PROCEEDINGS

ICSET 2019

The Second International Conference on Science, Engineering and Technology

"Sustainable Development in Developing Country for Facing Industrial Revolution 4.0"

September 5-7, 2019
SKA Convention & Exhibition Center, Pekanbaru, Riau, Indonesia

Editors:
Arbi Haza Nasution
Evizal Abdul Kadir
Luiz Moutinho

Organizer :

Co-Organizers :

UNIVERSITI TEKNOLOGI MARA

Infrastructure University Kuala Lumpur

ICoSET 2019

Proceedings of the
Second International Conference on
Science, Engineering and Technology

Riau - Indonesia

September 5 - 7, 2019

Edited by Arbi Haza Nasution, Evizal Abdul Kadir and Luiz Moutinho

Printed in Portugal
ISBN: 978-989-758-463-3
Depósito Legal: 473348/20

http://icoset.uir.ac.id

BRIEF CONTENTS

INVITED SPEAKERS IV

ORGANIZING COMMITTEES V

PROGRAM COMMITTEE VI

FOREWORD VII

CONTENTS IX

INVITED SPEAKERS

Prof. EE-Peng Lim
Singapore Management University
Singapore

Assoc. Prof. Yuichi Sugai
Kyushu University
Japan

Prof. Ir. Dr Sharul Kamal Abdul Rahim
Universiti Teknologi Malaysia
Malaysia

Assoc. Prof. Dr. Norma binti Alias
Universiti Teknologi Malaysia
Malaysia

ORGANIZING COMMITTEES

GENERAL CHAIR

Dr. Arbi Haza Nasution, M.IT, Universitas Islam Riau, Indonesia

TECHNICAL PROGRAM CHAIR

Dr. Evizal Abdul Kadir, ST., M.Eng, Universitas Islam Riau, Indonesia

GENERAL CO-CHAIR

Dr. Eng. Muslim, ST., MT, Universitas Islam Riau, Indonesia

EDITORIAL CHAIR

Yudhi Arta, S.Kom., M.Kom, Universitas Islam Riau, Indonesia

STEERING COMMITTEE

Prof. Josaphat Tetuko Sri Sumantyo, Ph.D, Chiba University, Japan
Prof. Ir. Dr. Sharul Kamal Abdul Rahim, Universiti Teknologi Malaysia, Malaysia
Prof. Toru Ishida, Kyoto University, Japan
Prof. Ee-Peng Lim, Singapore Management University, Singapore
Prof. Dr. H Syafrinaldi SH, MCL, Universitas Islam Riau, Indonesia

PUBLICATION AND RELATIONSHIP CHAIR

Dr. Syafriadi, S.H., M.H., Universitas Islam Riau, Indonesia

FINANCIAL CHAIR

Ause Labellapansa, ST., M.Cs., M.Kom., Universitas Islam Riau, Indonesia

EDITORIAL BOARD

Putra Efri Rahman, S.Kom, Universitas Islam Riau, Indonesia
Khairul Umam Syaliman, S.T., M.Kom., Politeknik Caltex Riau, Indonesia
Winda Monika, S.Pd., M.Sc., Universitas Lancang Kuning, Indonesia
Panji Rachmat Setiawan, S.Kom., M.M.S.I., Universitas Islam Riau, Indonesia
Rizdqi Akbar Ramadhan, S.Kom., M.Kom., Universitas Islam Riau, Indonesia
Anggiat, Universitas Islam Riau, Indonesia
Arif Lukman Hakim, Universitas Riau, Indonesia

PROGRAM COMMITTEE

Prof. Dr. Tengku Dahril, M.Sc, Universitas Islam Riau, Indonesia

Prof. Dr. Hasan Basri Jumin, M.Sc, Universitas Islam Riau, Indonesia

Prof. Dr. Sugeng Wiyono, MMT, Universitas Islam Riau, Indonesia

Prof. Zainal A. Hasibuan, MLS., Ph.D, University of Indonesia, Indonesia

Prof. Josaphat Tetuko Sri Sumantyo, Ph.D, Chiba University, Japan

Prof. Dr. Eko Supriyanto, Universiti Teknologi Malaysia, Malaysia

Prof. Dr. Zailuddin Arifin, Universiti Teknologi MARA, Malaysia

Prof. Jhon Lee, B.Sc, M.Sc., Ph.D, Kyungdong University, Korea

Prof. Ahmed A. Al Absi, Kyungdong University, Korea

Prof. Wisup Bae, Ph.D, Sejong University, Korea

Prof. Kyuro Sasaki, Kyushu University, Japan

Prof. Adiwijaya, Telkom University, Indonesia

Prof. Ir. Asep Kurnia Permadi, M. Sc, Ph.D, Institut Teknologi Bandung, Indonesia

Assoc. Prof. Dr. Azhan Hashim Ismail, Universiti Teknologi MARA, Malaysia

Assoc. Prof. Yuichi Sugai, Kyushu University, Japan

Assoc. Prof. Dr. Sonny Irawan, Universiti Teknologi Petronas, Malaysia

Assoc. Prof. Hussein Hoteit, King Abdullah University of Science and Technology, Saudi Arabia

Assoc. Prof. Dr. Anas Puri, ST., MT, Universitas Islam Riau, Indonesia

Kuen-Song Lin, Ph.D, Yuan Ze University, Taiwan

Dr. Shukor Sanim Mohd Fauzi, Universiti Teknologi MARA, Malaysia

Dr. Inkyo Cheong, Inha University, Korea

Ahn, Young Mee, Ph.D, Inha University, Korea

Hitoshi Irie, Ph.D, Chiba University, Japan

Julie Yu-Chih Liu, Ph.D, Yuan Ze University, Taiwan

Liang Chih Yu, Ph.D, Yuan Ze University, Taiwan

Chia-Yu Hsu, Ph.D, Yuan Ze University, Taiwan

Dr. Amit Pariyar, University Malaysia Sarawak, Malaysia

Dr. Madi Abdullah Naser, Sebha University, Libya

Dr. Nguyen Xuan Huy, Ho Chi Minh City University of Technology, Vietnam

Dr. Chunqiu Li, Beijing Normal University, China

Dr. Goh Thian Lai, Universiti Kebangsaan Malaysia, Malaysia

Dr. Syahrir Ridha, Universiti Teknologi Petronas, Malaysia

Dr. Kemas Muslim L., Telkom University, Indonesia

Dr. Moch. Arif Bijaksana, Telkom University, Indonesia

Dr. Satria Mandala, Telkom University, Indonesia

Dr. Wahyudi Sutopo, Solo State University, Indonesia

Dr. Zulfatman, University of Muhammadyah Malang, Indonesia

Dr. Suranto AM, UPN Veteran Yogyakarta, Indonesia

Dr. Eng. Husnul Kausarian, B.Sc (Hons)., M.Sc, Universitas Islam Riau, Indonesia

FOREWORD

In the name of Allah, Most Gracious, Most Merciful
Assalamu'alaikum Wr. Wb.,

Welcome to the Second International Conference on Science Engineering and Technology (ICoSET 2019). The advancement of today's computing technology, science, engineering and industrial revolution 4.0 play a big role in the sustainable development of social, economic, education, and humanity in developing countries. Institute of higher education is one of many parties that need to be involved in the process. Academicians and researchers should promote the concept of sustainable development. The Second International Conference on Science, Engineering and Technology (ICoSET 2019) is organized to gather researchers to disseminate their relevant work on science, engineering and technology. The conference is co-located with The Second International Conference on Social, Economy, Education, and Humanity (ICoSEEH 2019) at SKA Co-EX Pekanbaru Riau.

I would like to express my hearty gratitude to all participants for coming, sharing, and presenting your research at this joint conference. There is a total of 84 manuscripts submitted to ICoSET 2019. However only high-quality selected papers are accepted to be presented in this event, with the acceptance rates of ICoSET 2019 is 70%. We are very grateful to all steering committees and both international and local reviewers for their valuable work. I would like to give a compliment to all co-organizers, publisher, and sponsors for their incredible supports.

Organizing such prestigious conferences was very challenging and it would be impossible to be held without the hard work of the program committee and organizing committee members. I would like to express my sincere gratitude to all committees and volunteers from Singapore Management University, Kyoto University, Kyushu University, University of Tsukuba, Khon Kaen University, Ho Chi Minh City University of Technology, University of Suffolk, Universiti Teknologi Malaysia, Infrastructure University Kuala Lumpur, Universiti Malaya, Universiti Kebangsaan Malaysia, Universiti Utara Malaysia, Universiti Teknologi Mara, and Universiti Pendidikan Indonesia for providing us with so much support, advice, and assistance on all aspects of the conference. We do hope that this event will encourage collaboration among us now and in the future.

We wish you all find the opportunity to get rewarding technical programs, intellectual inspiration, and extended networking.

Pekanbaru, 27th August 2019
Dr. Arbi Haza Nasution, M.IT
Chair of ICoSET 2019

CONTENTS

PAPERS

FULL PAPERS

Design of Community-based Ecotourism at Cengkehan and Giriloyo, Wukirsari Village, Imogiri District, Bantul Regency, Special Region of Yogyakarta 5
Suhartono, Sri Mulyaningsih, Desi Kiswiranti, Sukirman, Nurwidi A. A. T. Heriyadi, Muchlis and Iva Mindhayani

Prototype Storage Locker Security System based on Fingerprint and RFID Technology 11
Apri Siswanto, Hendra Gunawan and Rafiq Sanjaya

Feasibility Study of CO2 Flooding under Gross-split Mechanism: Simulation Approach 15
Muslim Abdurrahman, Wisup Bae, Adi Novriansyah, Dadan Damayandri and Bop Duana Afrireksa

Online Classroom Attendance System based on Cloud Computing 20
Sri Listia Rosa and Evizal Abdul Kadir

Analysis of Porosity and Permeability on Channel Deposit Sandstone using Pore-gas Injection and Point Counting in Sarilamak Area, West Sumatra 26
Bayu Defitra, Tiggi Choanji and Yuniarti Yuskar

A Simulation Study of Downhole Water Sink Guidelines Plot Application using Real Field Data 31
Praditya Nugraha

Groundwater Exploration using 2D Electrical Resistivity Imaging (ERI) at Kulim, Kedah, Malaysia 35
Adi Suryadi, Muhammad Habibi, Batara, Dewandra Bagus Eka Putra and Husnul Kausarian

Risk Identification in Management System Process Integration Which Have Impact on the Goal of Management System Components 41
Nastasia Ester Siahaan, Leni Sagita and Yusuf Latief

The Performance of 3D Multi-slice Branched Surface Reconstruction on CPU-GPU Platform 49
Normi Abdul Hadi and Norma Alias

Tile-based Game Plugin for Unity Engine 55
Salhazan Nasution, Arbi Haza Nasution and Arif Lukman Hakim

Image Segmentation of Nucleus Breast Cancer using Digital Image Processing 64
Ana Yulianti, Ause Labellapansa, Evizal Abdul Kadir, Mohana Sundaram and Mahmod Othman

An Integrated Framework for Social Contribution of Diabetes Self-care Management Application 68
Zul Indra, Liza Trisnawati and Luluk Elvitaria

Spatiotemporal Analysis of Urban Land Cover: Case Study - Pekanbaru City, Indonesia 74
Idham Nugraha, Faizan Dalilla, Mira Hafizhah Tanjung, Rizky Ardiansyah and M. Iqbal Hisyam

The Effectiveness of Rice Husk Biochar Application to Metsulfuron Methyl Persistence 80
Subhan Arridho, Saripah Ulpah and Tengku Edy Sabli

Digital Forensics: Acquisition and Analysis on CCTV Digital Evidence using Static Forensic Method based on ISO /IEC 27037:2014 85
Rizdqi Akbar Ramadhan, Desti Mualfah and Dedy Hariyadi

Testing the Role of Fish Consumption Intention as Mediator 90
Junaidi, Desi Ilona, Zaitul and Harfiandri Damanhuri

Segmentation of Palm Oil Leaf Disease using Zoning Feature Extraction 98
Ause Labellapansa, Ana Yulianti and Agus Yuliani

Analysis of Economy in the Improvement of Oil Production using Hydraulic Pumping Unit in X Field 102
Muhammad Ariyon, Novia Rita and Tribowo Setiawan

Construction Design and Performance of Dry Leaf Shredder with Vertical Rotation for Compost Fertilizer 109
Syawaldi

The Impact of Additively Coal Fly Ash toward Compressive Strength and Shear Bond Strength in Drilling Cement G Class 114
Novrianti, Dori Winaldi and Muhammad Ridho Efras

Impact of Vibration of Piling Hammer on Soil Deformation: Study Case in Highway Construction Section 5 Pekanbaru-Dumai 120
Firman Syarif, Husnul Kausarian and Dewandra Bagus Eka Putra

Combination Playfair Cipher Algorithm and LSB Steganography for Data Text Protection 125
Apri Siswanto, Sri Wahyuni and Yudhi Arta

Fire Detection System in Peatland Area using LoRa WAN Communication 130
Evizal Abdul Kadir, Hitoshi Irie and Sri Listia Rosa

Forest Fire Monitoring System using WSNs Technology 135
Evizal Abdul Kadir, Sri Listia Rosa and Mahmod Othman

Multi Parameter of WSNs Sensor Node for River Water Pollution Monitoring System (Siak River, Riau-Indonesia) 140
Evizal Abdul Kadir, Abdul Syukur, Bahruddin Saad and Sri Listia Rosa

Analysis for Gerund Entity Anomalies in Data Modeling 146
Des Suryani, Yudhi Arta and Erdisna

The Incidence of Rhinoceros Beetle Outbreak in Public Coconut Plantation in Tanjung Simpang Village, Indragiri Hilir, Riau Province 151
Saripah Ulpah, Nana Sutrisna, Fahroji, Suhendri Saputra and Sri Swastika

Mobile Application of Religious Activities for the Great Mosque Islamic Center Rokan Hulu with Push Notification 155
Salhazan Nasution, Arbi Haza Nasution and Fitra Yamita

An Augmented Reality Machine Translation Agent 163
Arbi Haza Nasution, Yoze Rizki, Salhazan Nasution and Rafi Muhammad

The Community Perception of Traditional Market Services in Pekanbaru City, Riau Province 169
Puji Astuti, Syaifullah Rosadi, Febby Asteriani, Eka Surya Pratiwi and Thalia Amanda Putri

Separation of Crude Oil and Its Derivatives Spilled in Seawater by using Cobalt Ferrite Oxide 175
Mohammed A, Samba, Ibrahim Ali Amar, Musa Abuadabba, Mohammed A. Alfroji, Zainab M. Salih and Tomi Erfando

Study of Open Space Utilization in Pekanbaru City, Riau Province 182
Mira Hafizhah T., Febby Asteriani, Mardianto and Angelina Rulan S.

Application of Augmented Reality as a Multimedia Learning Media: Case Study of Videography 188
Ahmad Zamsuri, Fadli Suandi and Rizki Novendra

Green Building Performance Analysis in the Stimi Campus Building 194
Dian Febrianti and Samsunan

Towing Service Ordering System based on Android: Study Case - Department of Transportation, Pekanbaru 200
Panji Rachmat Setiawan, Yudhi Arta and Rendi Sutisna

Biosurvey of Mercury (Hg), Cadmium (Cd), and Lead (Pb) Contamination in Reclamation Island-Jakarta Bay 205
Salmita Salman, Achmad Sjarmidi and Salman

Expert System to Detect Early Depression in Adolescents using DASS 42 211
Nesi Syafitri, Yudhi Arta, Apri Siswanto and Sonya Parlina Rizki

Geotechnics Analysis: Soil Hardness on Stability of Davit Kecil's Weir in Ulu Maras, Kepulauan Anambas, Kepulauan Riau 219
Miftahul Jannah, Dewandra Bagus Eka Putra, Firman Syarif, Joni Tripardi, Nopiyanto and Husnul Kausarian

Support for Heritage Tourism Development: The Case of Ombilin Coal Mining Heritage of Sawahlunto, Indonesia 229
Jonny Wongso, Desi Ilona, Zaitul and Bahrul Anif

Aerial Photogrammetry and Object-based Image Analysis for Bridge Mapping: A Case Study on Bintan Bridge, Riau Islands, Indonesia 237
Husnul Kausarian, Muhammad Zainuddin Lubis, Primawati, Dewandra Bagus Eka Putra, Adi Suryadi and Batara

Monitoring Single Site Verification (SSV) System and Optimization BTS Network based on Android 243
Abdul Syukur, Siti Rahmadhani Sabri and Yudhi Arta

Characterization of the Ethnobotany of Riau Province Mascot Flora (Oncosperma tigillarium (Jack) Ridl.) 250
Desti, Fitmawati, Putri Ade Rahma Yulis and Mayta Novaliza Isda

Effect Stocking Density on Growth and Survival rate of Larval Selais Fish (Kryptopterus lais) Cultured in Recirculation System 254
Agusnimar Muchtar and Rosyadi

Development of Safety Plan to Improve OHS (Occupational Health and Safety) Performance for Construction of Dam Supporting Infrastructure based on WBS (Work Breakdown Structure) 258
Aprilia Dhiya Ulhaq, Yusuf Latief and Rossy Armyn Machfudiyanto

Design of Web Login Security System using ElGamal Cryptography 268
Yudhi Arta, Hendra Pratama, Apri Siswanto, Abdul Syukur and Panji Rachmat Setiawan

Standard Operational Procedures Development for Government Building's Care and Maintenance Work of Outer Spatial and Housekeeping Component to Improve Work Effectiveness and Efficiency using Risk-based Approach 274
Lasita Khaerani, Yusuf Latief and Rossy Armyn Machfudiyanto

A Novel Correlation on MMP Prediction in CO2-LPG Injection System: A Case Study of Field X in Indonesia 285
Prasandi Abdul Aziz, Hendra Dwimax, Tutuka Ariadji, Steven Chandra, Wijoyo Niti Daton and Ressi Bonti

Productivity Analysis of Frac-pack Completion in M Well with Sand Problem Indication and High Permeability Formation 291
Herianto, Prasandi Abdul Aziz, Wijoyo Niti Daton and Steven Chandra

Emulsion Treatment using Local Demulsifier from Palm Oil 299
Tomi Erfando and Emre Fathan

Designing an IoT Framework for High Valued Crops Farming 304
Domingo Junior P. Ngipol and Thelma D. Palaoag

Consideration of the Different Pile Length Due to Soil Stress and Inner Forces of the Nailed-slab Pavement System under Concentric Load 311
Anas Puri, Roza Mildawati and Muhammad Solihin

Utilization of Agricultural Waste to Be Bioethanol Sources as a Solvent on Paraffin Wax Crude Oil Issues 315
M. K. Afdhol, F. Hidayat, M. Abdurrahman, H. Z. Lubis, R. K. Wijaya and N. P. Sari

The Effect of Regeneration Time of Biomass Activated Carbon using Low Temperature to Reduce Filtration Loss in Water-based Drilling Fluid 322
Nur Hadziqoh, Mursyidah, Arif Rahmadani, Idham Khalid and Hasnah Binti Mohd Zaid

Improving the Accuracy of Features Weighted k-Nearest Neighbor using Distance Weight 326
K. U. Syaliman, Ause Labellapansa and Ana Yulianti

Predicting of Oil Water Contact Level using Material Balance Modeling of a Multi-tank Reservoir 331
Muslim Abdurrahman, Bop Duana Afrireksa, Hyundon Shin and Adi Novriansyah

Chip Formation and Shear Plane Angle Analysis on Carbon Steel Drilling using Solid Carbide Tools 337
Rieza Zulrian Aldio

A Solution to Increase Natuna D Alpha's Resource Utilization by Cryogenic Distillation: Conceptual Design & Sensitivity Study 342
Wijoyo Niti Daton, Ezra Revolin, Siptian Nugrahawan, Prasandi Abdul Aziz, Tutuka Ariadji, Steven Chandra and J. A. Nainggolan

Design of Volcanic Educational-based Natural Tourism at Giriloyo, Wukirsari Village, Imogiri District, Bantul Regency, Yogyakarta-Indonesia 349
Sri Mulyaningsih

Four Types of Moral Holistic Values for Revolutionizing the Big Data Analytics in IoT-based Applications 357
Norma Alias

AUTHOR INDEX 363

PAPERS

An Augmented Reality Machine Translation Agent

Arbi Haza Nasution[1], Yoze Rizki[2], Salhazan Nasution[3], Rafi Muhammad[1]
[1]*Department of Informatics Engineering, Universitas Islam Riau, Pekanbaru, Indonesia*
[2]*Department of Informatics Engineering, Universitas Muhammadiyah Riau, Pekanbaru, Indonesia*
[3]*Department of Informatics, Universitas Riau, Pekanbaru, Indonesia*

Keywords: Machine Translation, Augmented Reality, Chatbot.

Abstract: English is a language used as a universal communication tool. Therefore, without English skills, a person will have a difficulty to communicate properly and correctly in the international scope. This research developed an application of augmented reality-based translating machine that provides the education to students with different media in order to increase students' interest in learning English. This application used library Vuforia sdk which is able to display 3-dimensional characters with markerless techniques in the form of augmented reality. The final result of this study was an application that can be used on smartphones with Android operating system. Based on the results of the application testing, it is concluded that this application can display 3-dimensional characters in dim light with light intensity of 28 lux at a distance of 10cm-60cm and viewing angle of 10°-90°. After reviewing the application, 95% of the correspondents stated that this application is good so it can help students to relearn English outside the school.

1 INTRODUCTION

According to Yamin (2017), the current development of information technology makes all developing countries improve the quality of their human resources as an effort to face global competition. English is one language that is used as a universal communication tool in the international scope.

Moreover, Galih et al. (2017) states that English iscurrently a foreign language introduced in elementary schools because children aged 6-12 years have a brilliant learning period called the golden age (Saputra and Indonesia, 2014; Pangestika et al., 2017; Mariani and Ananta, 2017).

The learning facilities at school are still conventional in which teachers deliver the lessons assisted by textbooks as teaching guides in front of the class. As a result, this makes students less interested in the learning process.

This research generates a system in the form of an attractive English learning tool to increase children's learning interest at the school age. This system translates a text into sound in Indonesian to English and vice versa. A smartphone is needed as a medium to run the application. Characters in 3-dimensional form will translate questions from users, either words or sentences that have been previously inputted (Dikdok, 2017; Efendi, 2014).

2 LITERATURE REVIEW

There are several prior works being discussed in this section. The first study was an implementation of augmented reality systems conducted by Yoga Aprillion Saputra, (2014), entitled "The Implementation of Augmented Reality (AR) in Archaeological Fossils at the Bandung Geological Museum". The second study becoming the reference for the language translation process was conducted by Galih Vidia Pangestika, et al. (2017) entitled "An Android-Based English Language Learning Application for Elementary School Students". The next research was conducted by Mariani, et al. (2017) entitled "The Development of SMS Response and Phone Call Applications Using Android Text To Speech and Proximity Sensors for Drivers" as a reference for the implementation of Text To Speech method (Mariani and Ananta, 2017; Pangestika et al., 2017; Saputra and Indonesia, 2014).

Based on the literature reviews of the previous research, it can be concluded that the creation of an augmented reality-based machine translation that utilizes markerless techniques and Vuforia SDK as a

Nasution, A., Rizki, Y., Nasution, S. and Muhammad, R.
An Augmented Reality Machine Translation Agent.
DOI: 10.5220/0009146301630168
In *Proceedings of the Second International Conference on Science, Engineering and Technology (ICoSET 2019)*, pages 163-168
ISBN: 978-989-758-463-3

supporting library has never been done.

2.1 Machine Translation

There are three different kind of machine translation. The rule-based method is a technique that uses standard language rules in the process of transliteration (Rahman et al., 2014; Dewantara et al., 2013). Hansel (2009) states that statistical machine translation utilizes a machine translation paradigm in which the translation results are generated on the basis of statistical models using parameters obtained from the analysis of the collections of parallel two-language texts. The neural machine translation is a new feature of google translate that works by translating all sentences at once, so the translation looks more natural, accurate and not weird when it is read.

In the research of Nasution, et.al (2017), Machine Translation (MT) is very useful in supporting multicultural communication. Existing Statistical Machine Translation (SMT) which requires high quality and quantity of corpora and Rule-Based Machine Translation (RBMT) which requires bilingual dictionaries, morphological, syntax, and semantic analyzer are scarce for low-resource languages. Due to the lack of language resources, it is difficult to create MT from high-resource languages to low-resource languages like Indonesian ethnic languages. Nevertheless, Indonesian ethnic languages' characteristics motivate us to introduce a Pivot-Based Hybrid Machine Translation (PHMT) by combining SMT and RBMT with Indonesian as a pivot which we further utilize in a multilingual communication support system(Nasution et al., 2017; Panggabean, 2016).

2.2 Pivot-based Hybrid Machine Translation

In the research of Nasution, et.al (2018), Google Translate service and bilingual dictionary service were combined as a composite service in the language grid. There are more than a hundred high-resource languages available in the Google Translate service. To this date, two Indonesian ethnic languages, i.e., Javanese and Sundanese, are available in Google Translate service alongside the official language, Indonesian (Nasution et al., 2018; Nugroho, 2005).

It is unlikely that Google Translate can provide the rest of Indonesian ethnic languages in the near future, since the available corpora for Indonesian ethnic languages are still scarce. In order to bridge the gap between high-resource languages and low-resource languages, in this case between English and Minangkabau, a quicker approach is to create an English-Minangkabau PHMT with Indonesian as the pivot. Since Minangkabau has 61.59% lexical similarity with Indonesian based on ASJP, the morphology and syntax are similar. Therefore, Indonesian-Minangkabau word-to-word translation is expected to be acceptable.

2.3 Language Grid

Toru Ishida (2018) mentioned that globalization increasingly demands multilingual communication on the Internet, as well as in local communities. To create customized collaboration tools to support multilingual communities, the Language Grid was established ten years ago. It has been improving web-based services to communities throughout the world by providing highly adaptable infrastructure and access to a wide variety of language resources and services (Ishida et al., 2018; Nasution et al., 2017; Nasution, 2018).

3 RESEARCH METHOD

3.1 System Overview

Based on the results of the research analysis, it can be concluded that the Augmented reality-based Translating Machine has two criteria. This Augmented reality-based Translating Machine can interact with users by translating text from Indonesian into English and vice versa, and by displaying sound as the result of translation and animated 3D characters. Augmented reality-based Translating Machine is markerless, which means that it does not use printed markers to display 3D animation models.

Figure 1 explains the bird view of process from input in the form of text to output in the form of animation object and speech translation results.

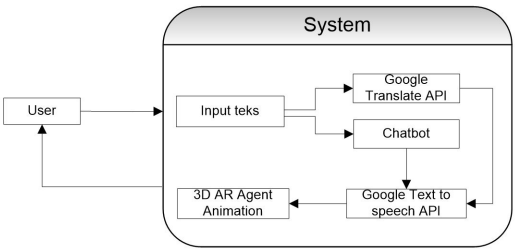

Figure 1: Whole System Overview.

3.2 Interactive Words

Interactive is a matter related to two-way communication or something that is mutually acting, active and interconnected and has reciprocity between one another (Warsita, 2008). In this system, the word "interactive" is classified into two categories, namely special and general. When a user types a word in the application, the word will be matched to the database. If it is in the database, the 3-dimensional character will say an interactive word consisted in a special interactive word table randomly. Otherwise, if the word typed by the user does not exist in the database, the 3-dimensional character will utter an interactive word consisted in a general interactive word table randomly. In this system, the interactive word consists of two languages, Indonesian and English.

Examples of general and specific interactive words can be seen in the following Table 1.

Table 1: Chatbot Corpus

Category	Keywords	#Random Statement
Food	fried rice, meatball, fried chicken, fried potatoes, egg	3 for each keyword
Color	red, yellow, green, blue, white	3 for each keyword
Animal	chicken, goat, cow, cat, dog	3 for each keyword
Transportation	plane, car, motorcycle, bike, train	3 for each keyword
Fruit	grape, apple, banana, mango, pineapple	3 for each keyword
General	None	5

3.3 Flowchart

In this study, the design of the application used a flowchart in order to show the workflow done by the system as a whole. In general, the flows of the application ofAugmented Reality-Based Translating Machine were as follows:

The flow diagram of the application of augmented reality-based Translating Machine can be seen in Figure 2 and Figure 3.

The flows of the system of an interactive machine based on augmented reality can be explained as follows:

1. The user inputs the text.
2. The text is checked in the database.

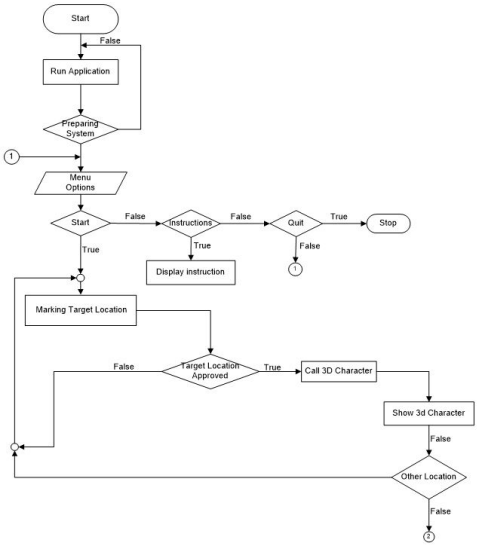

Figure 2: System flowchart (Augmented reality part).

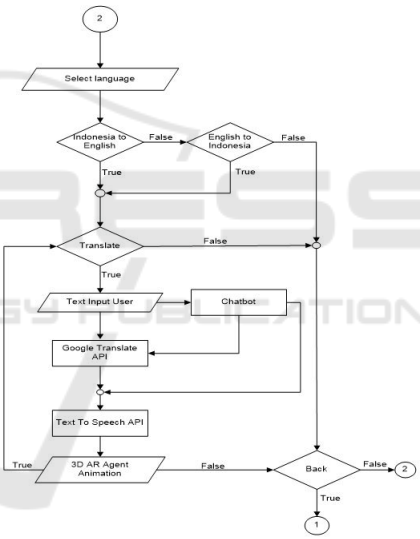

Figure 3: System flowchart (Language translation part).

3. If the text is in a special interactive database, the system would produce an interactive word output in a form of a text.
4. If the text does not exist in a special interactive database in the previous stage, the system would access the general interactive database and generated output from general interactive words in form of text randomly.
5. The output of interactive words is sent to the text to speech API to be changed into sound.
6. Character says the word or sentence to the user as output.

The information about the system flow for

the interactive word of Augmented reality-based Translating Machine can be seen in Figure 4.

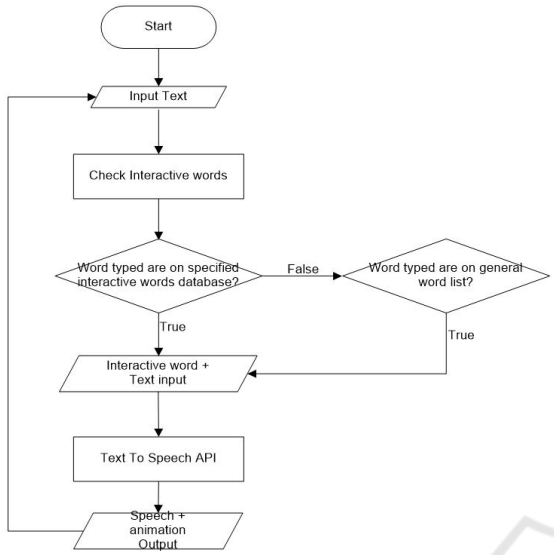

Figure 4: Interactive Word System Flowchart.

3.4 How the Application Works

This Augmented reality-based Translating Machine utilizes a markerless technique, which means that a marker used to display 3D characters has not been registered since the application making. The application will search and mark locations in the camera area as markers, and the location is listed as a marker to display the model of 3D characters. An overview of how the application works can be seen in Figure 5.

4 RESULTS AND DISCUSSION

The following is the interface of the application of augmented reality-based machine translation.

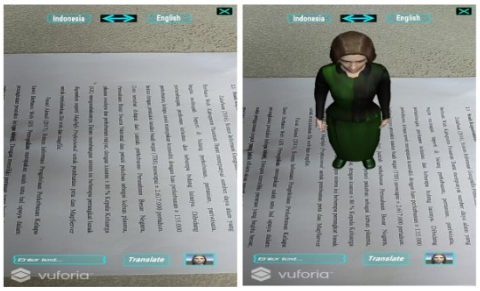

Figure 5: Application Interface

Figure 5(a) is a picture before the user presses the image button and Figure 5(b) is a picture after the user presses the image button.

In this subchapter, we discuss the results of the application testing that has been made. Some of the tests that have been carried out include light intensity testing, viewing angle testing, distance testing, markerless detection location testing, translation testing, and interactive word testing.

4.1 Black Box Testing Scenarios

Black box testing on the application of augmented reality translating machine was conducted to test each function of the interface input in the application, in order to know whether the interface input was in accordance with the expected output. A black box testing result shows that all the system designed match to table 3.1 functionally work as expected.

4.2 Light Intensity Testing

Light intensity testing was conducted inside and outside the room with different light intensities. This test was conducted to find out whether the application of augmented reality translating machine translator could track and display animated models at different light sources.

The conclusion of the test on light intensity can be seen in Table 2.

Table 2: Application test results against light intensity

Test Case	Light Intensity	Wait Time	Result	Test Results
Daytime Outdoor	230 lux	1 Second	3D Character showed	Success
Outdoor Night Day	28 lux	1 Second	3D Character showed	Success
Indoor	1130 lux	1 Second	3D Character showed	Success
Indoor	322 lux	1 Second	3D Character showed	Success
Indoor	0 lux	1 Second	3D Character not showed	Not successful

Based on the results of the light intensity testing in Table 2, it can be concluded that the application of machine translators cannot mark the location or tracking markerless if the light intensity is 0 lux. In other words, the markerless method in Vuforia did not require light even if there was little tracking on the target.

4.3 Distance and Angle Testing

The distance and angle testing was done to find out how far and at what angle the markerless method on Vuforia sdk displayed the 3D characters. This test was carried out with bright light. The test was repeated at a minimum distance of 10cm with an angle of 10°to the farthest distance of 60cm at an angle of 90°.

The results of testing distance and angle of the location can be seen in Table 3.

Table 3: Distance and Angle Testing

Action Testing		Result	Test Results
Distance	Angle		
10 cm	10°	Character 3D showed	Success
	60°	Character 3D showed	Success
	90°	Character 3D showed	Success
20 cm	10°	Character 3D showed	Success
	60°	Character 3D showed	Success
	90°	Character 3D showed	Success
30 cm	10°	Character 3D showed	Success
	60°	Character 3D showed	Success
	90°	Character 3D showed	Success
40 cm	10°	Character 3D showed	Success
	60°	Character 3D showed	Success
	90°	Character 3D showed	Success
50 cm	10°	Character 3D showed	Success
	60°	Character 3D showed	Success
	90°	Character 3D showed	Success
60 cm	10°	Character 3D showed	Success
	60°	Character 3D showed	Success
	90°	Character 3D showed	Success

Based on the data of the test results in Table 3, it can be concluded that with a distance of at least 10cm and an angle of 10, the application of the translating machine is still ableto display 3-dimensional characters well, and the translating machine application is still able to display 3-dimensional characters properly with the furthest distance testing of 60 cm with a taking angle of 60°and 90°.

4.4 Types of Tracking Object Testing

Testing the types of tracking object with the markerless method was carried out to find out the best object or place in marking the location by Vuforia sdk using the markerless technique. This test was carried out with 3 types of objects.

The conclusion of the overall results of testing the types of tracking object can be seen in Table 3. Based on the testing conducted on the tracking object, it can be concluded that Vuforia sdk using the markerless method cannot be used on all tracking object fields as listed in Table 3. It is because if the object lacks of image features, the 3D characters will not appear even though the light and color on the object are sufficient.

4.5 Evaluation

The evaluation was performed by giving questionnaires to 20 people, in order to find out the responses from users about the application of augmented reality-based translating machine. The results of the evaluation after giving questionnaires to 20 respondents can be seen in Table 4.

Table 4: Correspondent Percentage

Correspondent Percentage			
Excellent	Very Good	Good	Not Good
4	15	1	0

Overall, the results of the questionnaire were calculated by using the tabulation formula to get the results of the percentage of each answer to the questionnaire. Each of these percentages is as follows:

1. Excellent : 4/20*100% = 20%
2. Very Good : 15/20*100% = 75%
3. Good : 1/20*100% = 5%
4. Not good : 0/20*100% = 0%

5 CONCLUSIONS

The research and the design of the application of augmented reality-based translating machine have

been successfully implemented and a series of tests have been conducted to test the capabilities of the application and the following results are obtained. The application can be used as a reference in learning word pronunciation and translation from English into Indonesian and Indonesian into English. However, it cannot track well if there is no light. It also cannot display the 3-dimensional characters if there are few details on the marker. The minimum distance to obtain good results in displaying 3-dimensional characters is 10cm from the marked location point. At a distance of 60cm with taking angles above 10°to 90°, the application still can display 3-dimensional characters properly. The application can be used both outdoors and indoors.

REFERENCES

Dewantara, I. M. A. Y., Crisnapati, P. N., Kesiman, M. W. A., and Darmawiguna, I. G. M. (2013). Augmented reality book pengenalan gerak dasar tari bali. *Kumpulan Artikel Mahasiswa Pendidikan Teknik Informatika (KARMAPATI)*, 2(8):1022–1028.

Dikdok (2017). Naikan kemampuan google translate hadirkan neural machine translation untuk banyak bahasa, jurnal apps.

Efendi, I. (2014). Pengertian augmented reality. *Diambil kembali dari it-jurnal: http://www. it-jurnal. com/2014/05/Pengertian-Augmented-Reality-AR. html*.

Ishida, T., Murakami, Y., Lin, D., Nakaguchi, T., and Otani, M. (2018). Language service infrastructure on the web: the language grid. *Computer*, 51(6):72–81.

Mariani, H. T. and Ananta, M. T. (2017). Pengembangan aplikasi respons sms dan panggilan telepon menggunakan android text to speech dan proximity sensor bagi pengemudi mobil. *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer e-ISSN*, 2548:964X.

Nasution, A. H. (2018). Pivot-based hybrid machine translation to support multilingual communication for closely related languages. *World Transactions on Engineering and Technology Education*, 16(2):12–17.

Nasution, A. H., Murakami, Y., and Ishida, T. (2018). A generalized constraint approach to bilingual dictionary induction for low-resource language families. *ACM Transactions on Asian and Low-Resource Language Information Processing (TALLIP)*, 17(2):9.

Nasution, A. H., Syafitri, N., Setiawan, P. R., and Suryani, D. (2017). Pivot-based hybrid machine translation to support multilingual communication. In *2017 International Conference on Culture and Computing (Culture and Computing)*, pages 147–148. IEEE.

Nugroho, A. (2005). Analisis dan perancangan sistem informasi dengan metodologi berorientasi objek. *Bandung: Informatika*.

Pangestika, G. V., Wikusna, W., and Suryadi, A. H. (2017). Aplikasi pembelajaran bahasa inggris untuk murid sekolah dasar berbasis android. *eProceedings of Applied Science*, 3(3).

Panggabean, H. (2016). Urgensi dan posisi bahasa inggris di indonesia. Universitas Methodist Indonesia, Medan.

Rahman, A., Ernawati, and Funny Farady, C. (2014). Rancang bangun aplikasi informasi universitas bengkulu sebagai panduan pengenalan kampus menggunakan metode markerless augmented reality berbasis android. *Jurnal Teknik Informatika*, 7(2).

Saputra, Y. A. and Indonesia, T. (2014). Implementasi augmented reality (ar) pada fosil purbakala di museum geologi bandung. *Jurnal Ilmiah Komputer dan Informatika (KOMPUTA)*, 1:1–8.