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OPTICAL CHARACTER RECOGNITION APPLIED TO ANDROID-BASED BILINGUAL TRANSLATOR APPLICATION (ENGLISH AND INDONESIAN) TO SIGN LANGUAGE

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ABSTRACT
This research focused on the methods of optical character recognition technologies that applied to android-based translator application.The high number of deaf-born babies in Indonesia causes a high number of children who will grow but cannot recognize various types of lettersyet because they are limited by their physical abilities. So, to help introduce letters more broadly, effectively, and efficiently, the latest technological innovations are needed, one of which is the application of converting images containing text into text and translating into sign language. In making this android-based application used Optical Character Recognition (OCR) technology by using Tesseract as an engine of OCR (Optical Character Recognition) for character or letter recognition.

Keywords:
Optical Character Recognition, Translator Application, Android, Sign Language

INTRODUCTION

OCR (Optical Character Recognition) technology allows the conversion of scanned images from printed characters into text or other information that the user wants using an Android phone[1].The OCR technology is used for recognizing the letter on the android-based translator aplication. The android. Android is the most popular operating system in the world (OS) for mobile and tablet devices. This is an open source OS, made by Google, and is available for all types of developers with various levels of expertise. Android is the first free, open source, and fully customizable mobile platform, a pile of software for mobile devices including major OS, middleware and mobile applications. The Android SDK provides tools and API that needed to develop applications on the Android platform[2]. This translator application is focused in translating the word in Indonesian and English to Sign-Languange that will come up as .GIF format on the application. Sign Language that is widely used in Indonesia has 2 types, namely SIBI (Indonesian Language Signaling System) and BISINDO (Indonesian Sign Language). Indonesian Sign Language is a practical and effective communication system for Indonesian deaf people developed by Indonesian deaf people used as communication between people who hear. Indonesian Sign Language itself originated from the early language / language of the deaf mother, where the use of BISINDO itself adapts to the understanding of the language of deaf people from various deaf backgrounds without providing the structure of the Indonesian language[3]. The deaf people usually use the Sign Languange to communicate with other. The translator application will help the deaf wether they are deaf-born people, usually called as congenital deafness and also this aplplication can help the partially deaf people. Congenital deafness is a hearing loss at birth and occurs when the ability of the ear to convert the mechanical energy of sound vibrations into electrical energy is disturbed[4].

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Optical Character Recognition

OCR technology using the first three phases, firstis scanning documents as optical images. Next, therecognition which involves converting these images to character streams that represent the letters of the known word and the last element used to access or save converted text. The converted text is the extracted text. When, the user starts capturing images using a cellphone camera that contains text. Most character recognition systems will be recognized through the input images that connected with the software.

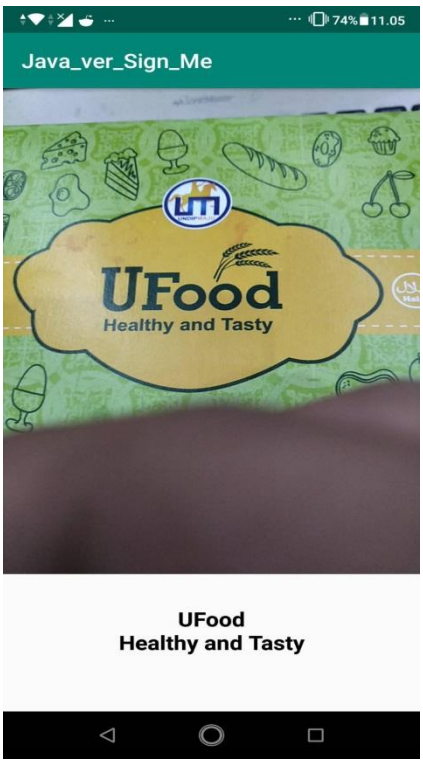

Fig. 1: The result of the interpretation of the image by the OCR

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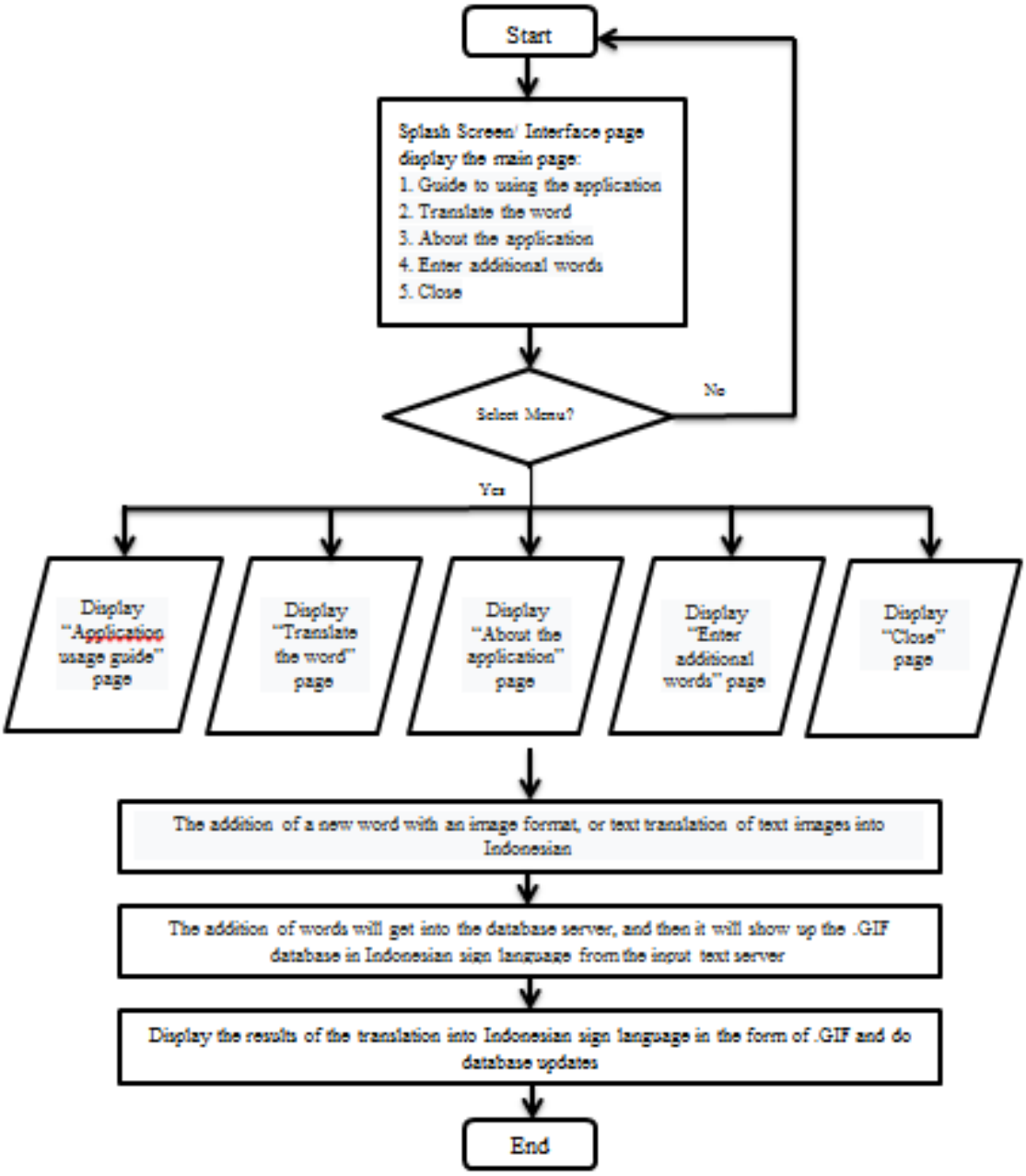

Fig. 2:Overall Application Flow Chart

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METHODOLOGY

The methodology adopted in this paper is consist of 3 stages, 1. Preparation stage (linear study and work plan determination); 2. Implementation Phase (Procurement of tools and materials, translator application design); 3. Phase Testing Tools (analyzing tool capabilities).

Preparation Phase

- Conduct a literature study on the making of applications using the Android-based OCR method, the system of communication of deaf people, the Indonesian Sign Language System.
- Prepare the design and detailed arrangement of the application. Application design flow provide an understanding of the working principles and set of tools.
- Determine the work steps and preparation of applications which include database creation, application programming techniques, translator systems with Web Translator, and the display page creation on the application.

Implementation Phase

- Establishing Tools and Materials for Making the Translator Application
  1. Research Tools
  The equipment used is a set of computers, Android phones, laptops and cameras.
  2. Research Materials
  This study does not use materials, but uses a programming manual as a reference in application development
- Making Indonesian Sign Language Database Creation
  Making a Database with the help of a Indonesian Sign Language user, who will demonstrate the gesture of Indonesian Sign Language which will later be recorded and made in the .GIF format to be used as the output of the translator application. Files that have been created will be saved to the server, because it will take up a lot of space capacity when it placed on the application.
- Making SIGN-ME Application Creation
  Designing the application's main page needs to be done before starting to create an application programming language. After the interface page design is created, a new project will be created with an Android base and utilizing OCR technology. OCR will convert images in the form of text into text, which will then be linked to Web Translators such as Microsoft (Bing) Translate and Google Translate. Text (Output) will appear in Indonesian translation. This first text output will be continued to be translated into Indonesian Sign Language by inputting the .GIF format file database from the server. Then it will produce an output in the form of a .GIF file that translates Indonesian Language each word into Indonesian Sign Language.

Prototype Testing Phase

In making a prototype several tests were carried out:

- Application Effectiveness and Efficiency Testing
  Conducted by procuring questionnaires for congenital deaf people around Semarang. Measurement of the speed of time translating, and the level of usefulness for people with deafness.
- Testing App Screens
  Used to adjust the appearance of the application on the main page with an outline of the application design that has been made.Tests have been done on the display of applications through the emulator and the results are the same as the outline of the application design that has been made.
- Testing the Level of Conformity
  Measuring Character Accurancy, which is used to measure the introduction of input text with actual text.
- Testing of Output Suitability
  Knowing the suitability of the meaning of the output in the form of .GIF with the meaning of the translated text

CONCLUSION

Based on the research carried out on the three stages of methodsfor making the translator applicationamong them; preparation phase, implementation phase, and prototype testing phase. However, it was concluded that the optical character recognition was very effective to recognize each word in the text and then thetext (Output) will

be translated into Indonesian Sign Language by inputting the .GIF format file database from the server. And the benefits of this research are providing solutions for deaf people especially congenital deafness in Indonesia who want to learn foreign languages, helps make it easier for deaf people, especially congenital deaf to read books and papers that can improve their knowledge, helping non deaf people to communicate with deaf people.

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