Crime Mapping and Geography Distribution Analysis for CARAGA Region, Philippines

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ABSTRACT

With the advent of new technologies, people have greater access to information and other necessary resources needed for their daily routine, as a way to improve the quality of life particularly in peaceful and safer community. This study provides a greater impact in achieving the said quality of life by devising a new technology integrating different frameworks, such as mobile computing, geographic information system, decision support system and web applications. Further, this technology will predict would-be incident/crime commission for analysis and possible preventive actions. Mobile users can report any incidents and crime within the area, thus providing information to the local government authorities. The system also provides geographical distribution of crime rate through graphical representation. The efficient and timely forecasting and data analysis of crime rates within the region can now be achieved. And the implementation of mobile reporting for emergency situation with Geographical Information System (GIS) is a timely solution in emergency situation broadcasting.

KEYWORDS

Emergency Reporting, Mobile User, Geographical Information System, Mobile Computing, Forecasting, Philippines
INTRODUCTION

This study provides a greater impact in achieving the said quality of life by devising a new technology integrating different frameworks, such as mobile computing, geographic information system, decision support system and web applications (Chainey & Ratcliffe, 2013). But broadcasting the different warning signals of emergency situations towards concerned officials was a great challenge for developing countries due to the insufficient usage of information technologies (Palmer, Kemp, Kielmann, & Bal, 2012). With this situation, the researchers formulated an idea of creating a mobile application that focuses on emergency reporting that has the capability to capture an emergency situation such as crime, flood, fire, and accident. Regarding data transmission, unobtrusively it uses two mobile transmission medium such as the internet or plain SMS. To ensure reliable information sent to the web server as the key source of emergency response team, resident personal profile information will be saved first in an emergency response database server (Murphy, 2010).

Furthermore, this technology will predict would-be incident/crime commission for analysis and possible preventive actions. Mobile users can report any incidents and crime within the area, thus providing information to the local government authorities. The system also provides geographical distribution of crime rate through graphical representation and a great help in our local society (Olden, 2002).

FRAMEWORK

Figure 1. Crime Mapping and Geography Distribution Analysis for Caraga

A reporter is an entity who will report for any emergency situations using an Android-based and non-android based mobile phone. For an Android phone user with no mobile data/internet connection, a built-in phone camera will be used to capture a photo of any incident happened (Tomas, Filip, & Antonin, 2008). For non-android phone users, a pre-formatted text message in three dialects in the Philippines such as...
English, Cebuano, and Tagalog will be utilized as a form of a report. Both of the two users being mentioned uses a text message containing the type of incident and its exact location using GSM Short Messaging System (Chapman, 1996).

The GSM modem with its capability to send and receive SMS messages provided that it has a valid Subscriber Identity Module (SIM) card, receives the incoming message.

The SMS Gateway acts as a middleware between the GSM modem and the web server. It translates the packet of data from the GSM modem into useful business information and vice versa. It is also responsible for uploading and downloading data to the web server that houses the database (Rahman, 2007).

On the other part, a web server which is a web-based application is the interface that handles the location-based mapping using Google Map application.

And the ERS database is the main storage of any kinds of reported incidents and the reporter’s basic information from Android and non-android mobile devices (Therese, Fajardo, & Oppus, 2009).

Figure 2. Event Geography Analysis Conceptual Framework

The emerging technology such as GIS has a prodigious aid in crime analysis by way of identifying apprehensive incidents, and events in any geographic area, thus participatory report generation amongst the community using mobile-based infrastructure makes the public aware crime concerns and enhance the policing methodologies’ decision making (Tendler, 1996).
Applying GIS Technology to Crime Analysis

Crime Mapping using GIS answers the following:
- Detection of incident types for immediate response and validation.
- Identifying of usual incidents happened in every place for analysis.
- Improvement of various policing techniques for better and safety community.
- Community participation regarding identifying crimes and reporting emergency situations.
- A mechanism to support crime analysis and forecasting using spatial crime database.

**OBJECTIVES OF THE STUDY**

The study aims to devise new technology that would strengthen the monitoring of crime and provision of assessment within the vicinity of the region, thus improving a quality of life towards a peaceful and safety community.

Specifically, it intends to:
- Develop a graphical interface integrating geographic information system for crime distribution in the vicinity.
- Design a mobile application for participatory reporting of incidents and crimes within the locality.
- Devise a system that predicts incidents/crimes to provide preventive actions and crime rate analysis.
METHODOLOGY

This phase is based on identifying the different modules needed for system development which includes the following:

Security Check
This module contains the security countermeasure of the system. It serves as validation on different types of reporters to ensure data correctness. Lastly, this security measure will be executed only once, after a successful installation.

Camera Intent. Implementing the camera feature in a mobile device runs on an Android operating system. This is the source in creating emergency reports such as crime, flood, fire, and accidents by just capturing an image.

Mobile Data/Internet Transmission
The transmission of data to the web server has been done through mobile data or internet connection. This mobile application will check first the availability of this communication medium upon transmission. After a successful transmission, the web server will then receive an image, type of incident and reporter’s number.

SMS Transmission. SMS gateway serves as a transmission medium for Android and non-android mobile reporters. The unavailability of mobile data connection has been replaced with this communication medium. After successful transmission, the web server will then receive a pre-formatted SMS message shown below.

Example 1: Sample SMS message for an android reporter using SMS connection.
“CRIME, 8.9563,125.16789, picture name(64 byte representation)"
Example 2: Sample SMS message for a non-android reporter using SMS connection.
“KRIMEN may pinatay dito sa may ampayon.”

DEVELOPMENT AND TESTING
This module is the testing phase of the system execution to identify its usability and reliability. The researcher selected the programming environment and standards used in building the system. The Android Development Toolkit powered by JAVA language is used in developing the Mobile Application because it fits the requirements needed in developing the said application. In developing the web-based interface, an open source programming language is used which is the Hypertext Pre-processor (PHP). Another language used is the SQL, which is a query language that serves as storage of the system on the different kinds of reported incidents. The programming languages are chosen because they have met the requirements for the development of this study.

Validation, verification, and testing are done in this phase. They are conducted according to the plan and conclusively demonstrated that both the user and system requirements have been met. First testing done was desk checking the program in which the researchers reviewed entire system process to check for logical and physical errors.
Next, the researcher conducted series of unit testing to identify and solve different system errors that cause the program to end abnormally.

**Unit Testing**

This section deals with the various tests that have been made to developed software so as to detect the failures it may have.

Table 1. Unit Testing Result

<table>
<thead>
<tr>
<th>SIN</th>
<th>MODULES</th>
<th>POSSIBLE OUTPUT</th>
<th>RENDERED RESULT</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Install QuickHelp.apk on Android phone</td>
<td>Installation Successful</td>
<td>Installation Successful</td>
<td>Success</td>
</tr>
<tr>
<td>2</td>
<td>Check whether UI is Displaying On screen</td>
<td>Display UI</td>
<td>Display UI</td>
<td>Success</td>
</tr>
<tr>
<td>3</td>
<td>Capture Image using Android phone</td>
<td>Captured Image</td>
<td>Captured Image</td>
<td>Success</td>
</tr>
<tr>
<td>4</td>
<td>Send SMS from Application</td>
<td>SMS sent</td>
<td>SMS sent</td>
<td>Success</td>
</tr>
<tr>
<td>5</td>
<td>Send Report using Mobile data connection</td>
<td>Report sent</td>
<td>Report sent</td>
<td>Success</td>
</tr>
</tbody>
</table>

**RESULTS AND DISCUSSION**

**Android Application Graphical User Interface (GUI)**

A user interface shows the different features of the system. In this study, it maintains the simplicity of its design to enhance users familiarity and software production. The following figures are the screenshots of the user interface of the study.

Figure 4 shows the security check screen wherein a reporter will input a valid mobile number used in validation of emergency reports.

![Security Screenshot](image)  
Figure 4. Security Screenshot.
Figure 5 shows the home screen which contains command buttons on different types of an incident such as crime, flood, fire, and accidents. Each command button has a link towards the built-in phone camera in capturing emergency situations.

Web-based Application graphical user interface

Figure 6 shows the lists of reporters using Android and non-android mobile devices. The mapping of reporters uses the Google Map technology in identifying the name of the location and Mobile Global Positioning System (GPS) for accurate location.
Figure 7 shows the geographical information on different types of crime happened within a specific location. This will aid the local officers for their crime rate analysis and in decision making.

Figure 8 shows the list of three different types of reporters with their reported incident and specific location. First is the Web Android reporters use their Android mobile phone to capture an image and then send a report using mobile data or
internet connection, an addition of reporter’s accurate location through mobile Global Positioning System (GPS). Second is the Mobile SMS reporter, using SMS gateway and non-android mobile device in creating emergency reports through a text message. The composition of the text message includes type, description, and place of the incident (ex. Krimen [type] mayroon pong pinatay dito sa [description] calibunan cabadbaran [place]). And an Android Mobile SMS reporter refers to an individual who uses an Android mobile device in capturing emergency situations using SMS transmission medium in the absence of mobile data/internet connection. The text message includes the type of incident and location-based information (ex.CRIME [type], 8.9876, 125.8966 [latitude and longitude data]).

Figure 9. Reporters using an Android phone with mobile data connection.

Figure 9 shows the list of captured emergency situation from reporters using an Android phone with a mobile internet connection as a way of transmitting reports. It displays the information of the reporter, the type of incident and the captured image from the built-in phone camera. This web page also contains the identification of a total number of reports of each type of incident.

CONCLUSIONS

The functionality introduced by this project demonstrated the Crime Mapping using Geographical Information System to determine the crime distribution within the region. The result showed that smartphone and ordinary mobile phone sent to the
emergency reporting portal captured most of the report classified by incident set by the administrator. Standard geocode for latitude and longitude along with incident images are captured and rendered in a map-based interface to locate the exact location of the incident. And crime rate analysis has been achieved by the Local Police Officers for decision making through the aid of the system.

**LITERATURE CITED**


Web-based Mother Tongue Dialect Translator for Philippine Basic Education System

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ABSTRACT

The implementation of the mother-tongue education in the Basic Education System, it raises problems to the educators. Some educators are not well versed in the native language of the learners. The educators cannot easily translate and interpret the
English words into the different dialects in the country. The reason why the researchers
developed this project is to help the teachers to translate words from the first language
into the second language of the learners. The proponents’ inspiration for this study is
to improve the vocabulary skills of an educator through recognizing new sets of words
from a local dialect. This project aims to develop a functional and workable web-based
dialect translator that would address the specific difficulty of our modern educators. The
proponents developed a web-based mother tongue dialect translator to aid the problem
of the educators. Based on several tests conducted, the translator has 100 % accuracy
in English to Tagalog, Sugbuanong Binisaya, and Surigaonon sentence translation. In
reverse, the translator has only 20 % accuracy in Tagalog, Sugbuanong Binisaya, and
Surigaonon to English. The average execution time of the translation is 1.081537008
seconds in the average bitrate of 1.228 Mbps. The translation execution time of the
translator varies on the internet speed provided by the Internet Service Providers (ISP).
This study will solve the problem of the educators in teaching the mother tongue dialects
to the learners. The educators can easily translate the words into different dialects by
using this application. This will reduce the time that they consumed in looking for
the right translation of the words. This will help us to communicate and understand
everyone in our society.

KEYWORDS

Web-based, Mother Tongue, Dialect, Basic Education, Translator, Agusan del Norte, Philippines, Asia

INTRODUCTION

The etymological and social differing qualities in the Philippines conveys intricacies
on the issue of dialect arrangement in training Fallis (2013). Presenting native language
tutoring from the grassroots level is difficult from an expansive scale authoritative stance,
yet it is the most encouraging as far as group duty and supportability is according to
Ball (2010). According to Cummins (2001), at the point when kids keep on building
up their capacities in two or more dialects all through grade school years. They pick up
a more profound comprehension of dialect and how to utilize it successfully.

Based on the study of Piper, Zuilkowski, & Ong'ele (2016), mother-tongue
education requires teachers who share the language and culture of the children. It
also requires that teachers are trained in the same language they are to teach in. Some
teachers may not be truly proficient in the language of instruction and may struggle
with teaching in a ‘dominant’ language they are not fluent in themselves. Or they may
come from a minority language group and have been excluded from the learning process
due to a lack of training materials in their language. The reason why the researchers
developed this project is to help the teachers to translate words from the first language
into the second language of the learners’.

Today, there is no technology-based system that translates the first language into the local dialect of the Philippines. The researchers’ motivation for this venture is to improve the vocabulary skills of an educator through recognizing new sets of words from a local dialect. Educators can be good in familiarizing those uncommon vernacular from which they are not usually engaged with.

This application permits teachers to make an interpretation of words from English to the lingo and the other way around. The entire execution of this web application is done through the interpretation of a few Philippine tongues into English dialect and in the meantime, it permits the client to contrast words and changes its interpretation with various lingos. It minimizes time utilization on searching for comparable interpretations through books and different references; it additionally helps the instructors to enhance more their vocabulary aptitude both in lingo and English dialect. Words and expressions are recovered from the database.

This focuses on the translation of any instructional medium provided by teachers. This web-based application is intended only for educators, considering that teachers are in need of instructional support for their lessons, especially when it comes to a multilingual learning approach. The pupils can also use this web-based app with proper consent and permission from their teachers. This app is for instructional purpose only and is not intended for any use unless otherwise it is mandated by the school’s administrator. This application limits only from those words which are commonly used in basic education such as words in the class discussion, remedial education, social sciences, arts, values and morality, health, and others. The user is allowed only to enter a single sentence, word or phrase. It also limits within those of 3 dialects such as Sugbuanong Binisaya, Surigaonon, and Tagalog.

**FRAMEWORK**

**Mother-tongue on Basic Education System Implementation**

The semantic and social differing qualities in the Philippines conveys much-multifaceted nature to the issue of dialect strategy in training Fallis (2013). With more than 7000 islands and 181 unique dialects Lewis & Gary, (2013) stated that the Philippines offers a testing domain for executing a dialect arrangement that can serve the entire nation. Therefore, dialect approaches for Philippine schools have vacillated enormously in the course of the most recent century with an alternate arrangement for almost every era. According to Benson & Ph (2005)language is clearly the key to communication and understanding in the classroom. Many developing countries are characterized by individual as well as societal multilingualism, yet continue to allow a single foreign language to dominate the education sector. Instruction through a language that learners do not speak has been called submersion (Skutnabb-Kangas 2000, a genuine speculation of time and assets, alongside a guarantee for cooperation
among etymologists, teachers, and group individuals is required to prepare materials for bilingual projects. Especially, if the L1 is to be utilized over time of numerous years and especially if the dialects being referred to have not customarily been applied as a part of the composed structure.

The finding of the study of Khejeri (2014) revealed that teachers recognized Mother Tongue as a tool that helps learners appreciate their culture and as a language that creates a closer relationship between them and learners. Teachers also viewed Mother Tongue as a language that encourages and enables pupils to express themselves confidently in class since it is their first language. They also saw it as a language that allows all scholars to participate in the lesson, and a good number raised the notion that Mother Tongue makes it easier for learners to grasp difficult concepts. A few teachers saw Mother Tongue as contributing to a smooth transition of novices from the home environment to school.

Based on the study of Lartec, Belisario, Bendanillo, Binas-o, and Bucang (2014) Mother tongue instruction is the part of dialect as a medium of direction in advancing a viable educating and learning. An issue that has possessed numerous researchers everywhere throughout the world for a long time. This part of dialect as a medium of direction has been a worry for the most part in nations where migrant youngsters are in the minority, for example, the United States and Canada (Deyi, Simon, Ngcobo, & Thole, 2007). It is in those nations where research has been broadly directed, and various enactments have been passed and changed consistently. Regardless of such advancements, wrangles on the utilization of dialect held on.

According to Bühmann & Trudell (2008), the utilization of nearby dialects as a medium of guidelines does not suffice to ensure ideal adequacy of instructing and learning. The application of state dialects in necessary training was initially presented in 1979, but nothing else in the educational modules, for example, showing strategies and the substance of the guideline were improved. Subsequently, learning results did enhance for understudies in the trial schools, however not an astonishing arrangement. It was deduced that the use of the countrywide tongues in direction couldn't be maximally powerful without changing demonstrating techniques and making attractive training and learning materials. The move from the common dialect of French process likewise required consideration. Along these lines, the consumption of domestic dialects has been only one segment of Pédagogie convergence.

Language Translation Process

According to Catford (1965), interpretation is an operation performed on lingos: a technique of substituting a substance in one vernacular for a substance in another. He included, any speculation of understanding must draw upon a conjecture of tongue—a general semantic theory. In light of the investigation of Nolasco, (2008) that English is in like manner a second lingo or L2 to for the most part-Filipinos. By Social Weather Stations, in 2008, around three-fourths of Filipino adults (76%) thought they could appreciate conveyed in English; another 75% believed they could read English; three
out of five (61%) understood they could create English; close half (46%) held they could impart in English; around two fifths (38%) assumed they could think in English; while 8% held they were not furnished at all with respect to the English lingo.

**OBJECTIVES OF THE STUDY**

The proponents of this study wish to carry out these following objectives:

1. To develop a much comprehensive and reliable web-based application for dialect translation and sentence construction, this is to come up with an accurate conversion of words into different dialects, equivalent from words which have a same corresponding meaning;

2. To reduce time-consuming tasks of a teacher found for the exact translation of a word, this allows the teacher to search for a specific and definite paraphrasing of words without wasting time to scan for a book or other references.

As such, this project study aims to develop a functional and workable web-based dialect translator that would somehow address the specific difficulty of our modern educators.

**METHODOLOGY**

![Model View of Mother Tongue Dialect Translator](image)

Figure. 1. Model View of Mother Tongue Dialect Translator

The Figure 1 above illustrates the model view of the proposed web-based application. The user can access the application from their devices like Personal Computer (PC), Laptop and mobile phones as long as the device is connected to the internet. The application is hosted by a free web hosting company. The proponents utilized the HTML 5 for the application that the smartphones and tablets can responsively access it.
**Activity Diagram**

Figure 2 shows the activity diagram of the Web-based Mother Dialect Translator. It illustrates the arrangement of activity of the framework of the proposed application. It indicates the following actions or activity during the utilization of the Web-Based Mother Tongue Dialect Translator. When the translation failed, it restarts from the top but the translation will be successful it will be displaying the translated dialect.

![Activity Diagram](image)

**Figure 2. Web-based Mother Tongue Dialect Translator Activity Diagram**

**Use Case Diagram**

![Use Case Diagram](image)

**Figure 3. Web-Based Mother Tongue Dialect Translator Use Case Diagram**
The Figure 3 above illustrates the use case diagram of the proposed application. The use case diagram shows the progression of related associations between the client and the proposed application. It demonstrates how the actor communicates through the framework. The use cases serve as the state which the actor can interact and perform an activity within the translator. The following state includes means to say that the translator cannot perform the translation without their functionalities.

**Sequence Diagram**

Figure 4 below illustrates the Sequence Diagram of the proposed application. It shows how functions work with each other and in what request. It shows the interaction from index.php until the actor disconnects. The index.php is active while the other lifeline executes the other sequences. The actor can select the dialect structure, the target dialect for the translation and input words to be translated. The message will return to index.php after it successfully translates.

![Figure 4. Web-Based Mother Tongue Dialect Translator Sequence Diagram](image)

**Development of the Web-based Application**

These are the codes utilized by the proponents to develop the proposed application. The HTML codes and PHP scripts above serve as the front-end content, and CSS 3 enhances the Graphical User Interface (GUI) of the proposed web-based application. The proponents utilized the method POST for sending the inputted data to the server. The action of the said method is PHP_SELF means that the path of execution of the codes is on the same page. The GUI is divided into two columns, the first column contains the group button of the dialect structure and original dialect to be translated, and the second column contains the translated dialect. MySQL is utilized as a Relational Database Management System (RDBMS). The initiation of the database connection is included in the file, named db.php. The file named translate_execute.php executes the process of the translation of the dialect.
The file contains the following script: There are two if statement that identifies the type of the inputted dialect structure. First, the if ($t=='w'||$t=='p') that identifies the type of the inputted dialect if it is a word or a phrase. If it is true, the $f will be processed in a switch statement (switch ($f)) where $f is the variable for the type of dialect to translated. There are four cases inside the switch statement; case ‘English’, case ‘Tagalog’, case ‘Sugbuanong Binisaya,’ case ‘Surigaonon’. When the $f is equal to any of the given cases. The cases will execute the following if and else if statements; the first condition is if ($h=='English') where $h is the variable of the button group of the target dialect. The following database queries are being executed.

$emp_query variable compares the original dialect which is $0 in the database if it is a word or phrase exists. When the query finds the $0, it returns the new value of the dialect in the $res variable that will be displayed in the text area in the GUI.

The second if statement that identifies the dialect structure of the inputted dialect is if ($t=='s'), it detects if it is a sentence. Then, if it is true the $f will be processed in a switch statement, the process is the same with the switch ($f) that discussed above. The difference is the codes inside in every case. These are the following scripts inside the case;

The proponents utilized the explode script to separate the inputted sentence into words in an array. Inside the for a loop, the array of words is compared with the database. When the emp_query locate the equivalent value of the word, the new word is stored in the $res variable. In every time that the query locates the equivalent value of the different words, the $res will now store in the $new, and the $new is appended to $res to make it a new sentence. When the loop is finished, the $res will be displayed in the GUI.

Testing
The proponents conducted several tests to check the functionality, reliability, and usability of the web-based mother tongue dialect translator.

Functionality Test
The main function of the application is to translate a word, phrase or a sentence. This test aims to check the featured functions of the application if its response accordingly as expected by the users’. There are two indicators that marked during the test, the following are:

Success – The proponents mark check the success panel if the application successfully executes the functionality that being tested.
Failed – check for the failed panel if it’s failed to respond and execute the expected function.
Table 1. Results of Functionality testing of Mother Tongue Dialect Translator

<table>
<thead>
<tr>
<th>Functions</th>
<th>success</th>
<th>Failed</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Word and Phrase translation</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English to English</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>English to Tagalog</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>English to Sugbuanong Binisaya</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>English to Surigaanon</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Tagalog to Tagalog</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Tagalog to English</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Tagalog to Sugbuanong Binisaya</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Tagalog to Surigaanon</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Sugbuanong Binisaya to Sugbuanong Binisaya</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Sugbuanong Binisaya to English</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Sugbuanong Binisaya to Tagalog</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Sugbuanong Binisaya to Surigaanon</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Surigaanon to Surigaanon</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Surigaanon to English</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Surigaanon to Tagalog</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Surigaanon to Sugbuanong Binisaya</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td><em>Sentence Translation</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English to English</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>English to Tagalog</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>English to Sugbuanong Binisaya</td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>
Reliability Test

This test aims to check how reliable the application. This is to check the accuracy of the translation process of the translator. There are five different five words translation that being processed. This will check the inputted words will be translated accordingly as expected. The proponents mark check the success panel if the words that were successfully translated as expected and mark the failed panel if the translator is failed to provide the exact translation as expected.

Table 2. Reliability Test for Mother Tongue Dialect Translator

<table>
<thead>
<tr>
<th>Trial</th>
<th>Data Processed</th>
<th>Success</th>
<th>Failed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The monkey whistles on tree</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Good morning of God children</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Two plus three minus one</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>The good children of God</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>two children, please come here</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
English to Tagalog, Sugbuanong Binisaya, Surigaonon

<table>
<thead>
<tr>
<th>Trial</th>
<th>Data Processed</th>
<th>Success</th>
<th>failed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ang tatlong matsing sa kahoy</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ang tulo ka unggoy nitaghuy</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ang Dos dungagan ug tuyo</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ang maayung kabatan-unan sa Diyos</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>dos kabatan-unan kon puyde ngari dinhi</td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>

Tagalog, Sugbuanong Binisaya, Surigaonon to English

**Speed Test**

This test will measure the execution time of the application in a five words translation with the internet connection of 8 Mbps. The test is performed on a laptop with Intel Core i5 processor and 4 GB of Random Access Memory (RAM).

Table 4.3. Speed Test for Mother Tongue Dialect Translator

<table>
<thead>
<tr>
<th>Trial</th>
<th>Data Processed</th>
<th>ISP bit-rate</th>
<th>Execution Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The monkey whistles on tree</td>
<td>2.16 Mbps</td>
<td>0.0065360069274902 s</td>
</tr>
<tr>
<td>2</td>
<td>Good morning of God children</td>
<td>0.95 Mbps</td>
<td>0.0068070888519287 s</td>
</tr>
<tr>
<td>3</td>
<td>Two plus three minus one</td>
<td>2.63 Mbps</td>
<td>0.0089170932769775 s</td>
</tr>
<tr>
<td>4</td>
<td>The decent kids of God</td>
<td>0.16 Mbps</td>
<td>1.0815370082855 s</td>
</tr>
<tr>
<td>5</td>
<td>two broods, please come here</td>
<td>0.24 Mbps</td>
<td>0.024540901184082 s</td>
</tr>
<tr>
<td></td>
<td><strong>Average</strong></td>
<td><strong>1.228 Mbps</strong></td>
<td><strong>1.081537008 s</strong></td>
</tr>
</tbody>
</table>

5 words translation

**CONCLUSIONS**

Based on the several tests conducted, the researchers concluded the following:

All of the functionality of the application successfully responded as expected during the test. The translator can translate a word, phrase or sentence. During the reliability test, the proponents’ inputted different five words translation and the translation accuracy from English to the other dialect is 100%, but the translation accuracy from
the local dialects to English is 20% only. The translator cannot give the exact translation of a sentence from the local dialects to the English language. The average execution time of the translation is 1.081537008 seconds in the average bitrate of 1.228 Mbps; the speed of translation may vary from the internet connection provided by the Internet Service Providers (ISP).

RECOMMENDATIONS

The following recommendations are offered as possible ways to improve the Mother Tongue Dialect Translator for Philippine Basic Education System. Implement an algorithm that enhances the accuracy of the dialect translation; the algorithm may be an edge among the other existing language translator. Add more dialect that can be translated so that the other group of Filipinos can use the Mother Tongue Dialect Translator. Implement the Asynchronous Javascript and XML (AJAX) for more dynamic translation. The Translator can be used as instructional material for the Basic Education System.

LITERATURE CITED


