

Translation Evaluation of Social Media Auto-Translate Feature toward News Headline

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ABSTRACT

Machine translation has become an everyday part of society's news consumption patterns. Unfortunately, important news content is poorly mediated by social media, especially on the output of the translation system feature on the site. Therefore, further research is needed on the evaluation of the auto-translate system on social media. This study focuses on the results of linguistic evaluation on the output of social media machine translation in translating news headlines. The data were taken from news coverage by the Reuters channel in the period of September 1st–7th, 2023 and from social media such as Facebook and Twitter. The translation evaluation used linguistic elements consisting of orthography, morphology, lexical, semantic, and syntax. This study found various kinds of linguistic non-equivalence. Orthographic non-equivalence includes punctuation, capitalization, and apostrophes. Morphological non-equivalence in the two systems was found in number concordance, inflection, derivation, and compounding. Lexical errors occur in both systems in the form of no correspondence and missing target words, as well as untranslated words and proper noun. In terms of semantics, both systems had difficulties with polysemy, homonymy, and expression. Finally, syntactic errors occur with missing articles, prepositions, and inappropriate arrangements of syntactic elements.

Keywords: Translation Evaluation; Machine Translation; News Headline

INTRODUCTION

Technological developments have changed the way people access news today, such as the use of social media for easier access, as well as auto-translate to bridge language differences in foreign news. About half (48%) of US adults say they "often" or "sometimes" get news from social media such as Facebook, YouTube and Twitter, according to a Pew Research Center survey (Liedke & Matsu, 2022). News is often accessed using social media unintentionally, or "incidentally" (Boczkowski et al., 2018), and they play an important role in people's access patterns to social media. Both of these new habits have a fundamental flaw, which is the lack of mediation by editorial teams commonly found in conventional news agencies to ensure the accuracy of news and to attract readers' interest. Machine translation has become an everyday part of society, reflected in how the public perceives the use of machine translation itself (Vieira et al., 2023). Vieira (2020) describes how the perception of machine translation by the media is both positive and negative for the public. Positive

perceptions include the capacity of machine translation to match human translation, or the integration of machine translation systems that help users understand languages easily. Negative perceptions focus on the output of machine translation and its errors, such as in the article "Stop using Google Translate! Wrexham Council staff warned after complaints over Welsh language errors" (Randall, 2018). Translation systems in the pattern of public news access on social media have an important role, but the translation output of the system is still not mediated by social media managers. Thus, this study will answer the following research questions: 1) How is the result of linguistic evaluation on the output of social media machine translation in translating news headlines; and 2) Why the machine translation output is not linguistically equivalent

Translation evaluation in the context of machine translation refers to the identification and classification of individual errors in machine-translated text (Stymne & Ahrenberg, 2012). Such evaluation can point out specific strengths and problem areas for machine translation systems, which is difficult to do using standard automated evaluation metrics such as BLEU (Papineni et al., 2002) or human ranking of sentences (Callison-Burch et al., 2007). In addition, some commonly used metrics are *Sentence Error Rate*, *Word Error Rate*, *Position-independent Word Error Rate*, *METEOR*, *General Text Matcher*, and *Dependency Based Evaluation* (Way, 2010, p. 542). However, these evaluations are more applied to the overall machine translation algorithm. Stymne and Ahrenberg further cite several taxonomies for machine translation error analysis, such as Flanagan (1994); Elliott et al. (2004); Vilar et al. (2006); Farrus et al. (2010). In this study, we will adopt the taxonomy of Farrus et al. (2010) to evaluate the accuracy of auto-translation output by Facebook social media on news covered by news channels, especially in the headline section.

Before the advancement of Artificial Intelligence (AI), however, the field of linguistics has long predicted the possibilities of AI in the form of Computational Linguistics. Computational linguistics is an interdisciplinary field between computer science, linguistics, psychology, philosophy, and mathematics, which uses a computational perspective to address statistical modeling of natural language properties and processes (Clark et al., 2010). Computational linguistics has two main branches, theoretical and applied. Theoretical computational linguistics mainly concerns the study of issues in cognitive science. Applied computational linguistics, on the other hand, is concerned with the practical results of modeling human language use (Whitehead, 2020), including machine translation. One application of computational linguistics and natural language processing is in machine translation. The first breakthroughs in machine translation can be traced to attempts in the 50s to translate texts from foreign languages into English (Hutchins, 1999) in the form of the

Georgetown Experiments. With more availability of microcomputers in the 1980s, machine translation evolved into statistical machine translation models based on simple word alignment models (Brown et al., 1990). Then, statistical machine translation systems have integrated phrase and lexical alignment, leading to "a significant improvement in translation quality compared to the older IBM word-based model" (Way, 2010, p. 531). In the field of machine translation, the previously leading main paradigm was phrase-based statistical machine translation (Koehn et al., 2003; Marcu & Wong, 2002). Nowadays, the model has been slowly replaced by Neural Machine Translation, a deep-learning based machine translation powered by Artificial Intelligence (Cho et al., 2014; Sutskever et al., 2014). Neural Machine Translation has been implemented by leading technology companies, such as Google (Wu et al., 2016) and Facebook (Tran et al., 2021) respectively.

News begins with a title or headline, which tells the reader what the news is about (Bakhshandeh & Mosallanejad, 2005, p. 29). The headline is usually formed around a phrase or sentence directing the reader to the news content and representing the essence of the news in question. Headlines can persuade readers to read the text or ignore it. Chen Xu (in Khanjan et al., 2013) presents a definition of headlines as follows: "A headline is a concise set of words outside a news story or newspaper article, usually printed in different types and designed to summarize and comment on the news content." Headlines are usually written based on news items by, or under the supervision of, an editor and are sometimes considered the most difficult journalistic writing task (Bakhshandeh & Mosallanejad, 2005). Readers often scan headlines and choose among them the desired material based on its appeal or relevance to their own lifestyle or thinking. If we keep in mind the importance of headlines in evaluating and prioritizing news events, headlines are assumed to reflect precisely, briefly, and as clearly as possible the most important points of the news. From a journalistic point of view, headlines should correspond to the main components of the news and thus express the main content in a concise manner. In some cases, news headlines consist of certain sub-sections including kicker, main headline and deck (Badii and Ghandi in Khanjan et al., 2013).

Research on translation errors and quality in general has been conducted before, both analyzing human translation (Aresta et al., 2018; Sari, 2019) and machine translation (Halimah, 2018; Putri & Dewi, 2021; Sutrisno, 2020). Machine translation applications on headlines have also been studied before, from English to Japanese (Ono, 2003), Hindi (Joshi et al., 2013), Arabic (Abdelaal & Alazzawie, 2020; Mukhtar & Badawi, 2016), Lithuanian (Mahata et al., 2019; Petroniene & Žvirblytė, 2012), Kurdish and Persian (Rasul, 2018), and Indonesian (Supatmiwati & Abdussamad, 2020). In addition, the translation of headlines can also be analyzed from the perspective of

ideology (Al-Awwadeh, 2022; Ethelb, 2016; Khanjan et al., 2013), cross-culture (Jiang, 2019), even in terms of Skopostheorie (Shi, 2014) and Chesterman (Guo & Chen, 2021). This study seeks to fill the gap by evaluating the accuracy of auto-translate output by social media on news covered by news channels, especially in the headlines.

METHOD

This study uses qualitative approach, with data taken from news coverage by Reuters in the period of September 1-7 2023 on social media Facebook and Twitter. Reuters is chosen as data source for its identical caption when uploading to both Facebook and Twitter. During this period, 355 pairs of data were collected where both Reuters Facebook and Twitter uploaded the same headlines.

The data was then sorted according to the news categories covered, with 16 news categories obtained. The data will then be translated using the auto-translate feature from each social media in English to Indonesian. The machine translation output is then recorded using note-taking techniques. Then, the data will be tabulated and 10 pairs of headlines for each news category covered will be collected. The data were analyzed using the taxonomy of linguistic evaluation proposed by Farrus et al. (2010). The theory in question is used for its coverage of linguistic scope when analyzing machine-translated output compared to other theories. In linguistic evaluation, the errors were reported according to different linguistic distinctions: orthographic, morphological, lexical, semantic, and syntactic.

FINDINGS AND DISCUSSION

Bab According to Farrus et al. (2010), Orthographic errors include punctuation, accents, capitalization of letters, compound words, spaces derived from incorrect tokenization, apostrophes, conjunctions and errors in foreign words. Morphological Errors include loss of gender and number concordance, apocopes, errors in verbal morphology (inflection) and lexical morphology (derivation and compounding), and morphosyntactic changes due to changes in syntactic structure. Lexical Errors include loss of correspondence between source and target words, untranslated source words, missing target words, and proper nouns that are not translated or translated unnecessarily. Semantic errors include polysemy, homonymy, and expressions used differently in the Source Language and Target Language. Syntactic errors include errors in prepositions, errors in relative clauses, verbal periphrasis, clitics, missing or incorrect articles in proper nouns, and the arrangement of syntactic elements.

From 158 pairs of headlines, various linguistic non-equivalence was found from the social media auto-translate output with the following frequencies:

Table 1: Linguistic Non-equivalence by Auto-Translate Feature in Social Media:

Linguistic Non-Equivalence		Facebook	Twitter
Ortographic	Punctuation Marks	1	2
	Erroneous Accents	0	0
	Letter Capitalization	4	1
	Joined Words	3	4
	Spare Blanks from Detokenization	2	1
	Apostrophes	0	0
	Conjunctions	0	0
	Error in Foreign Words	7	4
Morphology	Lack of Gender and Number Concordance	79	63
	Apocopes	0	0
	Errors in Verbal Morphology (Inflection)	17	3
	Errors in Lexical Morphology (Derivation & Compounding)	30	11
	Morphosyntactic Changes	0	0
Lexical	No Correspondence Between Source & Target Words	11	2
	Non-Translated Source Words	27	22
	Missing Target Words	82	53
	Error in Proper Noun	27	9
Semantic	Polysemy	77	19
	Homonymy	15	1
	Expression used in a different way in source & target language	78	32
Syntactic	Errors in Prepositions	11	13
	Errors in Relative Clauses	8	4
	Verbal Periphrasis	0	0
	Clitics	11	11
	Missing / Spare Article in front of Proper Noun	5	1
	Syntactic Element Reordering	35	4
Total		530	260

In Table 1, it can be seen that the frequency of errors in Facebook auto-translate far exceeds that of Twitter auto-translate. The Facebook auto-translate system mainly struggles in translating Semantic aspects, such as Polysemy and Expressions in the Source & Target Languages. It can also be seen that both systems do not make errors in Accent, Concordance, Apocopes and Clitics. This is because these linguistic elements are not often used in Indonesian. Meanwhile, morphosyntactic errors were not used because in this study, the errors found were realized in the wrong arrangement of syntactic elements. The following will discuss cases of each linguistic non-equivalence produced by the system

Evaluation of Facebook Auto-Translate Feature

In general, Facebook auto-translate features produced more linguistic non-equivalence compared to Twitter systems, as evidenced in Table 1. In Orthographic for instance, Facebook produced errors in letter capitalization and joined words. It also produced error lexically in the form of no correspondence between source and target words, as well as error syntactically in the form of relative clauses. Furthermore, Facebook auto-translate performed worse across various linguistic categories with higher frequencies of non-equivalence compared to Twitter, with 220 non-equivalence in total. This section below will further discuss sample cases of non-equivalence produced by Facebook.

Table 2. Examples of Orthographical Non-Equivalence in Facebook auto-translate

No	Original Version	Facebook Auto-Translate Version
1	“Moderna said clinical trial data showed its updated COVID vaccine will likely be effective against the highly-mutated BA.2.86 subvariant of the coronavirus that has raised fears of a resurgence of infections”	“Moderna mengatakan data uji klinis menunjukkan vaksin COVID yang diperbarui kemungkinan akan efektif terhadap BA yang sangat mutasi. 2,86 subvariant virus corona yang telah menimbulkan kekhawatiran akan kebangkitan infeksi”
2	“Tropical Storm Idalia drenched the Carolinas with heavy rain before departing the US Eastern Seaboard , while officials in Florida, where the tempest made landfall as a major hurricane a day earlier, stepped up recovery and damage-appraisal efforts”	“Badai Tropis Idalia membasahi Carolina dengan hujan lebat sebelum berangkat dari peisisir Timur AS , sementara para pejabat di Florida, di mana badai mendarat sebagai badai besar sehari sebelumnya, meningkatkan upaya pemulihan dan penilaian kerusakan”
3	“When residents of a slum cluster in New Delhi's Janta Camp area heard that the #G20 Summit was to be held in the Indian capital , barely 500 meters from their homes, they expected it would benefit them as well. Instead, they were rendered homeless”	“Ketika penduduk sebuah kelompok kumuh di wilayah Janta Camp New Delhi mendengar bahwa KTT #G20 akan diadakan di ibukota India, nyaris 500 meter dari rumah mereka, mereka berharap itu akan menguntungkan mereka juga. Sebaliknya, mereka menjadi tunawisma”
4	“Lloyd's of London swung to a first-half pre-tax profit of \$4.88 billion, helped by rises in premium rates and positive investment returns, the commercial insurance market said”	“Lloyd's dari London berayun ke laba sebelum pajak setengah pertama sebesar \$ 4,88 miliar, dibantu oleh kenaikan tingkat premi dan pengembalian investasi positif, kata pasar asuransi komersial”

No	Original Version	Facebook Auto-Translate Version
5	“Pope Francis, who is sometimes received as a superstar on trips abroad, arrived in Mongolia to the joy of its tiny Catholic community but with his presence barely making a ripple in the overwhelmingly Buddhist country”	“Paus Francis, yang kadang-kadang diterima sebagai superstar dalam perjalanan ke luar negeri, tiba di Mongolia untuk sukacita komunitas Katolik yang kecil tetapi dengan kehadirannya nyaris tidak membuat riak di negara yang sangat Budha ”

Out of 158 samples, several orthographic non-equivalence was found related to punctuation, capitalization, compound words, spaces due to tokenization, apostrophes, and errors in foreign words were found. Number 1 shows a punctuation error due to incorrect tokenization of "BA.2.86" in the source text. Number 2 shows the lack of capitalization in the translation of the proper noun "Eastern Seaboard". Number 3 shows how word joined words resulted in the use of the non-standard form in "ibukota". Number 4 shows additional spaces due to the imperfect tokenization process. Then, number 5 shows how two errors can occur in one word. The system still uses the parent form of the word "Buddhist" derived from "Buddha", which is a lexical morphology error, while the spelling in the translation output is "Budha", which is not standardized according to the KBBI

Table 3. Examples of Morphological Non-Equivalence in Facebook auto-translate

No	Original Version	Facebook Auto-Translate Version
6	“African leaders proposed new global taxes and reforms to international financial institutions to help fund climate change action in a declaration that will form the basis of their negotiating position at November's COP28 summit”	“Para pemimpin Afrika mengajukan pajak global baru dan reformasi kepada lembaga keuangan internasional untuk membantu mendanai aksi perubahan iklim dalam deklarasi yang akan membentuk dasar posisi negosiasi mereka pada KTT COP28 November”
7	“Former Brazilian President Jair Bolsonaro and his wife Michelle chose to remain silent when they appeared before Federal Police to testify in an investigation into jewelry gifts that they received from Arab heads of state and never declared ”	“Mantan Presiden Brasil Jair Bolsonaro dan istrinya Michelle memilih untuk tetap diam ketika mereka muncul di hadapan Polisi Federal untuk bersaksi dalam penyelidikan hadiah perhiasan yang mereka terima dari kepala negara Arab dan tidak pernah menyatakan ”

No	Original Version	Facebook Auto-Translate Version
8	"Indonesia warned against Southeast Asia's bloc getting dragged into big-power rivalry as leaders gathered for a summit seeking to dispel worry about rifts over peace efforts in Myanmar and to reaffirm the relevance of their disparate group"	"Indonesia memperingatkan terhadap blok Asia Tenggara yang terseret ke dalam persaingan kekuatan besar saat para pemimpin berkumpul untuk sebuah pertemuan puncak yang berusaha menghilangkan kekhawatiran tentang keretakan atas upaya perdamaian di Myanmar dan untuk menegaskan kembali relevan dari kelompok mereka yang berbeda"

From 158 samples, several morphological non-equivalence was found related to gender and number concordance, verbal morphology (inflection) and lexical morphology (derivation and compounding). Concordance errors in this study were only found in plural because Indonesian does not recognize the concept of masculine feminine at the morphological level. In number 6, it can be seen that the system is often inconsistent in applying plural concordance in the Source Language to the Target Language, where "African leaders" is realized as "Para pemimpin Afrika", but "institutions" is only realized as "lembaga". Then, Facebook's system also struggles with the realization of the passive voice in the Source Language in number 7, where the inflection "me-" in "menyatakan" is given instead. Finally, number 8 shows a lexical morphology error where the system uses the parent form of the word "relevance" which is derived from "relevant", and is then translated into "relevan".

Table 4. Examples of Lexical Non-Equivalence in Facebook auto-translate

No	Original Version	Facebook Auto-Translate Version
9	"Myanmar's detained former leader Aung San Suu Kyi is ailing and a request for an outside physician to see her has been denied by the country's military rulers, a source familiar with the matter and the shadow government loyal to her said"	"Mantan pemimpin Myanmar yang ditahan, Jong-un , sedang sakit dan permintaan untuk seorang dokter luar untuk menemuinya telah ditolak oleh penguasa militer negara itu, sumber yang mengetahui masalah ini dan pemerintah bayangan yang setia kepadanya mengatakan"
10	"In a warehouse on the outskirts of Barcelona, women stand at conveyor belts, manually sorting T-shirts , jeans and dresses from large bales of used clothing - a small step towards tackling Europe's towering problem of discarded fashion"	"Di sebuah gudang di pinggiran Barcelona, para wanita berdiri di sabuk konveyor, menyortir T-shirt , jins dan gaun secara manual dari bal besar pakaian bekas - langkah kecil menuju mengatasi masalah gaya yang dibuang Eropa yang menjulang"

No	Original Version	Facebook Auto-Translate Version
11	"More than 70 people were killed overnight when a fire raged through a run-down , five-story Johannesburg apartment block, one of the worst such disasters in a city where poverty, household fires and homelessness are widespread"	"Lebih dari 70 orang tewas dalam semalam ketika sebuah kebakaran menyerang blok apartemen berlantai lima di Johannesburg, salah satu bencana terburuk di kota di mana kemiskinan, kebakaran rumah tangga dan tunawisma tersebar luas"
12	"NASA's SpaceX Crew-6 members, who spent their six-month mission conducting vital research, made their farewells as they readied themselves for the journey back to Earth."	"Anggota kru-6 SpaceX NASA, yang menghabiskan misi enam bulan mereka melakukan riset penting, membuat perpisahan mereka saat mereka bersiap untuk perjalanan kembali ke Bumi."

Table 4 shows several lexical non-equivalence found relating to the loss of correspondence between source and target words, untranslated source words, missing target words, and proper nouns that were either not translated or translated unnecessarily. In number 9, it can be clearly seen how there is no correspondence between "Aung San Suu Kyi" and the auto-translated output "Jong-un". Then, in number 10, it was found that the system chose not to translate the word "T-shirt" even though there is an equivalent of "T-shirt" in the Target Language as "*kaos oblong*". It can be noted that this error was also made by Twitter auto-translate, which suggests Target Language preference toward using foreign words instead of its translated variant. Number 11 shows a situation where the system omitted the word "run-down" in the Target Text, while data 12 shows a situation where the system should not have translated the proper noun "SpaceX Crew-6" into "*kru-6 SpaceX*".

Table 5. Examples of Semantic Non-Equivalence in Facebook auto-translate

No	Original Version	Facebook Auto-Translate Version
13	"The United States has an ' obligation ' to fulfil its backlog of arms sales to Taiwan and there is a bipartisan effort to ensure this happens, the vice chairman of the House Armed Services Committee said during a trip to Taipei"	"Amerika Serikat memiliki ' kewajiban ' untuk memenuhi cadangan penjualan senjatanya ke Taiwan dan ada upaya bipartisan untuk memastikan ini terjadi, kata wakil ketua Komite Layanan Bersenjata Dewan saat perjalanan ke Taipei"
14	"Hong Kong braces for Typhoon Saola, packing winds of over 125 mph. Flights are canceled, and schools and businesses shut ahead of the expected landfall."	"Hong Kong kawat gigi untuk Topan Saola, mengepak angin lebih dari 125 mph. Penerbangan dibatalkan, dan sekolah dan bisnis ditutup menjelang pendaratan yang diharapkan."

No	Original Version	Facebook Auto-Translate Version
15	“US President Joe Biden's strategy of backing politically crucial unions while avoiding strikes that cripple the economy has hit a bump in Detroit”	“Strategi Presiden AS Joe Biden untuk mendukung serikat-serikat politik yang sangat penting sekaligus menghindari serangan yang melumpuhkan ekonomi telah menabrak Detroit”

Several semantic non-equivalence was found relating to polysemy, homonymy and translation of different expressions in Source and Target Language. In number 13, the word "backlog" has various meanings including "cadangan" used by the auto-translate system. However, the context of using "backlog" here refers to sales, so the meaning of "backlog" here refers to unfulfilled sales. Then, in number 14 "braces" has homonyms which can mean "bersiap untuk hal yang sulit", or "kawat gigi". According to the context of the data, the system should use homonyms that mean "bersiap". Finally, the phrase "hit a bump" in number 15 is an expression with the figurative meaning of "terkena hambatan", where the lack of equivalence occurred because the system translated the phrase literally.

Table 6. Examples of Syntactic Non-Equivalence in Facebook auto-translate

No	Original Version	Facebook Auto-Translate Version
16	“US job growth likely slowed in August, partly reflecting striking Hollywood actors and the bankruptcy of a major trucking company, but the unemployment rate probably held at more than 50-year lows as labor market conditions remain tight”	“Pertumbuhan pekerjaan AS kemungkinan melambat pada bulan Agustus, sebagian mencerminkan aktor Hollywood yang mencolok dan kebangkrutan perusahaan truk besar, tetapi tingkat pengangguran mungkin bertahan di posisi terendah lebih dari 50 tahun karena kondisi pasar tenaga kerja tetap ketat”
17	“A key witness in the case accusing former US President Donald Trump of mishandling classified documents after leaving office has entered into a deal with prosecutors to provide testimony, his former attorney said in a court filing”	“Seorang saksi kunci dalam kasus ini yang menuduh mantan Presiden AS Donald Trump salah mengurus dokumen rahasia setelah meninggalkan kantor telah menandatangani kesepakatan dengan jaksa untuk memberikan kesaksian, kata mantan pengacaranya dalam pengajuan pengadilan”
18	“Pope Francis arrived in Mongolia to greet its tiny Catholic contingent, having earlier sent a blessing of ‘unity and peace’ from his plane to China, with which the Vatican has had difficult relations”	“Paus Francis tiba di Mongolia untuk menyambut Kontinjen Katoliknya yang mungil, setelah sebelumnya mengirim berkat 'kesatuan dan perdamaian' dari pesawat ke Tiongkok, yang dengannya Vatikan memiliki hubungan yang sulit”

No	Original Version	Facebook Auto-Translate Version
19	“Kazu Hiro, the make-up artist for Bradley Cooper's Leonard Bernstein biopic ‘Maestro,’ explained the thinking behind giving the lead character a prosthetic nose after some critics complained the nose pandered to Jewish stereotypes”	“Kazu Hiro, juru rias untuk biopic Leonard Bernstein Bradley Cooper ‘Maestro,’ menjelaskan pemikiran di balik memberikan karakter utama hidung palsu setelah beberapa kritikus mengeluh hidung tertuju pada stereotip Yahudi ”
20	“Malaysia said it is considering regulations that will make internet giants Google and Facebook parent Meta compensate news outlets for content sourced from them”	“Malaysia mengatakan sedang mempertimbangkan peraturan yang akan membuat raksasa internet Google dan Facebook induk Meta kompensasi outlet berita untuk konten yang berasal dari mereka”

Of the 158 samples, several syntactic non-equivalence was found related to prepositions, relative clauses, articles in proper nouns, and the arrangement of syntactic elements. In number 16, it can be seen that the use of the preposition "di" is not appropriate. Then, the relative clause error occurs in number 17, where the translation of "the" is considered as "this" because the output translation uses the word "ini". Case in number 18 shows inconsistency in applying clitics “-nya” to show possessive, such in “its” and “his”. In number 19, "Jewish" is a proper noun and depends on the context for the article used. In the above case, "orang" should be added in front of "Yahudi". Finally in number 20, we can see the inappropriate arrangement of syntactic elements in the Facebook auto-translate output "Facebook parent Meta" due to word-for-word translation into "Facebook induk Meta."

Evaluation of Twitter Auto-Translate Feature

Compared to Facebook, Twitter auto-translate features produced less non-equivalence linguistically. This implies that Twitter's auto-translate system is more robust, with better performance shown. The section below will discuss the cases of non-equivalence performed by Twitter.

Table 7. Examples of Orthographical Non-Equivalence in Twitter auto-translate

No	Original Version	Facebook Auto-Translate Version
22	“The S&P 500 ended higher after a jump in unemployment cemented expectations of a pause in interest rate hikes this month, while shares of streaming firms tumbled due to a rate dispute between Disney and Charter Communications”	“ S& ;P 500 berakhir lebih tinggi setelah lonjakan pengangguran memperkuat ekspektasi jeda kenaikan suku bunga bulan ini, sementara saham perusahaan streaming anjlok karena perselisihan suku bunga antara Disney dan Charter Communications”

No	Original Version	Facebook Auto-Translate Version
23	Cuba has uncovered a human trafficking ring that coerced its citizens to fight for Russia in the war in Ukraine, its foreign ministry said, adding that Cuban authorities were working to 'neutralize and dismantle' the network	"Kuba telah mengungkap jaringan perdagangan manusia yang memaksa warganya untuk berperang demi Rusia dalam perang di Ukraina, kata Kementerian Luar Negeri Kuba, seraya menambahkan bahwa pihak berwenang Kuba berupaya untuk 'menetralisir dan membongkar' jaringan tersebut"
24	The mayor of Uvalde has called for the resignation of the local prosecutor, questioning her impartiality in the probe of law enforcement's response to a deadly 2022 school shooting in the southwest Texas town	Walikota Uvalde telah menyerukan pengunduran diri jaksa setempat, mempertanyakan ketidakberpihakannya dalam penyelidikan tanggapan penegakan hukum terhadap penembakan sekolah yang mematikan pada tahun 2022 di kota barat daya Texas
25	"Sofia Coppola tells Priscilla Presley's story in Venice. 'Priscilla,' starring Cailee Spaeny and Jacob Elordi, is based on Priscilla's 1985 autobiography 'Elvis and Me'"	"Sofia Coppola menceritakan kisah Priscilla Presley di Venesia. 'Priscilla,' yang dibintangi Cailee Spaeny dan Jacob Elordi, didasarkan pada otobiografi Priscilla tahun 1985 'Elvis and Me'"

Out of 158 samples, orthographic errors related to punctuation, compound words, spaces due to tokenization, and errors in foreign words were found. Number 22 shows punctuation as well as spacing errors due to incorrect tokenization of "S&P" in the source text into "S& ;P". Number 23 shows the inconsistency of the auto-translate system to realize the apostrophe "'s" in the Source Language to the Target Language. Number 24 shows orthographic mistake in translating "mayor" into "*walikota*", whereas the appropriate form should be "*wali kota*". Then, number 25 shows the spelling in the output translation of "autobiography" into "otobiografi", which is not standard form according to KBBI.

Table 8. Examples of Morphological Non-Equivalence in Twitter auto-translate

No	Original Version	Facebook Auto-Translate Version
24	"A Russian drone strike on a Ukrainian grain exporting port damaged warehouses and set buildings on fire, Kyiv said, hours before scheduled talks between Russian President Vladimir Putin and Turkish leader Tayyip Erdogan"	"Serangan pesawat tak berawak Rusia terhadap pelabuhan pengekspor biji-bijian Ukraina merusak gudang dan membakar gedung , kata Kyiv, beberapa jam sebelum jadwal pembicaraan antara Presiden Rusia Vladimir Putin dan pemimpin Turki Tayyip Erdogan"

No	Original Version	Facebook Auto-Translate Version
25	“Mohamed al-Fayed, a self-made Egyptian billionaire who bought the Harrods department store and promoted the discredited conspiracy theory that the British royal family was behind the death of his son and Princess Diana, has died, Fulham Football Club said”	“Mohamed al-Fayed, miliarder Mesir yang membeli department store Harrods dan mempromosikan teori konspirasi yang mendiskreditkan bahwa keluarga kerajaan Inggris berada di balik kematian putranya dan Putri Diana, telah meninggal, kata Fulham Football Club”
26	“It was business as usual for the men at the #USOpen but manic Monday on the women's side with the draw blown wide open by upsets that saw contenders Ons Jabeur and Jessica Pegula join defending champion Iga Swiatek heading through the exit doors”	“Itu adalah bisnis seperti biasa bagi putra di #USOpen tetapi Senin yang maniak di sisi putri dengan hasil imbang terbuka lebar oleh kekecewaan yang membuat pesaing Ons Jabeur dan Jessica Pegula bergabung dengan juara bertahan Iga Swiatek menuju pintu keluar”

From 158 samples, morphological non-equivalence related to gender and number concordance, verbal morphology (inflection) and lexical (derivation and compounding) were found. In number 24, it can be seen that the system does not translate plurals in nouns in the Target Language. Then, the Twitter system in number 25 mistakenly used active form when translating “discredited” into “mendiskreditkan”. Finally, number 26 shows a lexical morphology error where the system uses “maniak” instead of “manik.” In English, “manic” and “maniac” share the same root, “mania”. However, “manic” is an adjective, while “maniac” is a noun, hence the non-equivalence.

Table 9. Examples of Lexical Non-Equivalence in Twitter auto-translate

No	Original Version	Facebook Auto-Translate Version
27	“From @Breakingviews: Qantas CEO Alan Joyce’s exit will barely reduce turbulence. And more sacrifices from the board's long haulers are likely, says @AntonyMCurrie”	“Dari @Breakingviews: Keluarnya CEO Qantas Alan Joyce tidak akan mengurangi turbulensi. Dan kemungkinan besar akan ada lebih banyak pengorbanan dari perusahaan-perusahaan jangka panjang , kata @AntonyMCurrie”
28	“From @Breakingviews: SoftBank may float its UK chip designer for \$50 billion to \$54 billion. That’s lower than initially hoped, but still implies an implausible future where revenue and profitability soar, says @LiamWardProud”	“Dari @Breakingviews: SoftBank mungkin akan menjual perancang chipnya di Inggris dengan harga \$50 miliar hingga \$54 miliar. Angka tersebut lebih rendah dari perkiraan awal, namun masih menyiratkan masa depan yang tidak masuk akal dimana pendapatan dan profitabilitas melonjak, kata @LiamWardProud”

No	Original Version	Facebook Auto-Translate Version
29	"Carlos Alcaraz and Daniil Medvedev moved quietly into the third round of the #USOpen while big-hitting American John Isner delivered his trademark stack of aces in taking his final bow at Flushing Meadows"	"Carlos Alcaraz dan Daniil Medvedev bergerak diam-diam ke ronde ketiga #USOpen sementara pemain Amerika John Isner memberikan setumpuk ace khususnya dalam melakukan pukulan terakhirnya di Flushing Meadows"
30	"ISRO wrote on a social media platform, 'Aditya-L1, destined for the Sun-Earth L1 point, takes a selfie and images of the earth and the moon.' Following the success of India's recent moon landing, ISRO launched a rocket on September 2 in its first solar mission"	"ISRO menulis di platform media sosial, 'Aditya-L1, yang ditujukan untuk titik L1 Matahari-Bumi, mengambil foto selfie dan gambar bumi dan bulan.' Menyusul keberhasilan pendaratan di bulan baru-baru ini oleh India, ISRO meluncurkan roket pada tanggal 2 September dalam misi surya pertamanya"

Of the 158 samples, lexical non-equivalence was found relating to no correspondence between source and target words, untranslated source words, missing target words, and proper nouns that were not translated or translated when not needed. Number 27 shows a lack of correspondence in translation of "long haulers" into "jangka panjang". In number 28, it was found that the system chose not to translate the word "chip" even though there is an equivalent of "cip" in the Target Language. It can be noted that this error was also made by Facebook auto-translate. Number 29 shows a situation where the system omitted the word "big-hitting" in the Target Text, while number 30 shows a situation where the system should not have translated the proper noun "Sun-Earth L1 point" into "titik L1 Matahari-Bumi", because in space science Sun-Earth L1 refers to the Lagrange point.

Table 10. Examples of Semantic Non-Equivalence in Twitter auto-translate

No	Original Version	Facebook Auto-Translate Version
31	"A key witness in the case accusing former US President Donald Trump of mishandling classified documents after leaving office has entered into a deal with prosecutors to provide testimony, his former attorney said in a court filing"	"Seorang saksi kunci dalam kasus yang menuduh mantan Presiden AS Donald Trump salah menangani dokumen rahasia setelah meninggalkan jabatannya telah menandatangani kesepakatan dengan jaksa untuk memberikan kesaksian, kata mantan pengacaranya dalam pengajuan ke pengadilan"

No	Original Version	Facebook Auto-Translate Version
32	“Huawei Technologies and China's top chipmaker SMIC have built an advanced 7-nanometer processor to power its latest smartphone, according to a teardown report by analysis firm TechInsights”	“Huawei Technologies dan pembuat chip terkemuka Tiongkok SMIC telah membangun prosesor 7 nanometer canggih untuk memberi daya pada ponsel pintar terbarunya, menurut laporan pembongkaran oleh perusahaan analisis TechInsights”
33	From @Breakingviews: The euro zone is trying to emulate the US by avoiding a recession and hefty job losses, despite raising rates. It may only half succeed , says @guerreraf72	Dari @Breakingviews: Zona euro mencoba meniru AS dengan menghindari resesi dan hilangnya lapangan kerja dalam jumlah besar, meskipun menaikkan suku bunga. Mungkin hanya separuh yang berhasil , kata @guerreraf72

From 158 samples, semantic non-equivalence related to polysemy, homonymy and translation of different expressions in ST and TT were found. In number 31, the word "mishandling" in classified documents has the connotation of "leaking", but the system translated the expression as "mis-handling" rather than as is. Then, in number 32 "power" has a lot of homonymy, which is not appropriate when translated as "memberi daya" because in the context of smartphones, the noun refers to the processor that functions as the brain, not as the battery. Then, the phrase "half succeed" in number 33 is an expression that means figurative "can succeed can fail", where the error occurs because the system translates the phrase literally.

Table 11. Examples of Syntactic Non-Equivalence in Twitter auto-translate

No	Original Version	Facebook Auto-Translate Version
33	“Scandinavian airline SAS plans to ramp-up winter capacity this year, the company said as it posted its first quarterly pretax profit since late 2019, aided by lower fuel costs, higher ticket prices and strong demand”	“Maskapai penerbangan Skandinavia SAS berencana meningkatkan kapasitas musim dingin tahun ini, kata perusahaan tersebut ketika mereka membukukan laba sebelum pajak kuartal pertama sejak akhir tahun 2019, dibantu oleh biaya bahan bakar yang lebih rendah, harga tiket yang lebih tinggi, dan permintaan yang kuat”
34	“The G7 and allies have shelved regular reviews of the Russian oil price cap scheme, people familiar with the matter told Reuters , even though most Russian crude is trading above the limit because of a rally in global crude prices”	“G7 dan sekutunya telah menunda peninjauan rutin terhadap skema pembatasan harga minyak Rusia, kata orang-orang yang mengetahui masalah tersebut Reuters , meskipun sebagian besar minyak mentah Rusia diperdagangkan di atas batas tersebut karena kenaikan harga minyak mentah global”

No	Original Version	Facebook Auto-Translate Version
35	“Tencent said companies could now use its large language artificial intelligence model ‘Hunyuan’ as it premiered the much-awaited product amid a race by tech firms race to become China's AI champion”	“Tencent mengatakan perusahaan-perusahaan sekarang dapat menggunakan model kecerdasan buatan berbahasa besar ‘Hunyuan’ saat mereka meluncurkan produk yang sangat ditunggu-tunggu tersebut di tengah perlombaan perusahaan-perusahaan teknologi untuk menjadi juara AI di Tiongkok”
36	“World leaders were on Thursday set for a series of meetings on security and trade against a backdrop of simmering tensions and open conflicts in parts of the world, as an ASEAN-hosted summit in Indonesia entered its final day”	“Para pemimpin dunia pada hari Kamis dijadwalkan untuk mengadakan serangkaian pertemuan mengenai keamanan dan perdagangan dengan latar belakang meningkatnya ketegangan dan konflik terbuka di berbagai belahan dunia, ketika pertemuan puncak ASEAN yang diselenggarakan di Indonesia memasuki hari terakhirnya.”

Out of 158 samples, syntactic non-equivalence related to prepositions and relative clause, clitics, articles in proper nouns, and the arrangement of syntactic elements were found. In number 33, it can be seen that the prepositions "to" is omitted by the auto-translate system. Number 34 shows the lack of connective word in the target text when translating “people familiar with the matter told Reuters”. Case 35 shows the lack of translation “its” from source text into clitics “-nya” in target text. Finally, in number 36, it can be seen that the arrangement of syntactic elements is not appropriate in Twitter's auto-translate output, where "ASEAN-hosted summit in Indonesia" means that the meeting was held by ASEAN, so the output should be "pertemuan puncak yang diselenggarakan oleh ASEAN di Indonesia."

CONCLUSION

From the evaluation of Facebook and Twitter auto-translate output, it was found that there were various kinds of errors in terms of orthography, morphology, lexical, semantic, and syntactic. Facebook produced 530 non-equivalence, while Twitter produced 260 non-equivalence across the linguistic categories. Orthographic errors in both auto-translate systems are capitalization and apostrophe errors, while punctuation errors are only found in Facebook auto-translate. Morphological errors in both systems often occur in the realization of inflection for plural and possessive. Then, lexical errors occur in both systems except for Twitter which does not experience source and target word correspondence errors. In terms of semantics, both systems had difficulties with polysemy, homonymy and expression. Finally, syntactic errors

occurred with missing articles, prepositions, and inappropriate arrangement of syntactic elements on Facebook and Twitter.

This research is limited to the number of samples used, as well as to the news focus used in this data sample. Furthermore, the research only investigates the linguistic aspect of the non-equivalence produced. However, the findings may suggest that social media user who read news occasionally should be able to trust Twitter auto-translate system better than Facebook.

While the result implies a better performance by Twitter, further research is recommended on how the results of this linguistic evaluation of translation correlate with translation accuracy, or with commonly used machine translation metrics such as BLEU. In addition, further research is needed on how these translation outcomes help readers explore news that is not available in their first language. The measurement of interest in reading can be done using surveys, or using metrics that are already built into each social media. Hopefully, further research can answer the correlation of the mediating quality of the auto-translate feature on social media toward readers' interest in accessing news.

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