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FILIPINO- MARANAO BI-DIRECTIONAL LANGUAGE TRANSLATOR WITH TEXT-TO SPEECH SYNTHESIZER

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Abstract — Many people want to be understood by others and/or one to understand others many had involved themselves into development of machine translation—even Filipinos. According to researchers' study many were being involved in producing today's generation translator but unfortunately, only a few has ever tried to translate domestic dialects into the national language which was understood by many—Filipino language. Because of this phenomenon, the researchers have decided to make a language translator using one of our Philippine dialects—Maranao language. The researchers chose Maranao because Muslim's population here in the Philippines is continuously growing and most of them (almost 2/3) are using Maranao. The researchers also included a speech synthesizer which will allow the user to listen to the translated words read by itself.

***Index Terms*— Machine Translation, Source Language, Target Language, Maranao, Spech Synthesis**

1. INTRODUCTION

Machine Translation (MT) is a technology that automatically translates text from one human language into another. The source language (SL) and/or the target language (TL) medium might be text or speech, but most MT systems work with text. [1]

Early attempts to machine translation to Philippine Languages such as IsaWika! established initial computational linguistic resources for subsequent efforts. The formal grammar established from IsaWika! Indeed became a stepping stone, as claimed by the authors of said project, to later efforts to machine translation or language technology, in general, using Philippine Languages (specifically, Tagalog). [2]

The main distinction of MT systems is in terms of overall strategy: whether translation from SL to TL takes place in a single stage (direct translation), in two stages (via an 'interlingua'), or via the 'transfer' approach, where translation proceeds in three stages. [3]

Machine translation, using the transfer approach, generally follows different phases: morphology, syntax, and semantics. Morphology refers to the study of the structure of words or how words are formed. Syntax deals with how words can be combined together to make larger phrases, such as, sentences. Semantics deals with real-world knowledge or the meaning of the sentence. [4]

Apelado, et al. stated that Computational linguistics in the Philippines is currently focused on Tagalog using the LFG framework. [5] Their study showed that not much has been done on other Philippine languages with respect to the computational aspects of these languages towards a multi-lingual machine translation system. They recommended that further study be conducted on the design and eventual implementation of such an MT system involving Philippine languages. [6]

People of Lanao, Maranao, a predominantly Muslim region in the Philippines island of Mindanao, [7] are the largest Moro ethnic group, who constitute the sixth largest Ethnic groups of the Philippines [8] They were also the largest cultural minority here in the Philippines. [9] Maranao people use Maranao language as their means of communication. This makes the viewpoint of creating a MT for Maranao language essential and useful especially in communication[10].

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2. DEVELOPED SYSTEM

Interpretivist proponents believe that they can reach a full understanding each individual's perception of reality. research must include how individuals experience the world, and each of these experiences are considered valid truths. Critical humanism is a subtype of this paradigm that involves the persons studied in the research process.[11]

The proponents used the Interpretivism paradigm for the reason that an Interpretivist research method considers every possible input since not all words will be included in the database, the researchers will also consider every possible and translate it with its thought no matter what[12].

Table 1
Evaluation of the respondents to the Filipino-Maranao Text-to-Text conversion

Criteria	SA	A	N	D	SD	WM	VI
1	28	46	24	2	0	3.795	A
2	33	50	17	0	0	3.923	A
Overall						**3.859**	**A**

Legend: **1** thought of the sentence remains after translation. **2** Words are clearly translated.

Table 1 illustrates the tallied assessment of 100 Maranaos in Pinagbuhatan, Pasig City for Text-to-Text conversion of Filipino-Maranao Bi-directional Language Translator.

Table 2
Evaluation of the respondents to the Filipino-Maranao Text-to-Speech conversion

Criteria	SA	A	N	D	SD	WM	VI
1	93	7	0	0	0	4.595	SA
2	8	30	37	25	0	3.163	N
Overall						**3.879**	**A**

Legend: **1** Only Output words in the target language text area are being told by the system **2** Words are in proper pronunciation

Table 3
Evaluation of the respondents to the language Filipino - Maranao translation

Criteria	Total weighted Mean	Verbal Interpretation
Text-to-Text Conversion	3.859	Agree
Text-to Speech Conversion	3.879	Agree
Overall	3.869	Agree

Table 4
Evaluation of the respondents to the Maranao-Filipino Text-to-Text conversion

Criteria	SA	A	N	D	SD	WM	VI
1	5	72	22	1	0	3.643	A
2	35	46	19	0	0	3.923	A
Overall						**3.783**	**A**

Legend: **1**Thought of the sentence remains after translation. **2** Words are clearly translated.

[1] WM-Weighted Mean; VI- Verbal Interpretation; SA-Strongly Agree; A-Agree; N-Neutral; D-DisAgree; SD-Strongly DisAgree.

Table 5
Evaluation of the respondents to the Maranao- Filipino Text-to-Speech conversion

Criteria	SA	A	N	D	SD	WM	VI
1	91	9	0	0	0	4.523	SA
2	23	27	37	11	2	3.459	A
Overall						**3.991**	**A**

Legend: **1** Only Output words in the target language text area are being told by the system **2** Words are in proper pronunciation

Table 6
Evaluation of the respondents to the language Maranao-Filipino translation

Criteria	Total weighted Mean	Verbal Interpretation
Text-to-Text Conversion	3.783	Agree
Text-to Speech Conversion	3.991	Agree
Overall	**3.887**	**Agree**

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Table 7
Evaluation of the respondents on system translation of Filipino – Maranao Bi-diretional Language Translator

Criteria	Total weighted Mean	Verbal Interpretation
Filipino to Maranao	3.869	Agree
Maranao to Filipino	3.887	Agree

Table 10
Evaluation of the respondents to the Translation Speed of Filipino-Maranao Bi-directional Language Translator

Criteria	SA	A	N	D	SD	WM	VI
1	90	10	0	0	0	4.515	SA

Table 11
Evaluation of the respondents to the System Design/Attractiveness

Criteria	SA	A	N	D	SD	WM	VI
1	7	51	32	10	0	3.435	A
2	3	34	50	13	0	3.211	N
3	9	39	42	10	0	3.371	N
Overall						**3.339**	**N**

Legend: **1** The interface of the system is simple and easy to navigate and understand. **2** Colors used in the system are not irritating to the eyes. **3** Texts are readable.

A. System Architecture

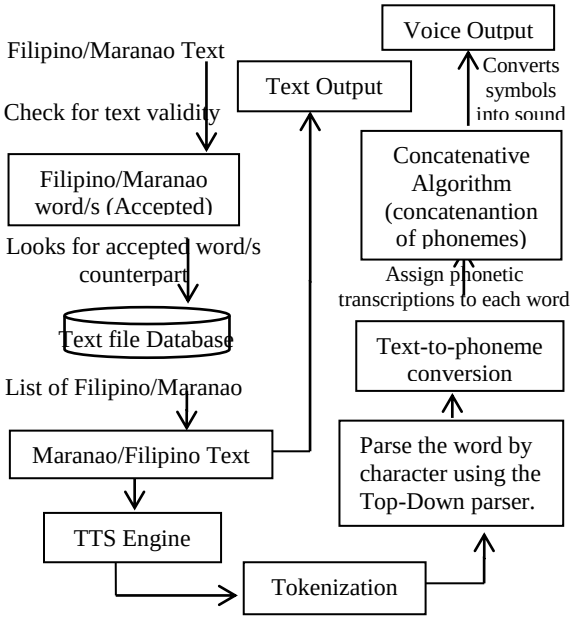

Figure 1

Figure 1.0 shows the System Architecture which discusses the formal description and representation of the system and how it process or translates source language/ text[13].

To use the system, the user must select the source language and the target language. The user must also input in the source language text area the texts he wanted to translate by the system. After input, the user must click the button center-right corner of the system interface. This will be the go signal of the system to start translating. The user can also hear the translated text by clicking the button for the speech synthesizer located at the lower-right bottom of the system interface.

3. RESEARCH METHOD & TECHNIQUE

Researchers used Descriptive Research Design also known as Statistical Research Design[14]. It describes data and characteristics about the population or phenomenon being studied. However, it does not answer questions about e.g.: how/when/why the characteristics occurred, which is done under analytic research.

The proponents chose the Survey Method Research under the types of Descriptive method because it uses participants who answer questions administered through interviews or questionnaires [15]. And after the participants or respondents answer the questionnaire, the proponents describe the responses given. In order for the survey to be both reliable and valid it is important that the questions are constructed properly[16]. Questions should be written so they are clear and easy to comprehend.

4. CONCLUSION AND FUTURE WORKS

Based from the findings of the study entitled "Filipino – Maranao Bi-directional Language Translator with Speech Synthesizer", the researchers have yielded the following conclusions:

The respondents "Agree" that the translation of both translation of Filipino-Maranao and vice versa in either Text-to-Text or Text-to-Speech conversions are accurate in providing the correct translation of the source language to target language and able to produce its right pronunciation.

Furthermore, the researchers have concluded that Filipino-Maranao Bi-directional Language translator is very efficient in performance and that it is excellently responsive and translate fast. Also, based on the summary

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of findings, the system is user-friendly as it is simple enough, easy to navigate and understand.

5. RECOMMENDATIONS

Based on the computations and evaluations of the respondents to the Filipino-Maranao Bi-directional Language translator facility, the researchers' recommend the following:

The researchers recommend additional Maranao words and its counterpart in the database for a better and wider Filipino-Maranao and vice versa translation. Also, the researchers recommend further study and development of system's speech synthesizer especially in the field of ponemang suprasegmental (stress and intonation) which will enhance the proper pronunciation of words and also future researchers may improve latency between phonemes to establish proper timing in pronunciation of words therefore the words that will be spoken by the system will be clearly understandable [17].

Furthermore, adding a voice recognition engine in the system will be better so that it will be easier to use especially for those users who are incapable of inputting texts of words in the system. Furthermore, the researchers recommend making a Google translate-like machine which consist and only limited to Philippine Languages or dialects conversion[18].

Future researchers may also convert this application into a web-based application[19] for easier access of users in different areas or in a mobile application for better portability[20].

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