Research Paper

Neural Machine Translation Strategies for Rendering Persian Slangs in Audiovisual Materials: Iranian EFL Teachers and Students in Focus

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Abstract

This study aims to examine how neural machine translation systems render slang terms in audiovisual materials. To this end, 100 dialogues from Iranian award-winning film 'Sheeple' (2018) by Houman Seyyedi were randomly selected and analyzed in order to identify Persian slang terms. Three neural translation machines were employed to translate these terms. Baker's (1992, 2011, 2018) strategies were applied to each neural translation output. After analyzing the results, it was determined that Google Translate had the highest frequency of "Translation by Paraphrase Using an Unrelated Word" while Targoman and Farazin mostly used "Translation by Paraphrase Using a Related Word". This study also assessed the naturalness of translation by asking the opinions of five expert Iranian EFL teachers regarding the equivalents proposed by neural machine translation. Although Targoman's performance is far from perfect in comparison to human translation, the data analysis indicates that Targoman is the most natural of the three translation machines. Ultimately, the results were shared by TEFL students in an Iranian university. A large number of these slang terms were unfamiliar to the students in their second language. Besides implications for teaching English language and translation, this study is beneficial for developers of neural machine translation systems who strive to improve the quality of machine translation.

INTRODUCTION

Slang terms are commonly heard or used in street talk. In general, slang is a prominent feature of very informal language used by certain societal groups (Rianto, 2020). Friedrich (1972) pointed out that this type of language is particularly popular among teenagers. Among other epistemological sites, slang terms can be easily seen in novels, movies, and song lyrics (Octavia, 2017). In the case of translation, it is more conceivable for the translator to come across slang terms in audiovisual materials, given that the source text's orality features abundantly spread. Thus, it is necessary to translate such words in AVT for the sake of conveying form and register as well as attached cultural notions.

With the advent of Machine Translation (MT) well over two decades ago, professional and non-professional translators rapidly turned to various data bases and online tools to assist them in their translation tasks. Nevertheless,

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the output of such tools is yet to be reliable. One of the challenges for MT could be their potential inefficiency to translate slang terms. In MT, texts are translated automatically from one source language to another (Tambouratzis, Vassiliou, & Sofianopoulos, 2017). Google Translate, Targoman, and Farazin are examples of Neural Machine Translation (NMT) as an approach to machine translating with tremendous amount of growth over the last decade. Two major NMT systems in Iran include Targoman and Farazin. Targoman is the first Iranian MT service on par with Google Translate, as noted by former Iranian Minister of Communication Azari Jahormi (Tehran Times, 2019).

Additionally, Neural Machine Translation has influenced traditional trends of research in translation, offering new possibilities for translators who can save more time by using online translation assistants such as Google Translate and its Persian counterparts. Current translation engines in the world use similar algorithms, and the main difference between them is the availability of translated corpora and as Ziabary (2020) notes, the accuracy of setting engine parameters and preprocessing in recent years, Google Translate has gained considerable popularity as a translation tool due to its improved performance (Donya-e-eqtesad, 2021). However, Google Translate is only sometimes the best translation tool, and tools based on deep learning (Deep Learning) are often more practical (ibid). Misconceptions, Word-for-word translation, Differences in sentence construction, and Misunderstanding of the text were risks in translation for NMT services (Tarjomer, 2021).

While Machine Translation is a well-established sub-field of research in Translation Studies, NMT has received relatively little attention in AVT. In the new digital era, algorithm recognition has been proposed to improve and translate slang terms. However, the machine has yet to be tested in the case of slang terms as a linguistic feature showing informality of language. In addition, recent studies have not explored the quality of the translation of Persian slang into English done through services run by NMT. Several researchers

have examined slang translation through NMT, including Absalan (2020), Asiri and Sahari (2018), Akbarian (2017) and Goyal and Lehal (2009). Furthermore, the majority of studies on Persian AVT have focused on censorship and ideological considerations in official dubbing and translation, as highlighted by Khoshsaligheh and Ameri (2016), Rezvani Sichani et al. (2021) and Rezvani Sichani and Afrouz (2019). However, there are few (if any) studies that examine the English subtitling and/or dubbing of Persian movies, which was the focus of our investigation. Our study aims to contribute to the literature on Persian AVT from a different perspective, exploring the translation strategies used to render slang terms in English subtitling of Persian films through NMT. We hope that our research will inspire more studies on this topic and provide a new perspective on Persian AVT. This study could provide valuable insight for translators and computer engineering on translation of slang terms.

Despite the initial hesitancy and varying opinions, over time machine translation has gained more currency in many communities of practice, including translator teachers and professional teachers. Although the NMT was one of the essential algorithms in computer-based translation, it has not been evaluated much in terms of less formal linguistic features such as slang, particularly in the field of audio-visual translation in Iran. Furthermore, several algorithms have been developed to assist in identifying and translating slang words in the new era, but there is a lack of empirical evidence on how NMT works in slang as an informal language.

It is the objective of this research to compare Google Translate, Targoman and Farazin, all of which utilize neural machine translation. These neural translation machines were employed in this research in order to translate Persian slang terms into English for the film "Sheeple" (2018). In addition to winning seven awards and 16 nominations in Iranian cinema, this film contains many colloquial terms and street phrases. An evaluation of the quality of translation performed by neural translation machine systems was performed using the consultation

of five experts. Also, as part of this research, two Persian Slang Dictionaries of Najafi (2020) and Anvari (2020) are examined in order to identify the Persian vernacular. This study aims to address the following questions by sharing the findings of the study with a group of English language learners at the university level. For the purposes of this study, the following questions are adopted:

RQ1. *What are Persian slang terms in a sample of sentences used in 'Sheeple' (2018) movie?*

RQ2. *What translation strategies were applied in the outputs of three NMT services, namely, Google Translation, Targoman, and Farazin, to render Persian slang terms in Sheeple's (2018) movie into English?*

RQ3. *What is the most frequent strategy utilized by each NMT service in this study?*

RQ4. *What are the attitudes of five experts toward the quality of equivalents given for each slang term provided by these NMT services in terms of naturalness?*

LITERATURE REVIEW

Neural Machine Translation as a subfield of computational linguistics is still developing with advancements in technology and epistemological contributions of researchers in computer engineering and translation studies. However, most human-generated online texts, especially on social media, are full of typos, slang, dialects, idiolects, and other noise that can adversely affect MT accuracy (Vaibhav, Singh, Stewart, & Neubig, 2019). Although automated systems do not perform as well as humans in terms of fluency, fidelity, post-editing, and precision, NMT remains a flourishing tool for translators.

Similarly, some translation materials can be difficult for human translators, and they may need to make multiple adjustments before the costumer is satisfied (Sargazi, 2015). As such, NMT services could provide some help or suggestions through which the less professional translator can be directed to finding equivalents with closer connotations to the target audience's culture. Moreover, there is a significant challenge in determining how machine translation

can produce translations of publishable quality (ibid).

As an example, no two human translators can create the same translation in the exact linguistic forms, and meeting customer demands may require multiple revisions. However, determining how machine translation can produce publishable-quality translations is a significant difficulty. In general, Hutchins & Somers (1992) classified human and machine translation into four types that include (Traditional) Human Translation ((T) HT), Machine-Assisted Human Translation (MAHT), Human-Assisted Machine Translation (HAMT) and Fully Automatic Machine Translation (FAMT). FAMT refers to translating a source text into a target text without human intervention (Hutchins & Somers, 1992)

The utilization of neural network models was originally confined to speech recognition. However, in due course, it has been adopted for other natural language processing (NLP) tasks such as translation modeling and parsing (Devlin et al., 2014). Deep neural networks have performed well in some applications, including object recognition and speech recognition (Cho, et al. 2014).Moreover, Cho et al.**Error! Bookmark not defined.** believed neural networks were useful for natural language processing (NLP). The statistical machine translation (SMT) process was more successful using deep neural networks. "Neural networks" have been described as a significant achievement in statistical machine translation, according to Koehn (2017), who stated that they promised a better sharing of statistical evidence between similar words and the inclusion of rich context.

Although neural machine translation (NMT) has developed lately, its uninterrupted representations and non-linear neural networks have made it challenging to signify its internal workings.

The main drawback in neural machine translation was the difficulty of "interpret[ing] the internal workings of NMT"; however, in statistical machine translation, the translation process was a derivation encompassing translation rules like phrase pairs (Ding, Liu, Luan, & Sun, 2017). Because NMT employed an

end-to-end approach and input information is taken as real-valued vectors or matrices, it was difficult to discover how target words were produced. Therefore, linking neural networks with language structures was extremely difficult, and in effect, it was quite challenging to understand how the translation process worked and how the NMT system operated.

At the intersection of NMT and less formal language, serious challenges could still exist due to the fact that these NMT services are likely to translate more meaning-based and closer to formal forms of language. More specifically, the translation of slang is unique in that slang has far different meanings from literal or dictionary meanings. Most slang terms have developed from a covert type of language that is generally only understood by a select group of people within various subcultures. Consequently, translators should be mindful of translating slang in an appropriate manner. In cases where literal translation fails to convey the message contained in slang, the translator should employ appropriate strategies to find an equivalent for a given slang term. Lack of understanding on the part of the translator or NMT services regarding slang terms in the source text may lead the target audiences' confusion. In the case of movie translation such challenges would be compounded due to the dominant orality features of most contemporary films in various genres.

Several studies have compared the performance of different machine translation services. Talaghani and Pazouki (2018) found that Targoman and Google Translate performed similarly in translating idioms, with Targoman translating two more correctly. However, Akbarian**Error! Bookmark not defined.** (2017) found that Karimi Hakak's human translations were more reliable than machine translations for English-Persian idioms. Torkaman (2013) found that machine translations were highly intelligible but less informative than human translations. Sargazi (2015) found that Google Translate achieved the highest naturalness score but was less accurate than human translators. Absalan (2020) found that Google Translate produced better translations with fewer errors compared to Microsoft

Bing and Farazin, but identified several common errors in machine translations that affect comprehensibility. In general, human translation provides more accurate and consistent equivalence than machine translation, according to Asiri and Sahari (2018).

The issue of English subtitling and dubbing of Persian movies has received attention in academic literature. Scholars such as Rezvani Sichani et al. (2019) and Miandoab (2018) have conducted research on the translation strategies employed in subtitling of Iranian dramas. They highlighted strategies used to render audiovisual materials. However, there is still a need for further research in this area, particularly on the quality and accuracy of English subtitles and dubbing in Persian movies through Neural Machine Translation as they have gain popularity in translations of numerous texts. Such research could provide insights into the challenges in these types of translation, and inform efforts to improve NMT service for the accessibility of Iranian cinema to global audiences.

METHODOLOGY

A corpus-based, descriptive-qualitative approach is used in this study to explore the translation strategies of three machine translation services (Google Translate, Targoman, and Farazin). To evaluate the NMT services, this study examines the outputs by analyzing translation strategies and comparing slang terms with their original translations. Initially, the researchers randomly selected 100 slang terms from the movie 'Sheeple' (2018) and found related slang after consulting with the books "Persian Slang Dictionary" by Abulhassan Najafi and "Farhang- Shafahi-Sokhan" by Hassan Anvari. Subsequently, Google Translate, Targoman, and Farazin systems were used to translate Persian slang words into English to evaluate the outputs based Baker's (1992, 2011, 2018) strategies. After that, five experts evaluate ten percent of the slang term output of three NMT services to determine whether the MT rendering of slang terms in English was satisfactory. Finally, in two sessions, the research results were shared with a group of TEFL students to find out what they thought of these equivalents

and to what extent they were familiar with such slang terms.

RESULTS AND DISCUSSION

Based on Baker's (1992, 2011, 2018) translation strategy, four major categories of translation strategies have been identified to translate expressions and with an extension to street talk and slang terms. They include a) Translation by a more general word, b) Translation by paraphrase using a related word, c) Translation by paraphrase using an unrelated word, d) Translation by Omission.

Translation by a More General Word

Translating a general word is a popular strategy. Baker (1992, 2011, 2018) notes that this strategy involves using the same expressions in the target language that have roughly the same meanings as those in the source language and contain similar lexical items. Translating a specific source word into a general term in the target language was possible with this strategy.

For example, "بیشعور" was translated in English as "chump." "بیشعور" in Persian means "an easily deceived or foolish individual." Google Translate produced "بیشعور," an equivalent, more general term since it conveys similar meanings in its SL and contains similar lexical items. This strategy is presented in Table 1.

Table 1

Slang Terms and Translation by a More General Word

No.	The Persian Slang	Expert's Equivalence	Dictionary	NMT output	NMT service	Start Time	End Time
1	مادرم میگفت روتو میکشیدم، چشمت نزنند. Word for word: Hitting your eyes	Jinx	-Farhang-e Shafahi Sokhan (p. 210) -Persian Slang Dictionary (p. 428)	Keep an eye on him	Farazin	00:01:35	00:01:39
2	این مسخره بازی جدیده؟ Word for word: playing ridicule	-Prank -Mockery	-Persian Slang Dictionary (p. 1349)	Teasing	Targoman	00:23:59	00:24:01
3	درگیر شدیم بعدش گفت چشم Word for word: eye	Right on	-Farhang-e Shafahi Sokhan (p. 208) -Persian Slang Dictionary (p. 424)	All right	Farazin	00:32:42	00:32:43
4	فقط پس انداختی Word for word: Putting behind	Breed	-Farhang-e Shafahi Sokhan (p. 146) -Persian Slang Dictionary (p. 245)	So you did.	Targoman	00:52:22	00:52:23

Translation by Paraphrase Using a Related Word

It is common to use this strategy when the concept expressed in the source item is lexicalized in the target language but in a different format. It will naturally occur if a particular target language form is used more frequently in the source text (Baker, 1992, 2011, 2018).

For example, the slang translation of "دلسوز" in English is "compassionate." The Persian word meant "being touched by the suffering of others and striving to alleviate it." Google Translate output is "compassionate" since the machine provided the literal translation equivalent to the TL; it is equivalent to paraphrase using a related word. "Compassion" contains exact lexical items in its SL. In this case, literal equivalents were abundant in three NMT services. This strategy is presented in Table 2.

Table 2
Slang Terms and Translation by Paraphrase Using a Related Word

No.	The Persian Slang	Expert's Equivalence	Dictionary	NMT output	NMT service	Time	
						Start Time	End Time
1	یه چوپون دلسوز Transliteration: Delsouz (heart burning)	Caring cookie	-Persian Slang Dictionary (p. 676)	Compassionate	Google Translate	00:00:53	00:00:56
2	عینهو فیلم هندی ها Transliteration: Filme Hendi (Indian movie)	Lovely-dovey flick	-Farhang-e Shafahi Sokhan (p. 412)	Indian movie	Google Translate	00:02:14	00:02:17
3	عوضی Transliteration: Avazi	-Asshole -Jerk	-Farhang-e Shafahi Sokhan (p. 397) - Persian Slang Dictionary (pp. 1034)	Jerk.	Farazin	00:18:15	00:18:15
4	من شاهینم !گرفتی؟ Transliteration: Grefti	Got it	-Farhang-e Shafahi Sokhan (p. 460) -Persian Slang Dictionary (pp. 1230-1231)	You got it.	Farazin	01:12:39	01:12:40

Translation by Paraphrase Using an Unrelated Word

Paraphrase by unrelated words can be used as an alternative to related words when a concept in the source item is not lexically available in the target language (Baker 1992, 2011, 2018).

For example, the slang translation of "شیتیل" in English is "Grease palms" The Persian word means "bribe someone with money in exchange for a favor." Google Translate provided "sheet" as the possible equivalent to paraphrase an unrelated phrase. Table 3 details the use of this strategy.

Table 3
Slang Terms and Translation by Paraphrase an Unrelated Word

No.	The Persian Slang	Expert's Equivalence	Dictionary	NMT output	NMT service	Time	
						Start Time	End Time
1	به درک Transliteration: Be darak	The hell with it	-Farhang-e Shafahi Sokhan (p. 125)	understand	Google Translate	00:13:01	00:13:01
2	اون که البته مال شما نیست مشدی Transliteration: Mashdi	-Man -Dude	-Farhang-e Shafahi Sokhan (p. 496)	Fixing	Targoman	00:15:08	00:15:10
3	مگه معامله شده تو از این شیتیل گرفتی؟ Transliteration: Shitil	Bonus -Grease palms -Hush money	-Farhang-e Shafahi Sokhan (p. 369)	sheet	Google Translate	00:25:47	00:25:49
4	هواشو داری Transliteration: Havasho	Got his back	-Farhang-e Shafahi Sokhan (p. 540) -Persian Slang Dictionary (p. 1493)	you have the air	Google Translate	01:30:41	01:30:42

Translation by Omission

This strategy is rather inappropriate in terms of faithfulness, but it can develop readability if used in proper situations. By using this strategy, translators can avoid lengthy explanations when the meaning conveyed by a particular item or expression can be explained for the Translation to be understood. (Baker, 1992, 2011, 2018).

Despite this, Baker (1992, 2011, 2018) emphasizes that any translation omission of words or expressions will inevitably result in

some loss of meaning. The scholar recommends this strategy only as a last resort when the benefits of producing a smooth, readable translation outweigh the importance of accurately conveying the meaning in a particular context.

For example, the slang translation of "قزمیت" in English is "Imbecile". The Persian word means "an idiot." Google Translate output was "Qezmit," which is not an omission, but a transliteration of the Persian slang. This could be an important distinction between human and machine translation. In the case of human translation, the omitted sections of the source text cannot be detected in the translated text,

unless a mapping is carried out. This issue is, however, blatant in machine translation without even checking the source text.

Additionally, "جزقلی" in English could be "Puny," and the output of the translation machine was translated into English, so the slang was precisely repeated, but the equivalent was meaningless; therefore, the approach included it. An NMT output included in this category has a meaningless word structure (for example, only one letter should be displayed, and the output error should be enclosed within brackets). This strategy is detailed in Table 4.

Table 4
Slang Terms and Translation by Omission

| No.	The Persian Slang	Expert's Equivalence	Dictionary	The English Equivalent of Slang in the NMT	Software Engines	Time	
						Start Time	End Time
1	زید مید Transliteration: Zeid Meid	-Bae -Side chick	-Farhang-e Shafahi Sokhan (p. 315)	Mm - hmm	Targoman	00:03:08	00:03:09
2	یه فکری به حال خودت بکن قزمیت Transliteration: Ghozmit	Imbecile	-Farhang-e Shafahi Sokhan (p. 503) - Persian Slang Dictionary (pp. 1089)	Qezmit	Google Translate	00:11:10	00:11:11
3	تو جزقلی بچه چیو واس من حل کردی Transliteration: Jezgheli	Puny	-Farhang-e Shafahi Sokhan (p. 188)	جزقلی	Farazin	00:31:54	00:31:55
4	لات بازی درآورد Transliteration: Latbazi	-Roughhouse -Hooliganism	-Farhang-e Shafahi Sokhan (p. 471)	لاتبازی	Farazin	00:36:12	00:36:12

What follows are frequencies of strategy use for each NMT services based on the translation outputs of slang terms in Seyyedi's movie 'Sheeple'.

a) Google Translate

A random selection of 100 slang terms was conducted to analyze the strategies employed by Google Translate. The results are presented in Table 5, Figure 1 and 2.

Table 5
Frequencies of Translation output produced by Google Translate

Translation Strategy for Google Translate Based on Baker (1992, 2011,2018)	Frequency	Percentage
Translation by a More General Word	9	9%
Translation by Omission	17	17%
Translation by Paraphrase Using a Related Word	34	34%
Translation by Paraphrase Using an Unrelated Word	40	40%
Total	*100*	*100%*
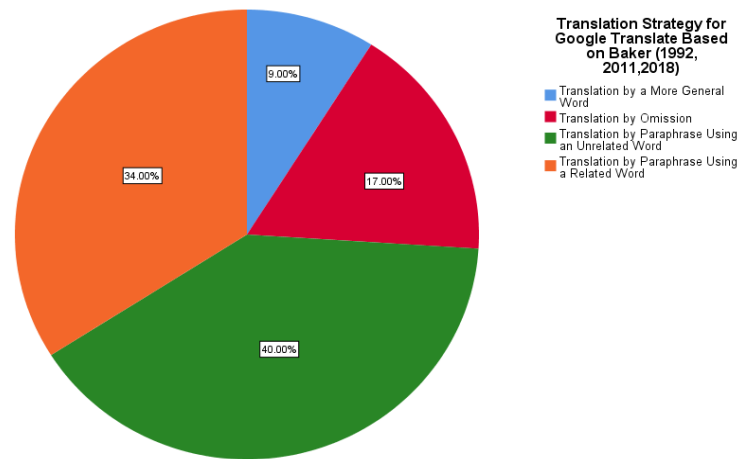
Figure 1
Percentages of Translation output produced by Google Translate

The researchers examined four main strategies from slang terms in this movie, which Google translated. According to the results, the most commonly used translation strategy is "Translation by Paraphrase Using an Unrelated Word," with 40%, and the least commonly used translation strategy is "Translation by Using a More General Word," with 9%. "Translation by Par-

aphrase Using a Related Word" at 34% and "Translation by Omission" at 17% are noteworthy.

b) Targoman

Table 6 and Figure 3 and 4 present the results of the analysis of the collected data for Targoman machine translation strategies.

Table 6
Frequencies of Translation output produced by Targoman

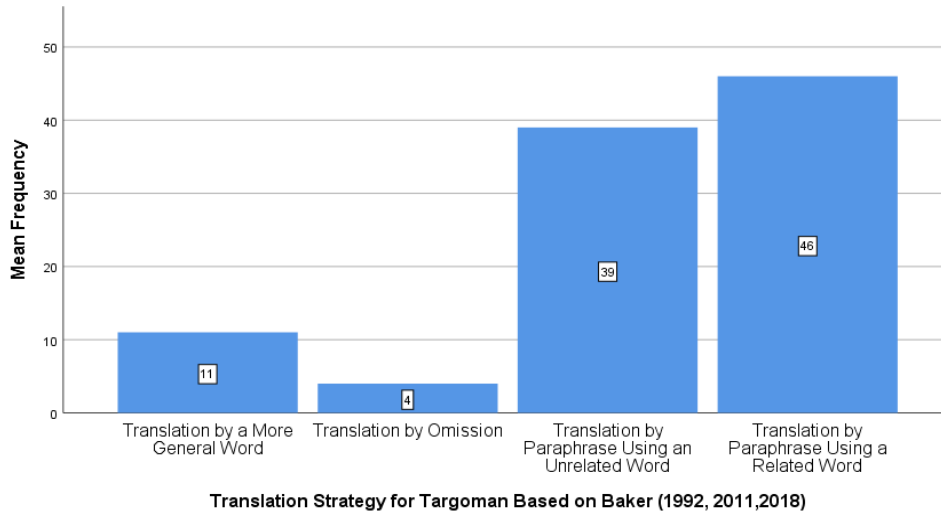| Translation Strategy for Targoman Based on Baker (1992, 2011,2018)	Frequency	Percentage
Translation by a More General Word	11	11%
Translation by Omission	4	4%
Translation by Paraphrase Using a Related Word	46	46%
Translation by Paraphrase Using an Unrelated Word	39	39%
Total	*100*	*100%*
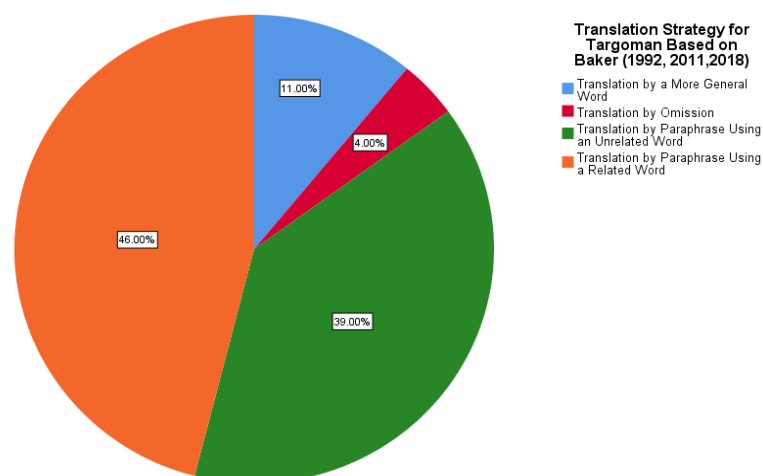
Figure 3
Percentages of Translation output produced by Targoman

A total of four strategies were examined based on slang terms in this movie, which Targoman translated. Based on the results, the most commonly employed translation strategy is "Translation by Paraphrase Using a Related Word," with 46%, whereas "Trans- lation by Omission" is the least frequently used translation strategy, with 4%. There are two notable usage ratios: "Translation by Paraphrase Using an Unrelated Word" at 39% and "Translation by a More General Word" at 11%.

Figure 4
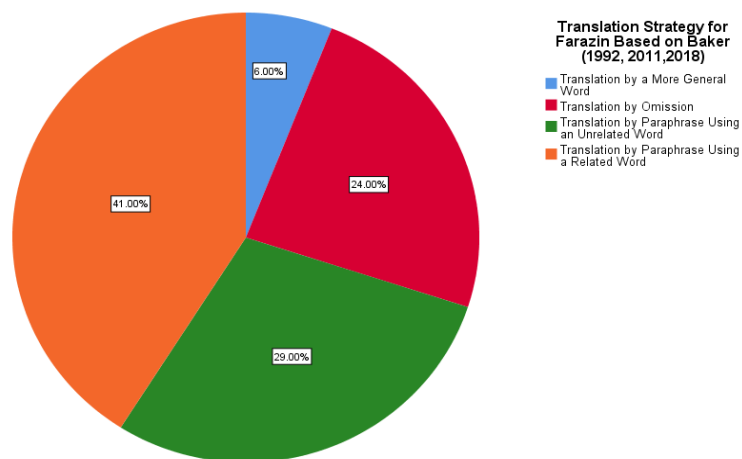*Frequencies of Translation output produced by Targoman*

In Targoman, it is evident that "Translation by Paraphrase Using a Related Word" is the most commonly used strategy and "Translation by omission" had the least frequency of use.

c) Faraz

Table 7
Frequencies of Farazin Translation output

Translation Strategy for Farazin by Baker (1992, 2011, 2018)	Frequency	Percentage
Translation by a More General Word	6	6%
Translation by Omission	24	24%
Translation by Paraphrase Using a Related Word	41	41%
Translation by Paraphrase Using an Unrelated Word	29	29%
Total	*100*	*100%*

Figure 5
Percentages of Translation output produced by Farazin

The researchers examined four main strategies selected from slang terms in this movie, which Farazin translated. Based on the results, the most frequently used translation strategy is "Translation by Paraphrase Using a Related Word" with 41%, and the least commonly used translation strategy is "Translation by a More General Word" with 6%. Additionally, "Translation by Paraphrase Using an Unrelated Word" at 29% and "Translation by Omission" at 24% are noteworthy.

Attitudes of Teacher Experts

Five linguistic experts who had 10 years of teaching English and translation in EFL/ESL situations voted on the naturalness of 90 Persian slang sentences selected from the sample under study. The samples were divided into 9 sets containing 10 slang terms. Table 8 shows their votes as well as the naturalness of the translation. The columns in Table 8 represent the number of expert votes for the naturalness of the translation outputs offered by each NMT service. In the event of natural translation, the NMT received a score of 1. Otherwise, the translation was given the zero value. Ultimately, the results of evaluation for each translation engine were provided in the table.

Table 8

A sample set comparison of the naturalness with ten cases in three NMT services evaluated by teacher experts

Sample	Analyzing the Data					
	Number of Votes by Expert for Google Translate	Naturalness of Form for Google Translate	Number of Votes by Expert for Targoman	Naturalness of Form for Targoman	Number of Votes by Expert for Farazin	Naturalness of Form for Farazin
غلط کردم Transliteration: Ghalat kardam	5	1	0	0	0	0
جا خوش کنی Transliteration: Ja khosh koni	0	0	0	0	0	0
به درک Transliteration: Be Darak	0	0	2	1	0	0
مشدی Transliteration: Mashti	0	0	0	0	0	0
عوضی Transliteration: Avazi	0	0	2	1	4	1
دیلاق Transliteration: Deilagh	0	0	0	0	0	0
لات بازی Transliteration: Lat Bazi	0	0	0	0	0	0
زبون نفهم Transliteration: Zaboon Nafahm	2	1	2	1	0	0
هارت و پورت Transliteration: Hart va Poort	0	0	0	0	0	0
بو ببرند Boobarand	0	0	2	1	0	0
Overall score	7	2	8	4	4	1

A translation is natural if it conforms to the theory of Nida and Taber (2004). Dynamic equivalence is natural when the meaning in the target language is culturally and effectively equivalent to the meaning in the source language, as Nida and Taber (2003) have noted.

Table 9
Overall evaluation of Three NMT Services

NMT	Analyzing the Data	
	Naturalness of Form	
Google Translate	2 in each set	20%
Targoman	4 in each set	40%
Farazin	1 in each set	10%

Table 9 shows that four out of ten Targoman cases in each analyzed set were natural translations. This means that 40% of slang words have been properly translated. Google translate produces 20% nature translations and Farazin has the lowest number of correct translations and 10% are natural translations. Targoman has achieved the best natural translation result among these three engines. It should be noted, however, that these services are not yet comparable with a human translation.

Upon sharing the research findings with a group of 10 English language teaching students at B1 level of proficiency in a focus group discussion, Baker's model was well received by all. It was found that many of the students did not know the slang terms, which suggests that this area of the language is not sufficiently emphasized during training sessions. However, after learning about Targoman, the students were enthusiastic about improving its quality by editing its output. During the focus group discussion, participants also expressed their views on the lack of attention given to slang in their language teaching courses. They noted that learning about slang could motivate students to learn English, as it would enable them to communicate more effectively with native English speakers. In addition, the group discussed the use of L1 in language teaching, in alignment with translanguaging principles. However, they indicated that due to a ban on the use of L1 in their language classes, they were deprived of knowing the equivalents of many English words in Persian. One student even recounted an experience in which their teacher was scolded by the language academy's educational department for introducing tasks that required the use of L1.

Despite these challenges, the group believed that using Iranian movies in an English language class as a translanguaging procedure would be an exciting way to learn about both linguistic and cultural aspects of L1. Overall, they emphasized the importance of incorporating translanguaging practices and slang education in language teaching courses to enhance students' learning experiences and motivation. The results of the study showed that three different NMT (Neural Machine Translation) services were not able to provide acceptable translations for most slang terms. This indicates that translating slang is a challenging task for NMT systems, and their translation quality is not comparable to human translation. This finding is consistent with the findings of other studies such as Absalan (2020) and Asiri and Sahari (2018). However, the results of this study are not consistent with Sargazi's (2015) findings, which reported that Google Translate performed better than other translation services. Furthermore, while Rezvaniniya's (2016) results showed that Google Translate provided acceptable outputs in terms of grammar, this study suggests that it is not a reliable assistant for translating slang terms. The study also noted that the Iranian counterparts of these NMT services were relatively more successful in translating slang

The results of this study can be a recent addition to the growing literature on Audiovisual Translation (AVT) that focuses on the Iranian context. This study is especially relevant as it discussed the issue of machine translation and its ability to translate slang terms in Persian audiovisual materials. The authors have conducted a naturalness assessment to evaluate the quality of machine-translated Persian slang that is absent in previous studies. The study provides an in-depth analysis of the strategies used in machine translation, which can help improve the quality of Persian audiovisual translation through NMT services. Although useful insights into the sociocultural aspects of Audiovisual Translation (AVT) have been

provided by studies conducted by Khosh-saligheh and Ameri (2016), Rezvani Sichani and Afrouz (2019), and Rezvani Sichani et al. (2021) with regard to ideology, taboo, and culture in AVT subfield, this study highlighted that emerging research trends in translation studies may yield novel perspectives on traditional research topics within this area of study.

CONCLUSION

Today, MT has a good reputation despite the differences of opinion at the beginning. Although neural machine translation was one of the essential algorithms in computer-based translation, it has not been assessed regarding formal linguistic features (such as slang) and experimentally, especially in AVT. Furthermore, there is a lack of experimental evidence on how NMT works in slang, a less formal language. In the new era, several algorithms have been proposed to improve the identification and translation of slang words. Moreover, studies have yet to be conducted on the translation quality of slang words of Persian to English translation machines.

This study evaluated Baker's (1992, 2011, 2018) translation strategies for translating Persian slang phrases into English for the Sheeple movie by Houman Seyyedi (2018) using NMT systems. The results of these strategies indicated that Google Translate had the highest frequency in the translation equivalence of slang terms with Translation by Paraphrase Using an Unrelated Word. The outputs of Targoman and Farazin translation machines were more frequent in Translation by Paraphrase Using a Related Words strategy.

In most cases, these equivalents did not show the correct meaning in the target language, indicating that such translations are far from street terms and human translations. Another aspect of this research was to investigate the naturalness of translation based on the theory of Nida and Taber (2004). Five experts were interviewed separately, and NTMs were scored based on their output. Data analysis showed that Targoman had the highest rank

among the three NMTs in terms of naturalness, with 40% naturalness, however the output was still far from human translation.

Furthermore, the study had several limitations that can be addressed in future studies. Firstly, the sample size for the study was relatively small, comprising only one film and the assessment of naturalness was assessed with a small group of Iranian EFL teachers and students. This may limit the generalizability of the findings to other populations. Secondly, the use of only one model for the analysis of outputs in the case of neural machine translation may have also impacted the accuracy and reliability of the results. It is important to note that the research conducted did not account for potential influences of factors such as ideology, social status, and socio-linguistic aspects on evaluators' perceptions of naturalness in translated slang. Furthermore, in the context of a dubbed version of the analyzed movie, results may vary. It is pertinent to consider these limitations in interpreting the findings. Future studies could explore these factors to provide a more robust and comprehensive understanding of the translation of slang in audiovisual media through NMT services.

Since translation is an interdisciplinary field in computer and information technology, graduates are highly recommended to contribute to the remarkable progress of artificial intelligence in NMT with more collaborations. In addition, these studies can help the engineers and designers of native translation machines to validate the output of NMT from a completely specialized linguistic and translational point of view and, if necessary, to design newer algorithms. The results of this study can provide better solutions for implementing a more accurate output of Targoman and Farazin from Persian to English, which can be investigated in future research.

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