DESIGN AND DEVELOP ELECTION SIMULATION INTERACTIVE APPLICATION FOR BLIND PEOPLE BASED ON ANDROID

Nugi Mulya Nugraha[1], Irawan Afrianto[2]

[1,2] Universitas Komputer Indonesia
Jl. Dipati Ukur No. 102-116 Telp. (022) 2504119, 2506634, 2533603 Fax. (022) 2533754
E-mail: nugi.mn@gmail.com[1], irawan.afrianto@email.unikom.ac.id[2]

ABSTRACT

Bandung General Election Commission is a government institution that is in charge and responsible for the success of general elections in the city of Bandung every year. But in its implementation, there are several obstacles, namely some people find it difficult to get information about the procedures for selecting one of them blind people due to the limited media delivery of available information. This research intends to help blind people in obtaining information about the procedures for choosing and the candidate pairs to be chosen use the help of google speech to text and text to speech so that blind people can easily get information with the help of voiceThe development of this interactive application uses google speech to text as input and text to speech as a medium for delivering information taken from the database that is updated by officers from the KPU on each selection. The data on the database is managed by KPU officers on the website so that blind users can receive the latest candidate pair procedures and information. The results of this research design and develop interactive application of election simulation for blind people based on andriod is that it can help blind people obtain information on procedures and pairs of candidates to be chosen.

Kata Kunci: Speech to Text, Text to Speech, Visual Impaired, General Election, Election Procedures, Android.

1. INTRODUCTION

Pemilu is a acronym of general election which is a way from the government of a democracy to determine who will take office in the next period. Semua isitilah ini baik pemilu atau pilkada All these terms are as a means of participation of citizens in the system of government. Elections have an important position, namely the implementation of popular sovereignty. Every citizen who has fulfilled the requirements and has the right to vote, will give his voting rights for who will rule. The importance of the government elections to establish a special institution to handle elections named KPU (General Election Commission). According to regulations KPU No 12 Years 2010 that people who can choose are already 17 years old at the time of collection / more or have been married. It was only in 2011 that the government was aware of the disabled and then put in law No. 19 of 2011 that people with disabilities had the same rights as normal people. In 2014 the data collection of the permanent voters list (DPT) from diffable people was conducted and may vote.

In 2014 there were at least millions of people with disabilities absent in the election, said the institution defending the political rights of people with disabilities [1]. The lack of active persons with disabilities is not without reason, this is because the government is not ready to disseminate information to persons with disabilities in addition to the absence of a candidate who targets disabilities. Approximately 2.45% of the Indonesian population has disabilities in 2012, then at least 6 million people with disabilities, of which 1.7 million suffer from visual impairments or blind people [2], with the number of persons with disabilities who are so high especially those who are blind and who can influence the success of the election they should be given an understanding of the election to participate in the development of this country.

With the limited senses of the blind, it is not possible to read slides or banners, both election socialization and information on the candidate pairs currently being carried out. Android Speech Recognizer is a speech recognition service provided by Google on the Android platform via the Android SDK. This service has a word error rate of 13.5% [3]. Android Speech Recognizer works by streaming audio to Google's remote server. Then the Google server will conduct a speech recognition process and send the results in the form of text back to the client. Text-to-Speech and Speech-to-Text itself is a method that utilizes input in the form of sound / audio [4] where the method changes the voice input into text and text into sound that has been provided by android studio to help developers to develop applications that use sound as input. Seeing the interest of the method and technology it should

be implemented in an application to change the existing text in election simulation slides into a voice that is attractively packaged in an interactive multimedia that will provide information about election procedures and android-based candidate pairs for persons with disabilities blind.

Based on the existing problems, an application is built that can help blind people in obtaining information about election procedures and information on candidate pairs.

The objectives to be achieved from the construction of this system are as follows:

1. To provide easy information on electoral procedures for voters based on sound in the form of interactive applications.
2. To provide knowledge about candidate pairs to be chosen based on sound in the form of interactive applications.

2. CONTENT OF RESEARCH

2.1 Theoretical Basic

Platform Theory aims to provide an overview of related theories in application design. Platform Theory discussed is Definition of Simulation, Multimedia, Method used, and tools used.

2.1.1 Simulation

Simulation can translate as a system or method used to solve or describe problems in real life that are full of uncertainties by using or not a particular model or method and more emphasis on the use of computers to get a solution. The use of simulation in learning is one way of learning that is able to provide system estimates that are more tangible according to the operational conditions of a collection of jobs.

2.1.2 Interactive Learning

Interactive learning is a learning method that is used to present a material or discussion about learning carried out by the instructor or which teaches to bring up interactive and educational conditions, between instructors and students, students and students as well as learning resources that support the occurrence of teaching and learning.

2.1.3 Speech To Text

Speech To Text is a development of techniques and systems that allow computers to receive input in the form of spoken words. This technology allows a device to recognize and understand the words spoken by changing spoken words into digital signals and matching the digital signals with a certain pattern stored in a device. The words spoken are transformed into digital signals by converting sound waves into a set of numbers which are then adjusted to certain codes to identify those words. The results of identifying spoken words can be displayed in written form as a command to carry out a command [4].

2.1.4 Text To Speech

Text To Speech is a method that allows developers to convert Text into a form of speech. This technology allows a device to recognize and understand the words spoken by changing spoken words into digital signals and matching the digital signals with a certain pattern stored in a device. The spoken words are the result of changing the text that has been translated from digital data and then converted into sound form. The results of the identification of translated words can be displayed in sound form as an information to do a command [4].

.

2.2 System Analysis

System analysis aims to describe and identify problems that exist in the system and intends to determine the obstacles that occur and the expected needs of the system that will be built.

2.2.1 Analysis Of The Problem

Based on the results of research that has been done by evaluating the knowledge of blind people about general elections related to the procedures for selecting and pairing candidates, especially in the city of Bandung, the problems faced by blind people are as follows:

1. The lack of media in disseminating the procedures for voting makes it difficult for persons with visual disabilities to get information about procedures for choosing.
2. Yet the presence of candidate that leads the blind visually impaired persons with disabilities make less knowing of candidate.

2.2.2 Analysis Of System Architecture

System architecture is the process of analyzing system which will be built on this research.

System architecture to be built are the stages to get an overview of the system to be built. Picture of system architecture can be seen in Figure 1.

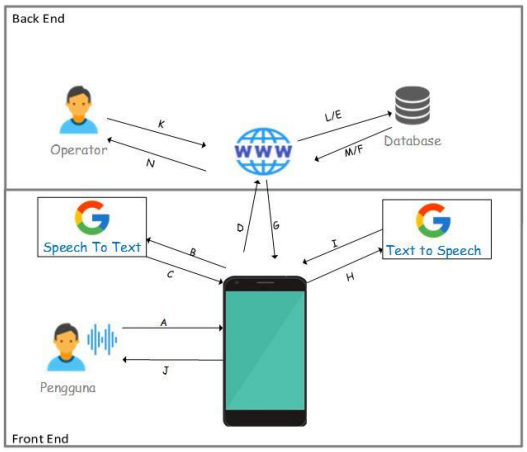

Figure 1. Design Of System Architecture

The above system architecture describes how phases of the system that will run later, here is a more detailed explanation about the image above from point poit:

***Frontend* :**

1. When users tapped the screen smartphone system will display a dialog with voice input, when it is the user begins to say the keyword to search for desired information.
2. Voice received will be sent to google servers speech recognition in realtime to convert it into text.
3. Google Speech Recognition to convert voice into text form by way of comparing the sound data is received with a database owned by Google. After the conversion is done, the Google Speech Recognition results send text conversion in English language to the device then dicocokan with the keyword that was made. Keyword that can be used is How to display the information of candidate Ordinances, to display the information of candidate.
4. The results of the conversion text google speech recognition is used as a keyword to find information with the help of API (Application Programming Interface).
5. The keyword has received compared to an existing data in database.
6. The specified data will be sent back to the website for display on forntend.
7. The data is sent back to the device. After the data is received by the device data in the form of the text is changed by google text to speech into forms of sound.
8. Google Text To Speech will process/convert text into voice/speech in accordance with the language of the device.
9. After the conversion is done, Google Text To Speech play/run the voice (speech) in realtime to the device,
10. The sound is played by the device accepted by the users as information.

***Backend* :**

11. The user here is the operator, where the operator is able to add, modify and delete data procedures, candidates, electoral lists and in the webservice displayed in the frontend.
12. If there is data that is modified, added, or removed webservice will be megirim to a database sql syntax.
13. The data has been successfully added, modified, deleted or sent back to the webservice to be displayed.
14. Users receive information data is already added, changed or deleted.

2.2.3 Keyword Analysis

Keywords allows users who are blind to search for information in question without having to pronounce its full of information that you want to search.

Of data that has been collected there are four very important points that allow users who are blind in finding such information.

1. The Candidate
2. Election Procedures
3. Date of Election
4. Use The Applicatoin Guide

Use help of candidate applications for writers use the Word as "paslon" by considering the error stream writer added the keyword "pas lon" in its application.

For procedures for the author using the keyword "tata cara" by considering the error stream the author adds the keyword "tatacara" in its application.

For help using the application the author uses the keyword "panduan" in the application.

For the selection date the author uses two "tanggal" keywords by considering the ease of the other stream the author adds the keyword "pemilihan" in its application.

```
private void recognition(String text){
    Log.e( tag: "Speech", msg: ""+text);
    String[] speech = text.split( regex: " ");
    if (text.equalsIgnoreCase( anotherString: "tata cara")
        startActivity(new Intent( packageContext: this, Ta
        finish();
    }else if (text.equalsIgnoreCase( anotherString: "paslo
        startActivity(new Intent( packageContext: this, Pe
        finish();
    }else if (text.equalsIgnoreCase( anotherString: "pandu
        startActivity(new Intent( packageContext: this, In
        finish();
    }
  if (text.equalsIgnoreCase( anotherString: " pemilihan")
      Intent i = new Intent( packageContext: this,TglPemi
      i.putExtra( name: "tgl",tglPemilihan);
      startActivity(i);
      finish();
```

Figure 2. Keyword Analysis

2.2.4 Speech To Text Analysis

In this application the service Google Speech to Text is used as the input sound that would later serve as navigation to help the disabled, the blind use the application.

This process is the input of the user's voice and outpun resulting from this process of text that will be used for lumped in with the keywords already provided to display the information in question.

To be able to use the Speech to Text features of Google API on the program, including the steps required to import class android. RecognizerIntent speech.

```
import android.speech.RecognizerIntent;
```

Figure 3. Sintak import Speech recognition

2.2.5 Text To Speech Analysis

Google's use of Text To Speech API allows developers to convert text into sound. This service can be processed offline and online. On the offline processing, supported languages are limited to the language contained in each device/smartphone.

Google's use of text to speech on this application is used to say back text on the screen smartphone user at the time the application was run.

To be able to use text to speech API on the application needed some first steps make sure the imported class android. speech. tts TextToSpeech..

```
import android.speech.tts.TextToSpeech;
```

Figure 4. Sintak import Android Text To Speech

As for the system processes that occur when text is converted to the vote on the application to be built using the text to speech can be seen as follows:

1. The first stage is the system of making objects from library google tts text to speech. The application will be built in object Crossword can be a list of candidate, the date of the election, or procedures.

```
tts = new TextToSpeech( context: this, (status) → {
```

Figure 5 Creating Object source code

2. To convert the text into sound the syntax used for the determination of the language to be used when the text in voice conversion into lips such as Local ("ind-ENG") which means the language of Indonesia, to more clearly can be seen in Pictures

```
if (status == TextToSpeech.SUCCESS) {
    int result = tts.setLanguage(new Locale( language: "ind", country: "IDN"));
    if (result == TextToSpeech.LANG_MISSING_DATA || result == TextToSpeech.LANG_NOT_SUPPORTED) {
        Log.e( tag: "TTS", msg: "Bahasa indonesia tidak support");
    }
    speak(text);
```

Figure 6 Language Configure Source Code

3. Then the Output is issued from the conversion in the form of votes where the system will get the text settings, detail paslon and date of the election of a textview and call the method to read the text speak.

```
private void speak(String text){
    if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.LOLLIPOP) {
        tts.speak(text, TextToSpeech.QUEUE_FLUSH, params: null, utteranceId: null);
    }else{
        tts.speak(text, TextToSpeech.QUEUE_FLUSH, params: null);
    }
}
```

Figure 7 Output Conversiton Source Code

4. At a time when activity in the destroy, then all objects should be dismissed and tts in shutdown.

```
public void onDestroy() {
    if (tts != null) {
        tts.stop();
        tts.shutdown();
    }
    super.onDestroy();
}
```

Figure 8 Stop the Conversation Source Code

2.2.6 Non Functional Requirements Analysis

Analysis and non-functional requirements include analysis and hardware as well as needs

analysis and software requirements. As for the non-functional requirements to run this application covers the needs of hardware, software and user needs a system that will use the application. Non-functional needs analysis aims to let the application that is built can be used in accordance with needs of the users of the application in seeking needed information.

2.2.6.1 Analysis of Hardware Requirement

Analysis of the hardware Requirement is the decomposition of non-functional requirements that relate to the specifications of the hardware that will be used and is associated with the process of building applications that will be used to run application.

No	Hardware	Spesification
1	Processor	Intel core i5 2,1 ghz
2	Memory (RAM)	8 GB
3	Hardisk	500 Gb
4	Conectivity	Internet Conection

No	Hardware	Spesification
1	Processor	1,5 ghz
2	Memory (RAM)	1,5 GB
3	penyimpanan internal	16 Gb
4	Conectivity	Internet

2.2.6.2 Analysis of Software Requirement

Needs analysis software, it takes some of the software supports for use in development and implementation. In the table below is the required software in development.

Table 1. Minimum spesification of sofware computer

Software	Minimum Requirement
Operation System	Microsoft Windows 7
Web Browser	Mozilla firefox, Google Chrome

While the minimum requirement for the specification of software on Smartphones can be seen in Table 2.

Table 2. Minimum Spesification of software Smartphone

Software	Minimum Requirement
Operation System	Ice Cream Sandwitch

2.2.6.3 Analysis of User Needs

Analysis of system users is intended to find out who the user is involved in running the system. The user that is public in particular disabilities disability netra and web operator.

This application not only can be used by disability but can be used by all walks of life to help the disabled, blind and disability as a media information about the election. To be able to run the entire feature found on the application, users are required to have an internet connection. Can be seen in Table 3.

Table 3. Analysis of User Needs

No.	Users	Spesification
1	Public	-
2	Operator	- Understand how to use the Windows - Understand how to use the web browser

2.2.7 Functional Requirements Analysis

A functional needs analysis can describe a plot that later will be used so that the right application development on purpose.

Use case diagrams are used to illustrate the actor with a use case that's located in the system can seen Figure 4.

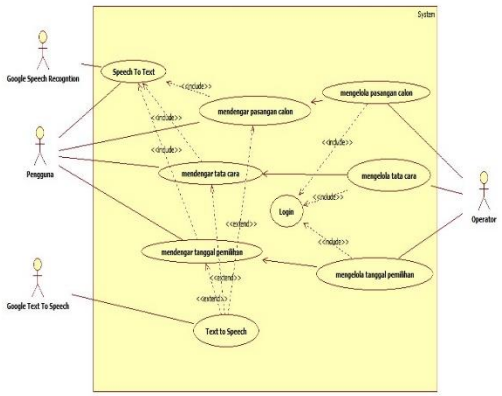

Figure 9. Use Case Diagram

2.2.8 Analysis Of Database

The analysis of the data base can be described as activities for analyzing the data used and processed on the database of the system. On this analysis explained how the flow of data as well as the data attribute.

Entity Relationship Diagram (ERD) is a way to obtain an overview of the data that will be applied to the system and need to use a symbol that is easily understood in accordance with anturan international. As for the ERD on this data base system development can be seen in Figure 10.

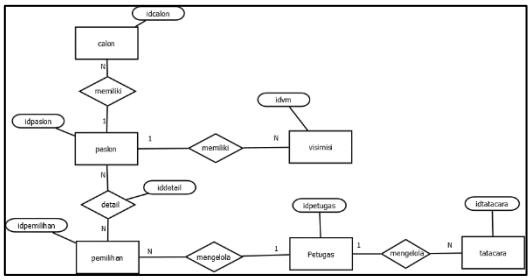

Figure 10. Entity Relationship Diagram

2.3 Interface Implementation

Figure 11. First Interface of Front End

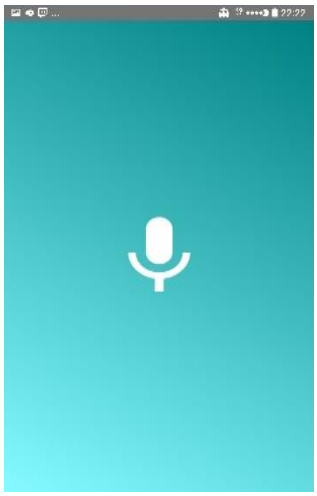

Figure 12 Interface of Speech Activity

Figure 13. Interface of Infromasi

2.4 Testing The System

System testing is an important part in the development of the application of simulated interkatif the election. System testing is useful for detecting errors and deficiencies that are present on the system. Testing is done to know that the system has been appropriate or not.

2.4.1 Functional Testing

Dari hasil pengujian functional testing dapat ditarik suatu kesimpulan bahwa aplikasi yang dibangun sudah dapat memenuhi kriteria yang di butuhkan .

2.4.2 Performance Testing

Performance Testing is testing applications where dexterity points that will be on the test speed is load halman page, as well as the precision of the input page ukura keyword applications that have been built. This testing is done using the web browser google chrome.

For testing the size of the website can be received due to the website being built contains only 1, 28mb while the expected is less than 2 MB.

For testing page load is acceptable because the page load to expect less than 5 seconds while page load average obtained by the application of less than 3.2 seconds.

UntuUntuk testing the precision of the input is not acceptable because the point on the test of each keyword is expected to succeed as much as 15 times while the score in can applications is the average 14 times.

2.4 Beta Testing

Beta testing is the testing that was done objectively to determine whether the purpose of the application is already achieved or not by giving a number of questions to the user. Beta testing is done by giving questionnaires to 13

respondents chosen randomly by the age of 17 years and over to find out results from application purpose is already achieved or not. sampling method using Snowball Sampling expressed by Sugiyono. Where the determination of the sampling done by initially from a small amount then the sample chose his friend to make samples and so on.

Based on the results of beta testing through the submission of a questionnaire using likert scale to calculate the interval of each question that has been submitted to the 12 respondents above the age of 17 years is obtained that for the purposes of the first the respondent says that the app info election can provide information and insights about how to vote. For the purposes of the two respondents said that election info application can provide information about candidates.

3. CLOSING

3.1 Conclusion

Based on the results obtained from the research gained in the preparation of the final project that lead to the goal of the research, it can be concluded.

1. Development of interactive applications For Election Simulation Disabilities Tuna Netra can provide information and insights on how to select.
2. Development Election Simulation For Interactive Applications with disabilities Tuna Netra can provide information about the candidate in detail.

3.2. Advice

This interactive application architecture still needs further development, including:

1. Maximize the delivery information is not limited to persons who are blind and do not require an internet connection.
2. Testing is insufficient because of the limited time in finishing the writing, making retrieval conclusion against a society that has a beta testing large populations to be difficult.

BIBLIOGRAPHY

[1] "Jutaan Penyandang Disabilitas absen dalam Pemilu dan Pilkada". 29 Januari 2015 [Online]. Available: http://www.bbc.com/indonesia/berita_indonesia/2015/01/150129_indonesia_difabel_pemilu. [Accessed: 03-Sep-2017].

[2] "Infografis hari Disabilitas". 08 March 2017 [Online]. Available: http://data.go.id/konten/visualization/infografis-hari-disabilitas/ . [Accessed: 03-Sep-2017].

[3] H.S. Nazrudin, Pemrograman Aplikasi Mobile Smartphone dan Tablet PC Berbasis Android, Bandung: Informatika, 2012.

[4] Smyth. Neil , Android Studio 2.3 Development Essential.: Payload Media, 2017.

[5] DW Maharani, I Afrianto, "Perbandingan Metode Jaringan Syaraf Tiruan Backpropagation Dan Learning Vector Quantization Pada Pengenalan Wajah", Jurnal Ilmiah Komputer dan Informatika, vol. 1, pp. 45-50, 2012.

[6] L. Williams, Testing Overview and Black Box Testing Techniques, 2006..