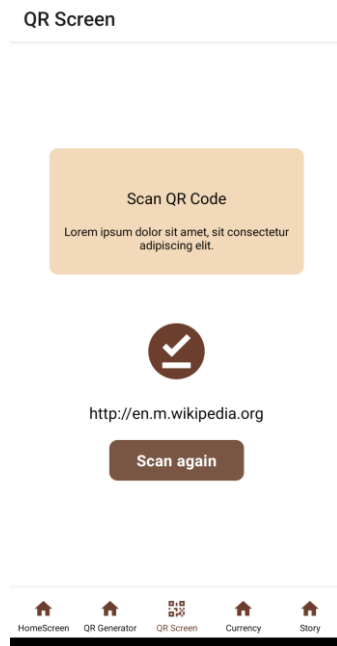


Fig -4: QR scanner helps the users to scan the QR codes and gives voice output of the embedded message in the code.

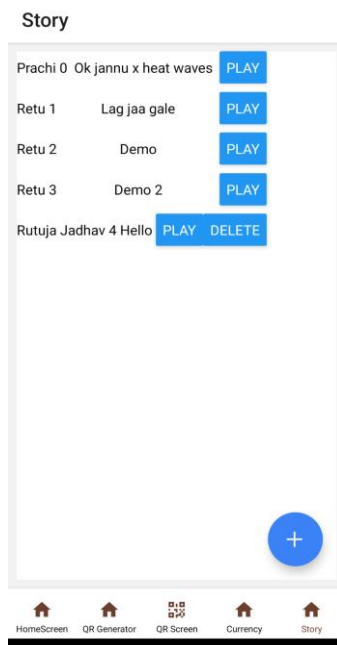


Fig -5: The audio stories section helps the users to create and post audio stories and reach out to larger audiences.

6. CONCLUSION AND FUTURE SCOPE

We have successfully implemented our project Forey: an android application for the visually impaired. The visually

impaired can use it efficiently and easily in their day to day activities.

The future scope of this project can be implementing currency notes of other countries and Indian coin currency detection.

ACKNOWLEDGEMENT

It is our privilege to express our sincerest regards to our guide Prof. Deepti Lawand for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We would also like to thank our Project coordinator, Prof. Gayatri Hedge who helped us a lot in finalizing this project within the limited time frame by constantly supporting us. We deeply express our sincere thanks to our Head of the Department Dr. Satishkumar Varma and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

REFERENCES

- [1] Ihekweaba Chukwugoziem, Aru Okereke Eze, Chiaghana Chukwunonso E., "A quick response (QR code generator with mobile scan application for mobile network recharge operations", International Journal of Scientific and Engineering Research, July 2019.
- [2] Ahmed Yousry, Mohamed Taha and Mazen M. Selim, "Currency recognition system for blind people using ORB algorithm", International Arab Journal of e-Technology, January 2018.
- [3] Rucha Doiphode, Mayuri Ganore, Ashwini Garud, Tejaswini Ghuge, "Be my eyes: android app for visually impaired people", JNEC 2017.
- [4] Gokul Ramasamy and Sakthi Subramanian, "Identification of currency denomination using image processing", IJARIIIT 2019.
- [5] Snehal Saraf, Vrushali Sindhikar, Ankita Sonawane, Shamali Thakare, "Currency recognition system for visually impaired", IJARIIIE 2017.
- [6] Komal Vora, Ami Shah, Jay Mehta, "A Review Paper on Currency Recognition System", IJCA 2015.
- [7] Chinmay Jathar, Swapnil Gurav and Krantee Jamdaade, "A review on QR code analysis", IJAIEM July 2019.
- [8] Mircea Moisoiu, Andrei Negrău, Robert Győrödi, Cornelia Győrödi, George Pecherle, "QR code scanning app for mobile devices", IJCSMC, June 2014.
- [9] Abhishek Mehta, Dr. Kamini Solanki, "Design and

development of QR code recognition from digital image", IJERT 2021.

- [10] Introduction to k-Nearest Neighbors: A powerful Machine Learning Algorithm.