# Intuitive Language Learning Application Using IoT and ASL

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**ABSTRACT**- This Project is an android application enabled with IOT and ASL. Which aids the people with visual and hearing impairments to learn a new language? Initially the application will prompt the user to select how he is differently abled (deaf or blind).Now based on the option selected for blind people the entire UI will be converted into voice recognition system and text to Speech ,Hence the user can orally listen and learn and to learn to write, a special interface called Braille Keyboard is used ..Three foreign languages are included in this project namely English French and German. The Alphabets along with the Braille codes will be taught to the blind people. The Main Novelty of this project is that a Braille keyboard is interfaced with the application. If the user is deaf, The UI will become touch based .Now the user will start learning visually and he will understand the words through ASL .After each lesson the user will be tested on their understanding. The entire features of the application is designed based on the requirements gathered from the blind and deaf students by interacting with them in person . So the main advantage of this application is that it will be user friendly for the actual real time end user. Every lesson can be replayed any number of times until the user understands it thoroughly phones. The application assists the blind people and make their learning process easier with voice interface and in addition a Braille keyboard is also being used .They will be given a clearer vision on the Braille code for each and every alphabet The application assists the hearing impaired people to learn a new language by the standard sign language , the ASL.

**KEYWORDS-** IoT(Internet Of Things), ASL(American Sign Language), UI(User Interface)

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## I. INTRODUCTION

This project is based on social service app which is especially for visually and hearing-impaired people. There are about 285 million people in the world are visually impaired, of whom 39 million are blind and 246 million have moderate visual impairment. There are about 37 million people across the globe who are blind, over 15 million are from India. Around 466 million people worldwide have disabling hearing loss, and 34 million of these are children. It is estimated that by 2050 over 900 million people will have disabling hearing loss. All the language learning apps available are being used only by the normal people .People with disabilities find it difficult to use these apps .One main disadvantage of the existing applications is that they don't have voice control .[10]The main vision of this project is to make people with disabilities to use it with ease . Since we develop this project as a Mobile application, this project provides an interactive system for the visually and hearing impaired.

## II. RELATED WORK

In the existing system, there are no applications developed to aid visually impaired people to learn a new language based on voice interface [1]. They have to use the applications which have touch interface and do not have voice input facility. For deaf there are some applications based on ASL .But the pictures used for the signs are not very clear and some features are not free the user has to pay to use those features.[4]. Moreover there is no such application which enables both the visually and hearing impaired people to use a single application.

### DISADVANTAGES
- In the applications available for the deaf, the signs used are not very clear and also they are not fully free[3].
- The normal language learning applications does not include the Braille codes for the alphabets which are

the only way a visually impaired person learn a language.

- Also so Far no application allows the Braille keyboard to be interfaced inside a mobile application [9].
- The Braille keyboards are meant only for Desktop PC's.

### III. PROPOSED WORK

In the proposed system, we develop a mobile application to rectify the problems in the existing system. Using this mobile application, the blind people can easily learn a new language along with their Braille codes through easy voice interface .Also the hearing impaired people can learn the language along with its Signs based on American Sign Language a standard form accepted widely.

The work flow of our project is as follows: Initially the app will prompt the user to select how he is differently abled (deaf or blind)[5]. Now based on the option selected for blind people the entire UI will be converted into voice recognition system and text to speech, Hence the user can orally listen and learn and to learn to write, a special interface called Braille Keyboard is used. Three foreign languages are included in this project namely English French and German. The Alphabets along with the Braille codes will be taught to the blind people. The Main Novelty of this project is that a Braille keyboard is interfaced with the app.

If the user is deaf, the UI will become touch based .Now the user will start learning visually and he will understand the words through American Sign Language .After each lesson the user will be tested on their understanding. The entire feature of the app is designed based on the requirements gathered from the blind and deaf students by interacting with them in person.

In this application the person will be tested at the end of every lesson .The app will ask the user to enter the Braille code for one of the alphabet they learnt in that lesson. The user can give the input through the Braille Keyboard which will be verified and prompt the user whether it is correct or incorrect[6].

The Hearing impaired person will also be tested at the end of every lesson based on the signs they learnt in the corresponding lesson.
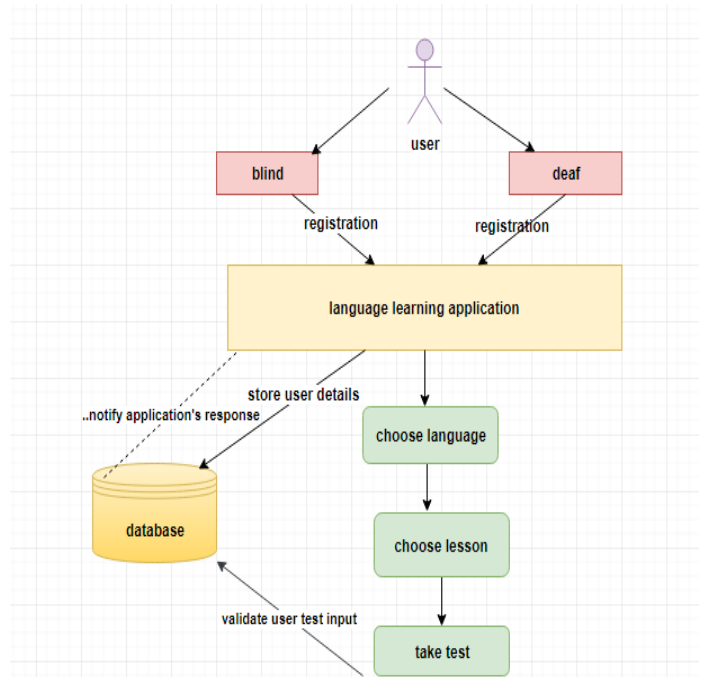


Fig.1: Architecture diagram of the proposed system

### ADVANTAGES

- In proposed system, it is made easy for the visually impaired people to learn a new language through a mobile application
- They are also allowed to use a Braille Keyboard which they are very adept in using to interact with Desktop PC's
- There are no mobile application so far which allows the use of Braille keyboard
- Every lesson can be replayed any number of times and page navigation is also only through voice input
- The application includes three foreign Languages Namely English, French and German.
- Both the visual impaired and hearing impaired person can use a single application.

### IV. MODULES

#### A) Unique Registration and Login

The Blind and deaf people will be asked to enter their name through voice input for blind people and through normal keyboard typing for deaf .Next the type of disability (Blind or Deaf ) should be mentioned .All the details entered will be stored in a database[2].
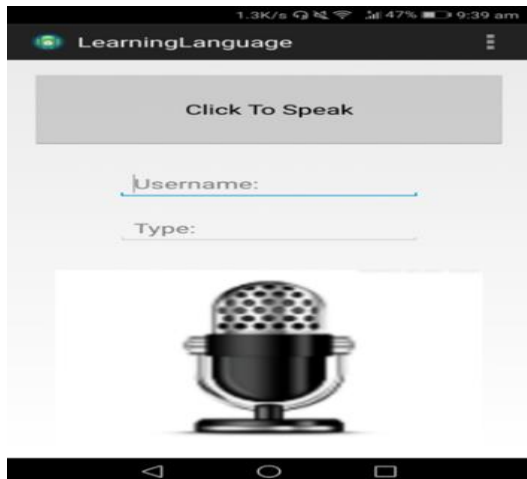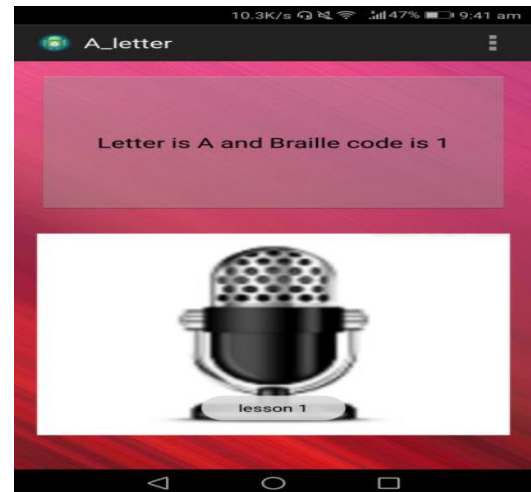
Fig 2: Registration Module

### B) Language Selection

If the Type is blind, the next page will ask the user to select the language they want to learn .There are three options available namely English French and German

Every Language will be split into four–five lessons and the user can navigate through each lesson using "next" and "previous" keywords.



Fig 3: Language Selection Module

### C) Learning Lessons

Every language will have four-five lessons and each lesson will contain 6 alphabets along with their Braille codes. Every alphabet can be played any number of times according to the grasping power of the user

At the end of every lesson a quick revision will be available to have a quick glance of everything seen in that lesson so far[8].



Fig 4: Lesson Learning Module (Blind)

### D) Blind (Test)

This is the main novelty of our project .In this module the user will be tested on whatever they learnt in the lesson so far .The app will ask the user to enter the Braille code for any alphabet (from the list they learnt ) [7].

The input will be given through the Braille Keyboard .The user will enter the code through the Braille keyboard which will be verified by the app and say whether it is correct or not.
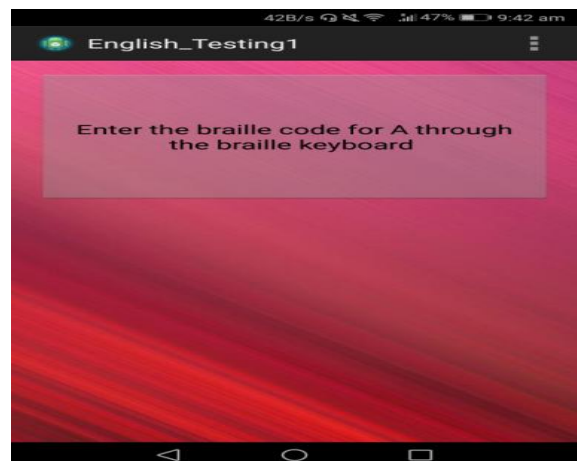


Fig 5: Blind Test Module

### E) American Sign Language (ASL)

If the user type is deaf, the next page will have a small introduction about ASL which is widely used by hearing impaired people to learn a new language [12].

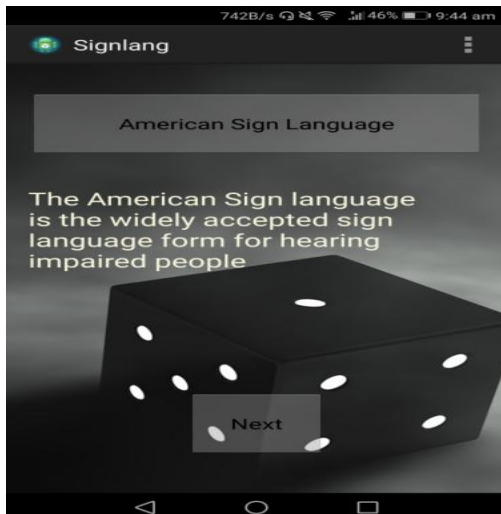From here the user can navigate through normal buttons.

Fig 6: ASL Module

### F) *Learning Lessons*

The next page will contain the alphabets split into four lessons. Each lesson will have 8 alphabets along with their signs .At the end of every lesson a test will be conducted to the user [11].



Fig 7: Lesson Learning Module (Deaf)

### G) *Deaf (Test)*

In the test for deaf .A sign will be given and the user will be asked to select the correct alphabet for that sign and another way of test is where the app asks the user to correctly select the sign for the given letter.



Fig 8: Deaf test module

## V. CONCLUSION

This application helps the blind people in learning the alphabets of languages like English, French and German along with their respective Braille codes. This app is designed in such a way that the user feels it easy to use and operate as the app is mostly controlled by voice .Additionally a Braille keyboard is designed for the user to test the codes learnt. And for the Deaf, ASL is taught along with test for individual lessons.

This is project was made based on the survey made on the existing apps for the differently-abled people and the suggestions given by the (differently abled mobile phone users). The usability, actability and user-centered aspects were considered during the development. Thus it is designed in such a way overcoming all the disadvantages stated.

## VI. FUTURE ENHANCEMENT

Future enhancements can be differentiating the type of user either beginner or advanced and categorizing the lessons according to the type.
For Blind - The project can be made into a fully voice controlled system with a wireless Braille keyboard which can input more number of characters.
For Deaf – ASL for words and sentences can be introduced along with GIF's or video format, a complete language learning guide for the differently- abled people can be done.

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