Android News Assistant for Blind

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***Abstract* – Android News Assistant is a mobile application which aims at solving the problems face by busy and bind people to read news by making the application read news for user. In this report first section describes the need for the application, second section describes the disadvantages of existing and advantages of new proposed system, third section describes the various features of application, fourth section describes entire technical details for making application and ends with conclusion and future work.**

***Keywords* – Android, Text to Speech, Dictionary, Blind**

I. INTRODUCTION

News is important for number of reasons within a society. News makes feel people connected and also plays a prominent role as a social gathering space too. Hence newspapers either physical or online place an emphasis in news. Having access to current events and up to date information has a great value in the modern world because of the constantly changing nature of the world. It's obvious that news media such as newspaper, television are in centre of our lives. Also a person's economic status obstructs him to buy a newspaper. But now with the apparition of websites, blogs and applications we only need internet and smart phone to access news.

Inspite of all these technical advancements the common man still faces a problem to get accessed to the news because of their busy schedule or their eye sight problems.

Android news assistant is an end to end application which provides solution to all the problems faced by the blind and busy people who cannot be able to read news.

How can the blind people and old people having short-sightedness, who cannot see read newspapers ?
How can we get to know the things happening in the world in our busy day schedule?
What can we do instead of wasting time while travelling in a crowded bus or train sitting idle?
What more we can do while doing jogging, working out in gym rather than listening to songs? What more we can do while doing jogging, working out in gym rather than listening to songs?

The answer to all the above questions is ***Listening the News Articles***. So the main goal of project is to make an application which will read you out news. The application is being made for android platform which is used by large number of people in world.

II. EXISTING AND PROPOSED SYSTEM

A. Existing System:

Existing system refers to accessing the news through news papers and news websites.

B. Disadvantages:

The disadvantages of existing system are

- Need to pay for newspapers.
- Cannot read news in crowded places like buses, trains .etc
- Blind people or people having eye sight problems can't read news papers or see mobile screen.
- Need to allocate some time for reading.
- Cannot read news if there is no internet.
- Need to search for the news you like in newspaper.
- Unable to understand vocabulary and so cannot understand news completely.
- No possible way to let your friend know about specific news.

C. Proposed System:

Proposed system refers to accessing the news using Android news assistant.

D. Advantages:

The advantages of proposed system are

- No additional costs.
- Can listen to news in crowded places where reading is not possible.
- Application will talk with blind or persons having eye sight problems with the help of specific

commands to know their preferences and play the specific news.

- No need to allocate extra time for reading. User can use application while jogging or during workouts rather than listening to songs.
- User can download the news when wifi is available and can access news anywhere even in case of no network connection.
- Application will recommend news to users based on past click behaviours.
- Making a single tap on any word will show the meaning of the word so that user can understand the news perfectly.
- User can share the news through messaging and networking applications like whatsapp, google, facebook etc to their friends.

III. FEATURES

The android news assistant has an easy to use UI with neat sleek design as it is mainly targeting the blind and busy people.

A. Online News:

Application gets news articles from Times of India website with the use of tool Jsoup [1] and also from Times of India Rest APIs [11] for developers.

A. Categorization:

All the news articles are categorised into topics like Top news, Cities, Indian news, City, Tech, Movie reviews, Entertainment, Lifestyle, Education, Environment, Business, Sports, Entertainment, World, Science, Events etc. Some of the categories will have sub categories like sports will have badminton, cricket, football etc. World will have USA, Russia, UK, Japan etc. Figure 1 shows the screenshot of application showing categories.

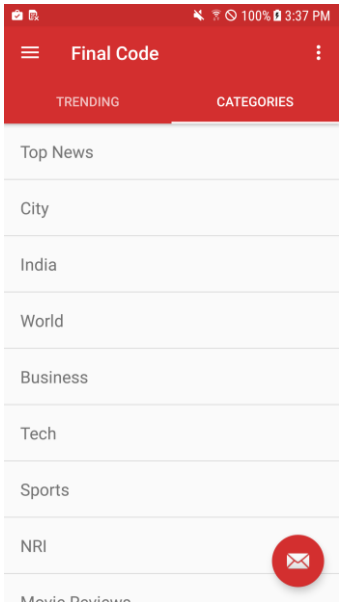

Fig. 1 Screenshot of different Categories of news

B. Speak News:

The application will have a play button which will read out the news for user. Even when the application is closed in foreground application will launch a service which will make application speak in background just like music player. One of the innovative feature is suppose if the user feel the news is boring or already know content in first few paragraphs already, clicking on the any word in the news article will make the application read news article from that word.

C. Offline News:

Offline News: Application also lets user to download entire news package when he has internet access like Wi-Fi or mobile network and can hear news any time after downloading which will be helpful if user doesn't have Mobile data but has Wi-Fi in his home or Office. Figure 2 shows news articles in offline mode.

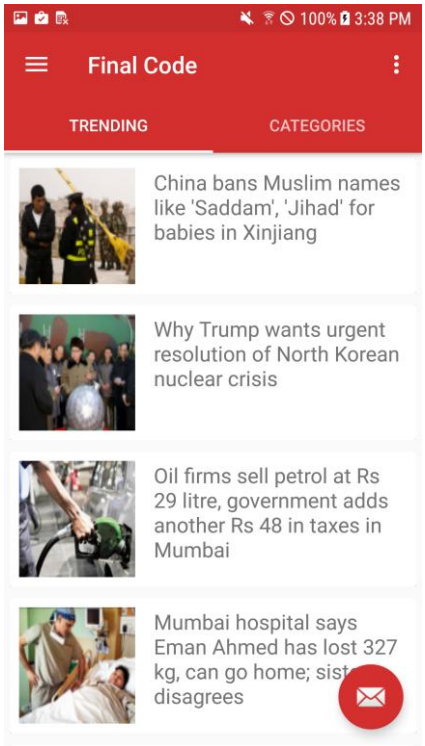

Fig. 2 Screenshot of application showing news in offline mode

D. Blind Assist:

Application also has a complete interactive system which helps blind person starting from opening the application to selecting the appropriate news and listening to them through a voice speaking intelligent personal assistant. User is provided with a list of specific commands at each and every step like "All categories", "Read all Headlines", "Play 1st article", "Increase sound", "Move to next article"

E. Dictionary:

While reading or listening to news if the user don't know the word meaning and unable to understand the sentence just

clicking on the word shows the popup in the form where the meaning to the word will be shown.

F. Authentication:

Application will provide custom authentication as well as sign in with google account for the user as options for login.

G. Recommendation System:

Application will provide you suggested articles based on your interests which are drawn from the type of articles you usually read and hear.

H. Social Box:

Any application user can share their view in the form of message for every news article in top news category.

I. Notifications:

Users usually get notifications of news articles based on their interests which are detected by the application through the click behaviour of the user.

J. Send Knowledge:

If a user feels that a news article is worth reading and feel that it should be read by his friends or his contacts he can share the news article in social networking applications such as whatsapp, google+, facebook etc.

K. Playlist:

User can select all the news articles he like to hear and make a playlist so that he can listen to all news at once and don't need to open application again and again
just like in music player.

L. Favourites:

User can select a news article and add it to favourites like in browser so that he can have access to all important news at one place.

IV. Application Development

A. *Languages, Tools and Technologies Used:*

a) Java: Java is a popular Object oriented language to build android applications.
b) *XML:* Extensible mark up language is set of rules which can be easily read by developers and machines. In android development xml is used for layout design, adding UI components and for transfer of data.
c) *SQLite* [2]*:* Sqlite is a relational database that is prevalent in android. In contrast to normal database systems like Mysql, Mongodb sqlite is not a client server type database.
d) *Android Studio* [3]*:* Android studio is a Integrated Development Environment for development of applications for mobiles, tablets, smart watches on android platform. The main component of android studio is java language. It is a beautiful editor that allows users to create user interface components, screens of android application.
e) *Firebase* [4]*:* Firebase is a mobile application platform with different tools and infrastructure that will help developers to build android application in highly efficient and scalable way easily. Firebase provides the features like real-time database, analytics, notifications using Google cloud messaging, authentication, storage etc.
f) *Volley* [5]*:* Volley is open source library which is useful for making http requests to get data from server in a fast efficient way. It also includes automatic scheduling of network requests, inbuilt caching etc.
g) *Gson* [6]*:* Gson is open source java library that is used to convert Json objects to Java objects and vice versa.

B. *Use case diagram:*

Use case diagrams are used to describe a set of actions systems (subject) can perform. Figure 3 shows the use case diagram of the application which has normal person and blind person as actors.

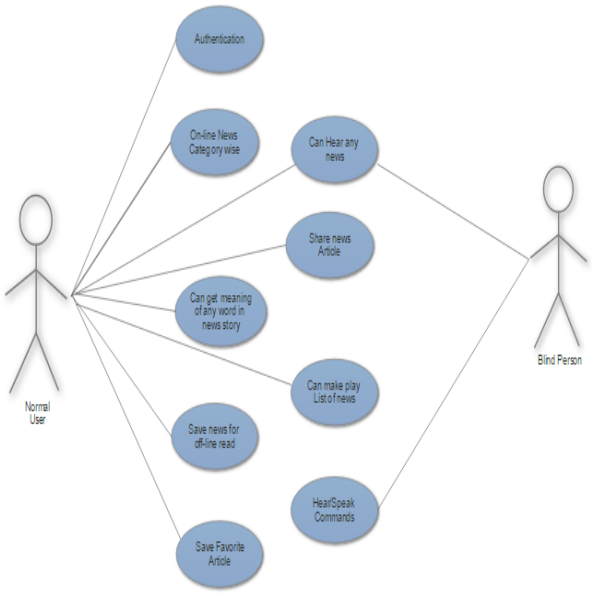

Fig.3 Use case diagram of news assistant

C. *Coding Methodology and Pattern :*

The entire application is cut down into different modules for better understanding and debugging of code. Figure 4 shows how different modules interact with each other.

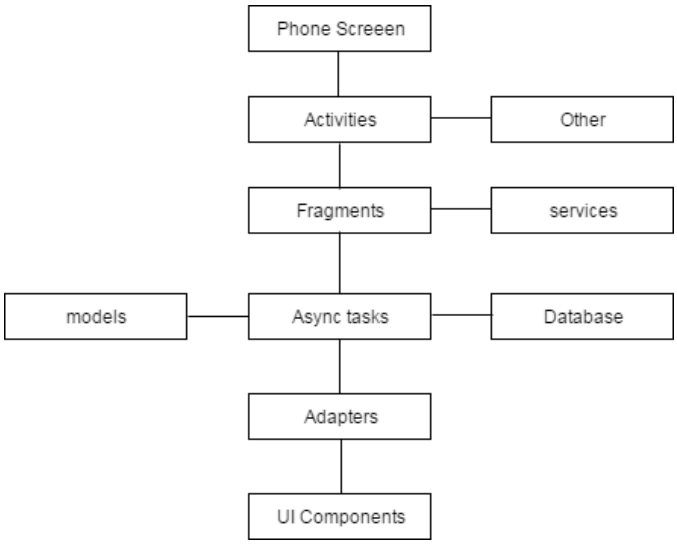

Fig.4 Modules Interaction

a) Activities: Each screen in the android application is associated with an activity. All the screens like settings, authentication, news, headlines each are associated with one activity which is an combination of a Java and Xml file.

b) *Async tasks* [7]*:* Asynctasks is a module where methods were defined to request and send data through REST apis by creating new threads which is important for UI without lagging.

c) *Models:* The data from rest api's are downloaded and is used in application is in the form of Json. Json objects are converted into java objects using open source library Gson for easy access of Json data. The corresponding java objects are stored in models module.

d) *Service* [8]*:* Service in android is useful to run tasks in background. Services run even when the application is closed. The code for making the application speak using text to speech, downloading offline news, utility services to control speech of application are stored in services module .

e) *Adapters* [9]*:* android news assistant contains a lot number of list views to display news articles in structured way. adapters are classes that acts as a bridge between the views present in list view and Json data.

f) *Database:* The news data stored for offline mode is stored in external storage system. Some of the functionalities are implemented using Sqlite database on android.

g) *Other:* Application also use authentication, Google cloud messaging, real time database etc provided by firebase. All the coded needed for configuration, connection and usage with firebase is placed in this module.

D. *User flow Diagrams:*

Actor: Normal person

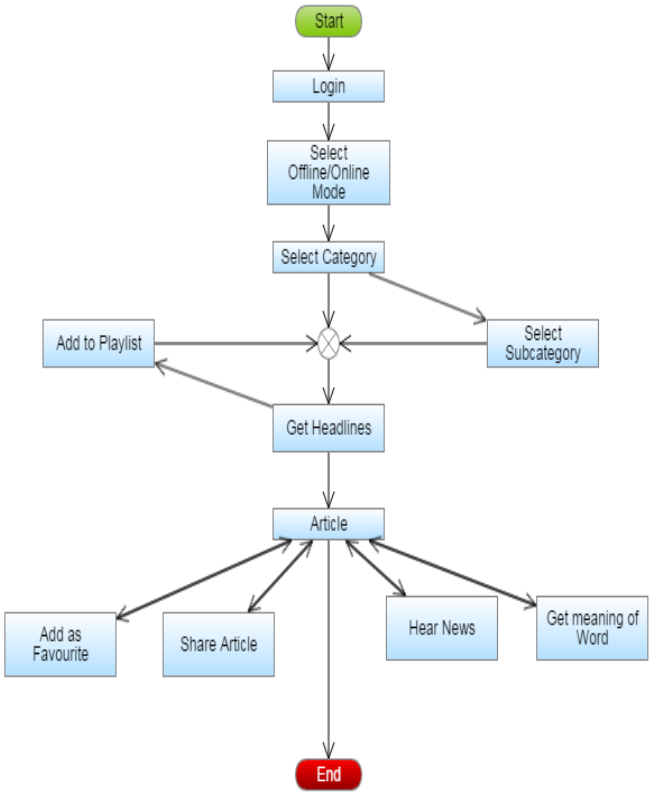

Fig.5 User flow diagram normal person

Actor: Blind Person

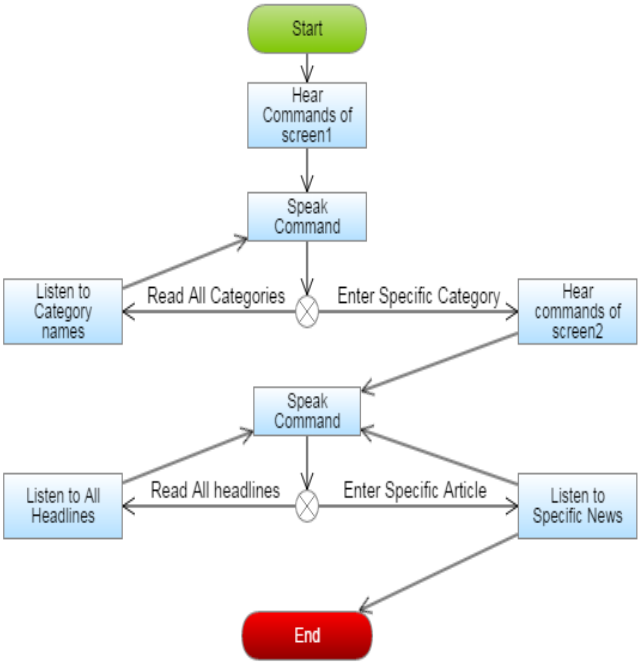

Fig6 User flow diagram blind person

E. *Technical Challenges:*

a) *Offline news access:* User can download the news modules when there is a possible network connection like Wi-Fi or mobile data and can access the news anytime even though the network connection is not available. This is made possible technically by making a background service in android which runs a recursive code by creating different threads to download the news articles from Times of India and stores them in the external file system of android in a specific way so that application can understand the data.

b) *Making the application speak news:* User can listen to news articles. This is made possible by using android's inbuilt text to speech class through which we can make application speak and can also set the different variations for speech like Locale, speech rate, pitch etc. The instance of text to speech class is created and is made to run on a service in background which receives commands from main UI thread of application.

c) *Getting meaning of word on tap:* The entire text in news article is processed to find indexes of spaces in entire text. Once indexes are found each word between indexes is made a link, the normal behaviour of long click in android is overridden and a on click listener is attached for each link. Now on tap of any word makes application call the on click listener which will call the WordsApi [10] to on a asynchronous thread to fetch meaning of word and toast the meaning.

d) *Interaction with blind:* User will be provided with specific commands and on saying that command application will send the recorded sound to Google inbuilt speech to text
available in browsers to get the words the user has spoken. If the words match with commands corresponding action will be done.

V. Conclusion

Through this project I learnt how to build an android application from scratch. I also got deeper understanding regarding difficulties in how to convert an idea to an application. I learnt how to take suggestions from seniors and how to adhere to deadlines.

VI. Future Work

This application presently supports only english language. It can be extended to support all the regional languages. The feature of converting text to speech and getting meaning of word can also be extended to books so that user can hear the story books, novels etc. Location based news recommendations can also be implemented based on the clicks the other users made in the nearby locations. The following application can be also me made to be controlled by Samsung smart watches and Samsung level ear phones rather than using speech commands.

VII. Acknowledgment

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