The Implementation of Yandex Engine on Live Translator Application for Bahasa and English Using Block Programming MIT App Inventor Mobile Based

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Abstract

One of the international languages used today is English. One of the essential things that become the principal capital is the mastery of foreign languages to compete and advance. In communicating, one of the supporting tools used today is a smartphone. They saw the needs and opportunities in terms of communication. The author does research, namely: the use of the Yandex engine, which will be implemented in an Indonesian and English translator application, which is expected to help users to get international language translation results, in terms of vocabulary or vocabulary, as well as pronunciation or how to pronounce/pronunciation words. The research method used is SDLC (Software Development Life Cycle). This method has analysis phases, system design phases, testing phases, and publication phases. This application is built for Android Operating System. The Yandex Engine is used as a translation engine in this research. MIT App Inventor is a tool used to build android-based applications; this tool is a visual programming scratch framework from MIT and implementation of Open Block distributed by the MIT Scheller Teacher Education Program. The result of this research is a mobile-based Indonesian and English Direct Translator engine. MIT App Inventor can work well using the Yandex search engine, which can produce a Live Translator whose features all work correctly and can be said to have the same results as other software development kits.

1. INTRODUCTION

One of the keys to success is communication. There is much success to be had in good communication. Success in business, career, leadership, or social life in activities of daily living. By communicating, it can be understood what the goals and objectives are to be achieved.

In communicating, each person uses a different language, generally according to the area or place where a person lives or the language skills. The more languages that are mastered, the easier it is for a person to communicate. According to linguists in the world, the exact number of how many languages exist in the world cannot be determined. However, based on data that the Ethnologue Organization has compiled, the number of languages currently collected is around 6,909. Which on the African continent: 2110 languages, the American continent 993 languages, the Asian continent 2322 languages, the European continent 234 languages, the Australian/Pacific continent 1250 languages.[1]

Among the many languages recorded in the world, several languages are designated as languages internationally or globally. One of them is English. English is considered a suitable language for use globally.[2]

To make it easy to learn and understand more deeply each language. So we need a knowledge container that can accommodate every language. Where in this case, the container can be found in the form of a dictionary. Etymologically the word dictionary comes from the word Qamus which comes from Arabic[3]

Currently, the physical dictionary itself can be a handbook or a book in general. However, apart from being in the form of a book, with the development of current technology, a dictionary is also available in electronic form where electronic dictionaries can be accessed using electronic equipment such as computers (PCs), laptops, tab devices (iPad, android tab, windows tab) and other electronic equipment.

In general, translations carried out using dictionaries only translate word for word; in today's technological developments, users need a fast method to translate words or sentences using only direct voice and produce translations that also appear in the form of voice into language is translated. In this paper, the researcher tries to implement voice to voice using speech to text and text to speech modules, with the concept of the captured voice being modulated into text, then proceeding from text to voice.[4][5][6][7][8][9]

There are quite a several dictionaries circulating in the conventional version; some are web-based. However, looking at the current needs, in general, mobile-based needs dominate.

In addition to using computers, the current technological trend is towards equipment that is easy to carry or known as mobile devices. Of the various kinds of mobile devices, the Android operating system is one of the most frequently used operating systems.[10]

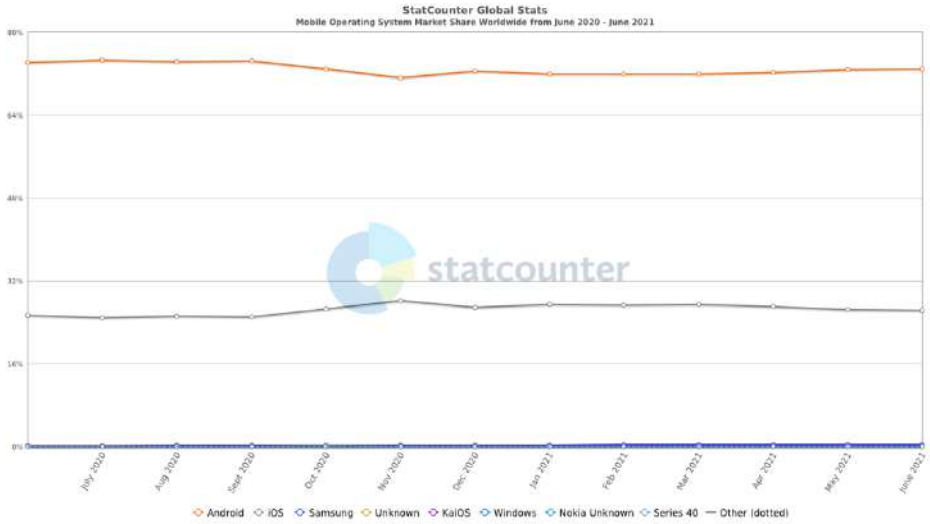

Figure 1 Smartphone *OS market share.*

According to a source from Statcounter, it was noted that the Android operating system is the operating system that dominates today, as shown in Figure 1. For this reason, the author of the Android-based operating system was chosen as the operating system used for implementation in this writing. This translator mobile application can carry out the translation process with several functions: a function to translate word for word, but it is still possible to translate sentences. In addition to translating words or sentences, this application supports the pronunciation of words and sentences in Indonesian and English in pronunciation. Furthermore, among the existing functions, this application is equipped with an important function, namely 'live translator,' where users can directly say the word or sentence they want to translate. The application will provide translation results in the form of voice or voice as well.

The tools used in the development of this application use a Text To Speech module that can convert from writing or text into voice or speech form.[11] Furthermore, as the engine that will do the translation, Yandex Engine is used. Yandex is an engine developed by a world-class

technology company listed on the NASDAQ since 2011. Yandex Engine supports 95 languages, including Indonesian and English, both in words or voice engines.[12][13][14] Moreover, this Yandex Engine is also supported by programming tools by MIT App Inventor. In this study, the Live Translator application was created using MIT App Inventor, a block/puzzle-based programming tool structured to become an Android-based mobile application.[15][16][17][18]

2. RESEARCH METHOD

2.1 Software Engineering

In this study, the method used is engineering research methods, research that applies science into a design to obtain performance according to the specified requirements.[19] The design synthesis of elements combined with the scientific method into a model that meets certain specifications. Research is directed to prove that the design meets the specified specifications. Research begins by analyzing and determining design specifications, selecting the best alternative, and proving that the selected design can meet the specified requirements efficiently. Then the trial is carried out both unit by unit, and overall, build the application to be ready to use. In the final stage, improvements are made if errors are found, and improvements are made to maximize existing functions.[20][21] as the layers in figure 2.

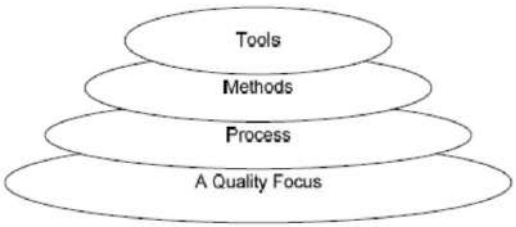

Figure 2 Software Engineering Layers

3. RESULTS AND DISSCUSSION

The conceptual framework of this research contains the concept of development based on SDLC theory to build a dictionary application, which is divided into conceptual research and conceptual applications.

2.2 Conceptual Framework

The conceptual research framework based on the SDLC is as follows:

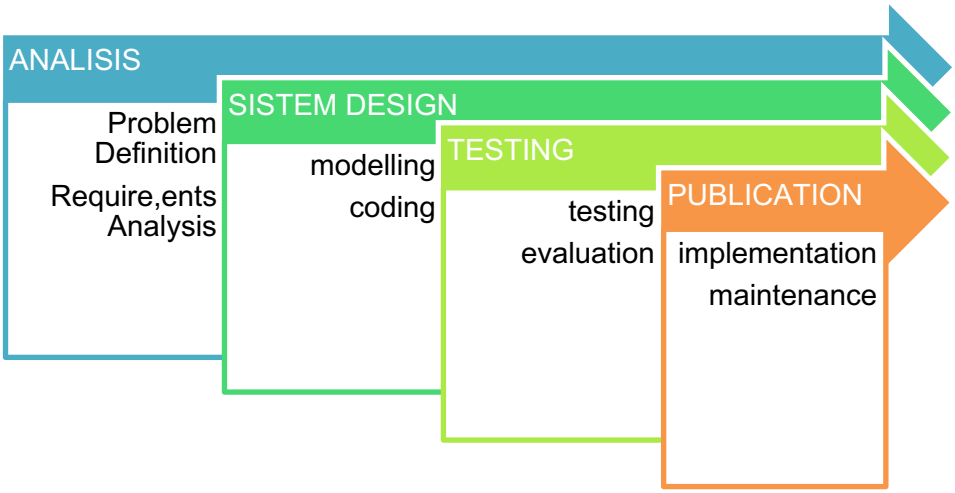

Figure 3 Research Conceptual Framework

1. Analysis

At this stage, problem analysis is carried out, why it is necessary to make this application. It also analyzes the needs of software and hardware, what technology will be used.

2. System Design

In this stage, the application's interface design is made, and the program design is carried out.

3. Testing

In this stage, testing is carried out on every existing feature of the application that has been designed in the previous process. After being tested, an evaluation is carried out; if something needs to be changed, changes will be made.

4. Publications

The last stage is the implementation process for the user. Finally, application maintenance is carried out after the application is published.

2.3 Application Conceptual Framework

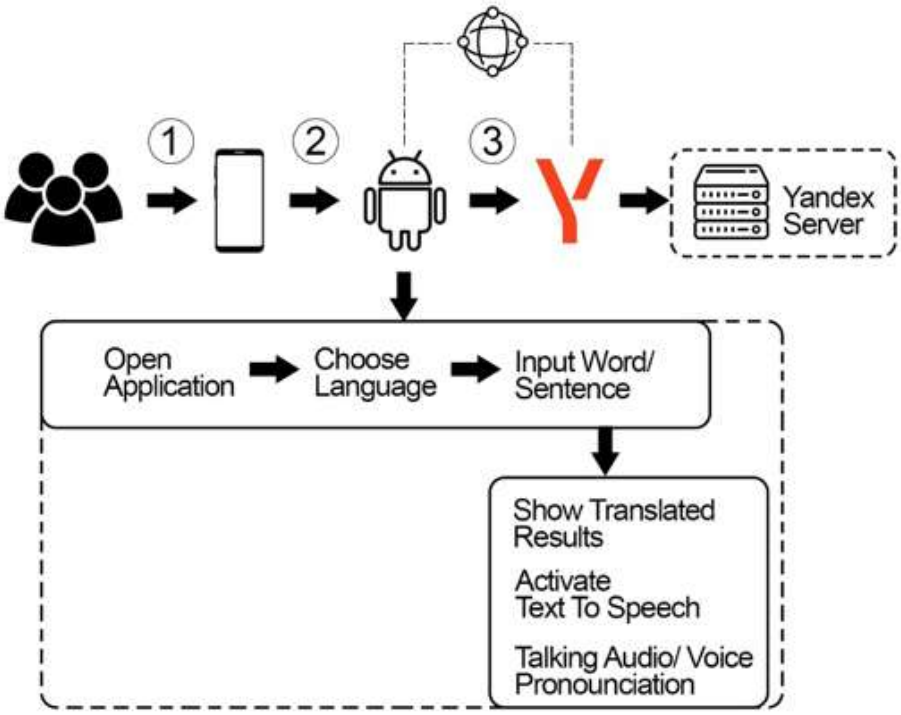

Figure 4 Application Conceptual Framework

As the conceptual framework of the application is as follows:

1. The user activates the smartphone with the android operating system

2. The user activates the electronic dictionary application:
   - The user selects the language to be translated
   - The user enters word or sentence
   - Application displays translations
   - The user activates text to speech to listen to the pronunciation of the word.

3. Through the internet network, the application retrieves data into the Yandex server, according to the request for words/sentences entered in the options in the application.
Testing

3. RESULTS AND DISSCUSSION

The following is the testing phase of the Live Translator Application.

Table 1 Testing Table

No.	Function	Paramenter	Action	Expect Output	Status
1	Translate from Bahasa to English	Access Yandex Engine Bahasa & Englsih	Menu Click: Translate Bahasa to English	English translation	Success
2	Translate from English to Bahasa	Access Yandex Engine Bahasa & Englsih	Menu Click: Translate Englsih to Bahasa	Bahasa translation	Success
3	Pronounciation word or sentence of Bahasa	Access Yandex Engine of Bahasa	Menu Click: Pronounciation	Bahasa pronounciation	Success
4	Pronounciation word or sentence of English	Access Yandex Engine of English	Menu Click: Pronounciation	Englih pronounciation	Success
5	Live translator	Access Yandex Engine Bahasa & Englsih	Menu Click: Live Translator	Bahasa & English	It works for Indonesian to English, but for English to Indonesian, the voice and language must be clear, the results tend to be inaccurate, mistranslation, if English is not read well by the microphone.

The author developed the system using the MIT App Inventor, where the system was developed using the Visual Programming Scratch Framework from MIT. Specifically, it is an implementation of Open Block distributed by the MIT Scheller Teacher Education Program, where the general appearance is as shown in Figure 5. In addition, MIT App Inventor uses cloud programming, where the programming code is stored in a Google account, as shown in Figure 6.

MIT App Inventor already supports Yandex Engine Translation services, which are used to carry out the translation process using the Language Database owned by Yandex Translator without manually entering Yandex API Keys. The Yandex engine works with the events module as follows:

Events

GotTranslation(text responseCode, text translation)

Event triggered when the Yandex.Translate service returns the translated text. This event also provides a response code for error handling. If the responseCode is not 200, then something went wrong with the call, and the translation will not be available.

Methods

`RequestTranslation(text languageToTranslateTo, text textToTranslate)`

By providing a target language to translate to (for instance, 'es' for Spanish, 'en' for English, or 'ru' for Russian), and a word or sentence to translate, this method will request a translation to the Yandex.Translate service. Once the text is translated by the external service, the event GotTranslation will be executed. Note: Yandex.Translate will attempt to detect the source language. You can also specify prepending it to the language translation. I.e., es-ru will specify Spanish to Russian translation."

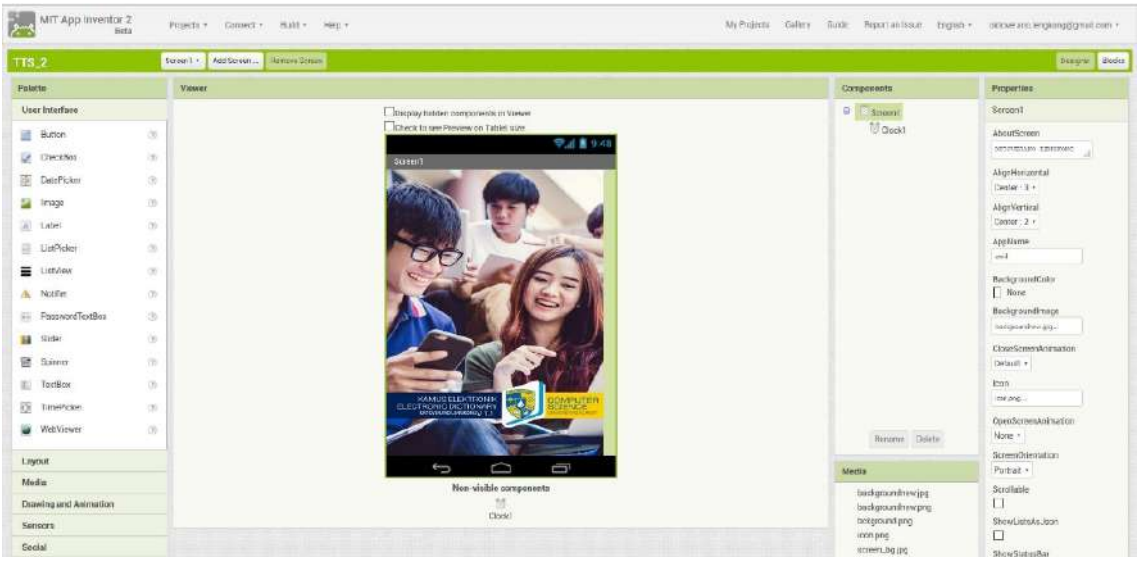

Figure 5 The interface of MIT App Inventor designer mode.

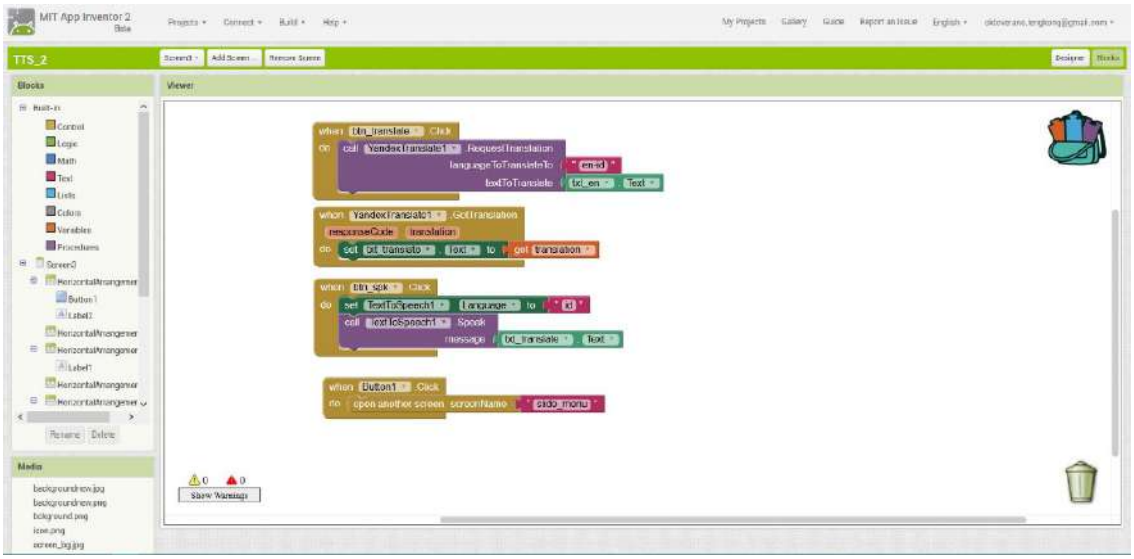

Figure 6 The interface of MIT App Inventor puzzle mode

Some of the main views of the Translator Application, namely: 1. Main Menu, which displays the menu of the application. 2. Menu translator; displays a menu of translation options between the two languages, Indonesian and English. 3. Pronunciation menu: displays the feature menu and plays how a word or sentence is mentioned. Each interface is accompanied by puzzle-shaped coding from MIT App Inventor.

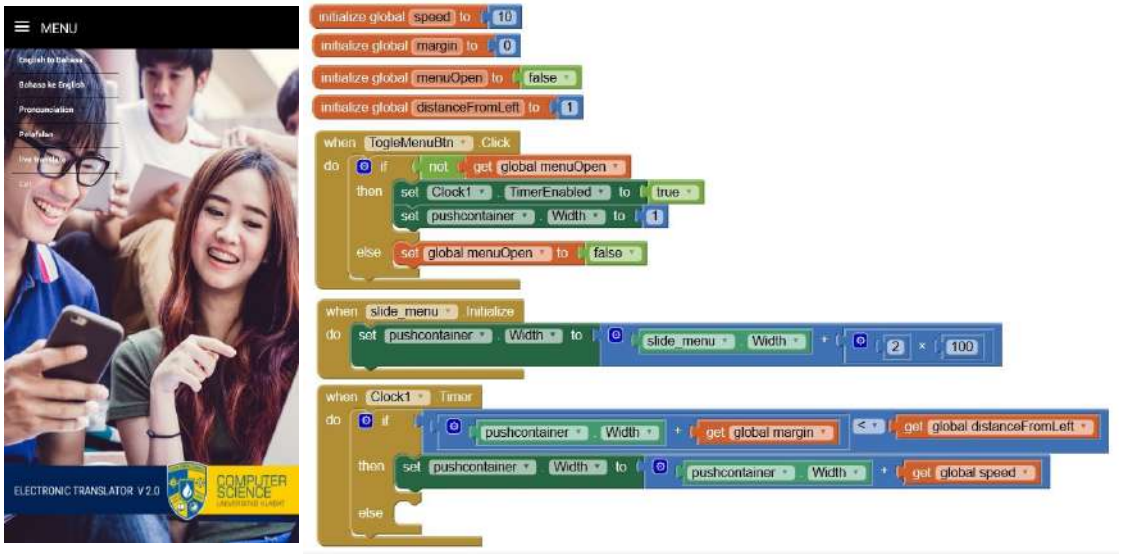

Figure 7 Main Menu Interface

Figure 7 is the interface of the main menu. The main menu consists of the feature menus of the applications made, namely; Translation from English to Indonesian, and vice versa from Indonesian to English. The display of the translation feature can be seen in Figure 8. Then there is a pronunciation feature or pronunciation, how to pronounce words from each language, which can be seen in Figure 9. Also, the main feature is a live translator who can input words or sentences directly from the voice or voice. Furthermore, voice recognition, which results from the translation,, also directly interacting to provide output in the form of sound generated from the Yandex Engine, as shown in Figure 10.

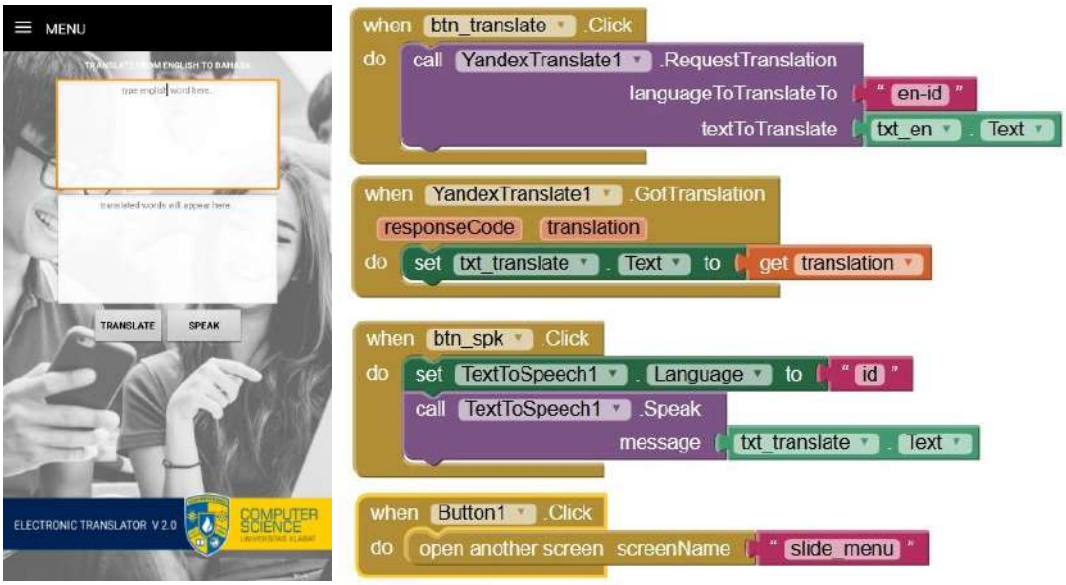

Figure 8 Translation Menu Interface

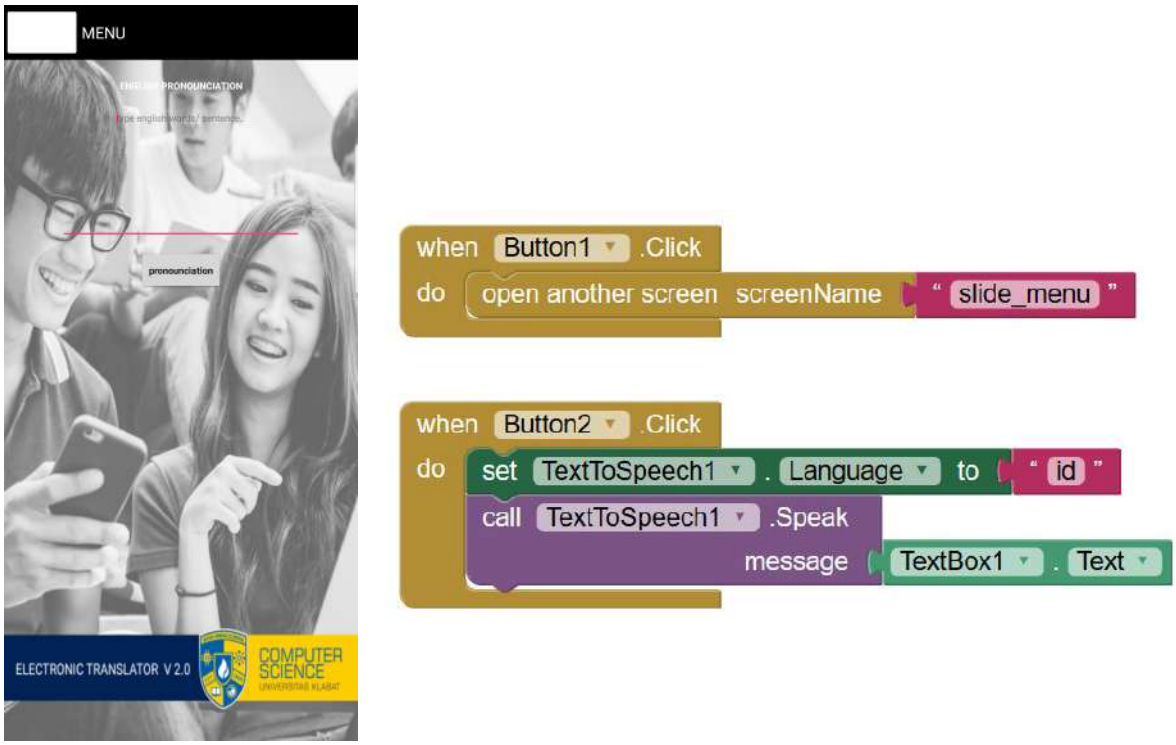

Figure 9 Pronunciation Menu Interface

Figure 10 Live Translator Menu Interface

4. CONCLUSION

Although still in the beta/trial stage, MIT App Inventor can produce android applications that can be used on Android Smartphones. The Text To Speech engine can run in either Indonesian or English. The .apk extension file can be directly downloaded via MIT App Inventor and installed on Android smartphones. From the results of this study, the authors found that the translation process or voice translation from the Yandex Engine, in particular words or sentences, there were translator errors, but not all of them. In this case, Indonesian. Therefore, the writer concludes that the Indonesian voice is still not optimal. However, the translation process through word and sentence input can run well and correctly.

5. FUTURE STUDY

The implementation of the Yandex engine can still be maximized, for further development can add features such as; addition of language, if the translation is in the form of a sentence, identification of the subject, predicate, object, and description in Indonesian or foreign language grammar can be carried out. The result of the translation can be more than one word or similar words. You can also add the auto-correction words feature so that it can be easily translated. Moreover, in the subsequent development, we can consider other translation engines.

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