Translation Error Analysis in Instructions of Virtual Assistants on Mobile Devices

การวิเคราะห์ข้อผิดพลาดการแปลคู่มือการใช้งานของผู้ช่วยเสมือนสำหรับอุปกรณ์เคลื่อนที่

Mongkolchai Tiansoodeenon, Wanpen Poomarin*, Matthew Taylor Noble*,*
*Narathorn Boonnum**, Praemai Horungruangchai**, and Warot Saksamanchai***
มงคลไชย เทียนสุดีนนท์, วันเพ็ญ ภุมรินทร์*, แมทธิว เทเลอร์ โนเบิล*,*
*นราธร บุญนุ่ม**, แพรไหม หอรุ่งเรืองชัย**, วรท ศักดิ์สมานชัย***

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Abstract

This study aimed to identify translation errors of translated instructions of virtual assistants (IVA) on mobile devices and compare the translation errors of IVA on mobile devices. The instruments used were a questionnaire and text analysis. The questionnaire was used in a survey and the reliability of the questionnaire (α - Coefficient) was 0.86. The results from the text analysis were verified by three English teachers acting as interraters. The findings were that semantic errors were found in all IVAs on mobile devices and had the highest number of errors, followed by transliteration and grammatical errors. Siri had the least number of errors compared to Google Assistant and Bixby.

Keywords: Translation Error Analysis, Instruction translation, Virtual assistant on mobile devices

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*อาจารย์คณะศิลปศาสตร์ มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี

**นักศึกษา คณะศิลปศาสตร์ มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี

บทคัดย่อ

การศึกษานี้มีจุดประสงค์เพื่อระบุข้อผิดพลาดของการแปลคู่มือการใช้งานของผู้ช่วยเสมือนจริงสำหรับอุปกรณ์เคลื่อนที่ (IVA) และเปรียบเทียบข้อผิดพลาดของการแปลคู่มือการใช้งานของผู้ช่วยเสมือนบนอุปกรณ์เคลื่อนที่ต่าง ๆ เครื่องมือที่ใช้ศึกษา ได้แก่ แบบสอบถามและการวิเคราะห์ข้อความ แบบสอบถามมีค่าความน่าเชื่อถือ (α - Coefficient) ที่ระดับ 0.86 ผลของการวิเคราะห์ข้อความได้ผ่านการตรวจสอบจากอาจารย์สอนภาษาอังกฤษ 3 คน ผลการศึกษาพบว่า มีข้อผิดพลาดด้านอรรถศาสตร์ในคู่มือการใช้งานของผู้ช่วยเสมือนทุกชุด และมีจำนวนข้อผิดพลาดสูงที่สุด รองลงมา ได้แก่ การแปลแบบทับศัพท์และข้อผิดพลาดทางไวยากรณ์ คู่มือการใช้งานผู้ช่วยเสมือนจาก Siri มีจำนวนข้อผิดพลาดการแปลน้อยที่สุดเมื่อเทียบกับ Google Assistant และ Bixby

คำสำคัญ การวิเคราะห์ข้อผิดพลาดการแปล การแปลคู่มือการใช้งาน ผู้ช่วยเสมือนสำหรับอุปกรณ์เคลื่อนที่

Introduction

It is evident that our daily life in the new digital era involves technology. Many innovations have emerged to respond the demand of digital natives. However, many of these innovations are written in English. This brings favor to those who have obtained certain levels of English proficiency because they can access various sources of knowledge. It is also obvious that most of the world's most visited websites are mainly written in English. Consequently, it is advisable for those who would like to extend their knowledge to improve their language proficiency, so that they can understand the messages available on the internet. Since English is not always easy for everyone to acquire, translation has always been needed to carry the meaning in between English and a target language (Cabral, 2020: https://www.alumiarelisio.com/blog/importance-of-translation). Catford (as cited in Osman, 2017) explains that "translation is the replacement of textual material in one language (SL) by equivalent textual material in another language (TL)". Moreover, Cabral (2020) also mentions that translation is important because it allows people to communicate and understand each other's ideas and cultures without having to learn a second language.

Despite the fact that translation benefits people in the sense of gaining new ideas, it faces some problems caused by errors in a rendered text made by a translator. Krisetyawati (2010:8) states that common errors are caused by the lack of knowledge and different levels of language competence especially in terms of grammar and meaning. Pojprasat (2007) conducted research on translation errors of both syntax and semantics made by grade 12 students who took a translation course. The findings revealed that the most frequently

occurring syntax and semantic errors contained articles and confusing words. Similarly, Pornwiriyakit and Dandee (2015) found that the dominant errors produced by students majoring in English were tenses in terms of grammar and homonyms in terms of semantic. In another context, Li and Liang's research (2019) introduced 3 translation errors found in the subtitles of the movie "The Wandering Earth" including grammatical, cultural, and pragmatic errors respectively.

In previous studies, the main focus was on investigating the errors by either administering translation tests to students, or analyzing errors from literature. None of these studies explore translation errors in the area of IVA on mobile devices. Smartphones and mobile devices are part of life for many digital natives (Schwartz, 2019) and the IVA on mobile devices are becoming popular amidst smartphone users. Billions of voice assistants are being used nowadays that the number of these tools is expected to be hitting 8 billion by 2023. In addition, there are many IVAs on mobile devices that plausibly could be investigated the errors after translated into the target language. Therefore, this study was interested in identifying the translation errors in IVA of Siri, Bixby, and Google Assistant.

Objectives

1.1 To identify translation errors of translated IVA of Siri, Bixby, and Google Assistant.

1.2 To compare translation error of the translated IVA of Siri, Bixby, and Google Assistant

Literature review

AI Translation Systems

AI translation systems can be defined as computer systems that translate content either with human or without human assistance. These systems can serve translation bilingual or multilingual, unidirectional or bidirectional purposes (Yanisky-Ravid & Martens, 2019: 122). Three translation approaches are applied to translation system functions. First, a directional translation approach which is designed for a specific matching of languages operates by transferring linguistic information from the source language to a target language under certain rules. Second, an interlingua approach which depends on two stages of translation. The first stage is translation from the source language to an intermediate interlingua and the second stage is a further translation from the interlingua into the target language. This approach attempts to identify patterns and find similarities in all languages and then generate a new language that synthesizes all common structures prior to

translating the data to the target language. Finally, the third type of translation system is a transfer approach. It functions by converting the source language into an abstract representation at the initial stage and then converting this into target language equivalent representations as the second stage. As a final stage, texts are converted into the target language (Yanisky-Ravid & Martens, 2019: 122).

It is evident that AI translation tools depend on a stored translation memory. In other words, AI translation uses a database that stores translated segments are to translate a file of segments. Before they perform translation, they analyze how many availabilities of translated segments for reuse are required. For these reasons, the question of whether AI translation can replace human is reasons whether AI can replace human is still under discussion. Word meanings depend on context and people who speak different languages and have limited cultural understanding when they express themselves in writing (Yanisky-Ravid & Martens, 2019: 125). Moreover, Firth (1957), the father of contextual linguistics, (as cited in Constantine, 2019) agreed that understanding the context is pivotal for interpretation. Therefore, it is hard for even the most high-level machine to understand human thoughts as well as emotions. This raises the question of to what extent AI translation system offer potential accuracy (Yanisky-Ravid & Martens, 2019: 125).

Constantine (2019:472) analyzed a google translation from French to English and vice versa. The results revealed that providing more context and expanding the sentence yield led to more accurate translation from google translations. Even though google translation has improved from previous versions to deal with more sophisticated texts, it still cannot completely understand original texts and AI itself also does not comprehend the texts it produces.

In summary, AI translation systems demonstrate the benefits in assisting humans in translating from a source language to a target language. However, the translation reliability is still questionable because it is crucial to understand and process context in order to make the most reasonable interpretation for translation.

Translation Error Analysis

In order to ensure the validity of translations, error criteria from translation experts were used. The analytical error criteria of this study were adopted from Lisattruklai, (2011:48). There are three types of errors focused on in this study as follows.

1. Grammatical errors in translating instructions from English to Thai focuses on three grammatical points:

- Tense refers to translation errors regarding tense used in Thai.
- Passive voice refers to the errors caused by sentence emphasis on action.
- Dummy subject refers to errors when "it" appears in the translated context.

2. Semantic errors in translating instructions from English to Thai focus on the following points:

- Homonym refers to the errors occurring when a multiple-meaning word is incorrectly translated to Thai, and thus is not concordant with the context.
- Phrasal verb refers to errors in the sense of translating a two-word verb into Thai.
- Idiom refers to errors regarding the connotative meaning translated into Thai.
- Equivalence in meaning refers to errors occurring when the translated text and source text is not equivalent in meaning by omitting, adding, and distorting.

3. Transliteration is the process of replacing a character in the syllabic system of writing with a conversion alphabet. It is the simplest way to ensure that the conversion text is not ambiguous.

In conclusion, translation error analysis criteria adapted from Lisattruklai (2011:48) focus on three main domains: grammatical error, semantic error and transliteration which commonly occur in English to Thai translation.

Methodology

The research methodology first attempted to identify the popularity of mobile phones available in the market and then located errors of each IVA on mobile devices. The questionnaire was used during the first phase by posing questions on an online social platform. The details of the questionnaire focused on how mobile users prefer to give their instruction via IVA. The second phase aimed to analyze the errors of each VSI. The error analysis criteria were adapted from Lisattruklai (2011), Wimonchalao (2000) and Kanchanawan (2006).

A. Data Collection

The criteria employed to collect texts for analyzing were based on popularity and market share in the mobile business and which functions mobile users often do to make a command via virtual assistant. Moore (2018) conducted a survey of the smartphone market share in 2019. The result revealed that Samsung which employed a virtual assistant operating system called Bixby ranked at first place with 20.1%, Apple using an operating virtual assistant named Siri came in at second place with 16%, and the rest of Android smartphones, compatible with Google Assistant, took more than half of the market share. Therefore, IVAs studied for error analysis in this study were Siri, Bixby and Google Assistant.

The compilation of translation texts (English to Thai) consists of 13 instructions. The instructions consist of 5 versions for Siri, 7 versions for Bixby, and 1 version for Google Assistant. The rationale behind that there is only 1 version of Google Assistant is because it is continuously updated by Google. The versions of each virtual instruction were shown in table 1 below:

Table 1 the versions of AI instructions

VSI Operating system	Version	Translated words count	
		English words	Thai words
Siri	iOs 8.4	73	77
	iOs 9.3	65	74
	iOs 10.3	108	135
	iOs 12.3	88	102
	iOs 13.6	103	135
Bixby	S20	135	159
	Note20	157	184
	A50s	100	118
	Galaxy Z Fold	100	118
	Note 10+	100	118
	A71	100	118
	A50	100	118
Google Assistant	1 (online database)	269	330

B. Data analysis

Each type of error in the instructions were divided into smaller sentences to analyze the data. Mean and error frequency count were used to report the data. The analytical error criteria of this study were adopted from Lisattruklai (2011), Pornwiriyakit and Dandee (2015), and Kanchanawan (2006).

To validate the error identification, the results from translation analysis were checked by three teachers, who teach translation courses at Rajamangala University of Technology Thanyaburi, serving as interraters. Descriptive statistics (mean) was used to analyze the data. To receive clear frequencies of errors, the formula shown below was used.

EP (%) = Error Percentage

N = Number of each type of translation errors

T = Total number of all types of translation errors

In addition, the description of each error found in each virtual instruction was presented with explanations of their error patterns, and frequencies along with error occurrences.

To interpret the level of translation accuracy, the formular proposed by Suharsimi (2006:196) as cited in Krisetyawati (2010) was applied in this study and demonstrated below.

76 – 100% = very poor.

56 – 75% = poor

40 - 55% = good

Less than 40% = very good.

Results

The findings of the error analysis of each virtual instruction operation systems were shown as follows:

$$\mathrm{EP}(\%) = \frac{N}{T} \times 100$$

The table below reveals the number of errors and frequency found in each IVA operating system.

Table 2 Frequencies of translation errors found in all instructions

AI Voice summon instructions	Total number of sentences analyzed (N)	Type of error			Total (100%)	Level of translation accuracy
		Grammatical error	Semantic error	Transliteration		
		Tense	Equivalence in meaning			
Siri	29	1 (3.44%)	1 (3.44%)	-	2 (6.88%)	Very good
Bixby	62	-	7 (11.29%)	14 (22.58%)	21 (33.87%)	Very good
Google	25	-	8 (32%)	-	8 (32%)	Very good
Summary	116	1 (1.16%)	16 (18.56%)	14 (22.58%)	31 (35.96%)	Very good

Table 2 showed that grammatical error was only found in Siri at 3.44 percent while semantic error was found in all IVAs. There was 1 error in equivalence in meaning for Siri at 3.44 percent, 7 errors in Bixby at 11.29 percent, and 8 errors in Google Assistant at 32 percent. Finally, error in transliteration only occurred in Bixby at 22.58 percent (14 errors). This can imply that Siri makes the least number of errors compared to Bixby and Google Assistant.

Discussion

The error analysis of IVAs of IOS, Bixby and Google Assistant revealed that there were only three explicit types of errors including grammatical error (tense) which were found only in Siri. However, semantic error in equivalence in meaning was found in all IVAs as demonstrated in the following examples:

Example 1: A grammatical error found in Siri.
Source language: *If you're using a headset,*
Target language: *หากคุณใช้ชุดหูฟัง*

The above problematic sentence showed the translation error in tense because the present continuous indicator {-ing} in the phrase 'If you're using a headset' is omitted.

Yanisky-Ravid & Martens, (2019: 125) indicated that culture is significant for interpretation. The omission of the word "กำลัง" may result in misinterpretation even though tenses do not exist in Thai language.

Example 2: A semantic error found in Google Assistant.

Source language: *On Pixel 3 and Pixel 2 phones, you can also squeeze your phone to talk to the Google Assistant.*

Target language: *ในโทรศัพท์ Pixel 3 และ Pixel 2 คุณบีบโทรศัพท์เพื่อพูดคุยกับ Google Assistant ได้ด้วย*

Nida and Taber (as cited in Ran, 2009) explained that source language and target language should be equivalent in the closest natural way in terms of meaning and style. Moreover, Machali (1998) states that not only "the sameness of meaning" is a factor to be considered when translating but also the naturalness of expression". This problem derives from the limitation of the AI translation system because the word "squeeze" might be stored in its database as "บีบ". Therefore, the neutral network will read and retrieve the information but as Constantine (2019) indicated about AI translation systems do not understand the texts that it produces.

To make the translated texts more understandable for Thai mobile users, the suggested translation in order to avoid confusion with the word "squeeze", should be 'กดค้างที่ปุ่มเปิดเครื่อง' instead of 'บีบ' to keep the actual meaning of the text.

Example 3: A semantic error found in Bixby.

Source language: *If you are using a headset, you can use the center or call button in place of the Home button.*

Target language: *หากคุณใช้ชุดหูฟังคุณสามารถใช้ปุ่มตรงกลางแทนที่ปุ่มโฮมได้*

The above is an inequivalent in meaning error since the phrase 'or call button' didn't appear in the target language. The error found in the Bixby operating system indicated that the AI translation system cannot interpret texts with complexity as Yanisky-Ravid & Martens, (2019: 125) stated, so it is still questionable whether AI translation system will ever be able to entirely replace human translation.

Example 4: A transliteration error found in only Bixby.

Source language: *Launch the Bixby app and tap: > Settings > Automatic listening > Hands-free only.*

Target language: *เปิดใช้แอพ Bixby และสัมผัส: > Settings > Automatic listening > Hands-free only.*

The transliteration error was evident when the word 'app' was not correctly written into the target language (Thai). Thai Royal Society as cited in Kachanawan (2006) states that {P-} and {-P} are replaced with 'ป '. So, the character 'p' in the word 'app' should be transliterated into 'แอป'. It was shown that most of the errors occurred in the translation manual of virtual assistants were inequivalent in meaning. This might distort the meaning from the source language to the target language. Meanwhile, transliteration error occurred repetitively in only one single word which might be implied that the awareness of the errors was not addressed.

It is evident that AI translation systems might be able to translate from a source language to a target language in some instances. However, the complexities of the language demonstrate problems in its power of interpretation. In addition, AI translation systems cannot provide accuracy of translated common words from a sauce language to a target language. In particular, those common words used in specific contexts in the target language. Therefore, culture differences still cause difficulties for AI translation systems.

Conclusion

The error analysis in instruction of virtual assistant on mobile devices can be concluded that most of the errors are semantic errors in equivalent in meaning and these errors still exist in the later versions except Siri. All IVAs tend to omit translating some words from the source language to the target language. This represents the limitation of AI translation system when it comes to deal with complexities and cultural differences. This might be lead mobile users to misinterpret the meaning and may cause confusion. Therefore, the AI translation system in mobile devices might be helpful for mobile users in some certain extent, the effectiveness and usefulness are still opened for discussion.

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