Analysis of Japanese-Indonesian Translation Using Machine Translation

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Abstract

Translating Japanese to Indonesian using the Google translation engine is an easy thing. However, the results of the google translate translation must go along as possible with reasonable accuracy. This study aims to determine the accuracy of Google Translate translation in translating Japanese articles into Indonesian. The research uses combined research methods through literature studies from various literature sources. The theories used in this study are Machali's assessment theory (2009), Hartono's translation theory (2017), Bassnett-McGuire's addition and subtraction theory (1991), and the BLEU algorithm (2002). The data is taken from a speech of the Ambassador of Japan to Indonesia, taken from an official article on the embassy's website. The research found the correct semantic assessment value, incorrect semantic assessment value, type of semantic error, and the value of the BLEU algorithm assessment. Google translate can provide a correct result in terms of semantics or meaning. The average correct semantic value indicates this is around 88.03%. The assessment of the BLEU algorithm for google translate text gets an assessment result of 37.11. This average value includes a low value, which shows a significant difference in structure between the google translate text and the translator text. In other words, the results of google translate are suitable for conveying the meaning of the results of the translation. However, it is essential to improve the sentence structure of the results of Google Translations.

Keywords
Japanese, Indonesian, Google translation engine, BLEU Algorithm, semantic evaluation

1. Introduction
Along with the development of globalization, many things can go out and enter from abroad into Indonesia or vice versa. It is starting from clothes and food to language. One of the examples is products or goods originating from Japan. There are so many changes in trends and preferences in Indonesian society towards Japan. Because of this, now it is not foreign to see products or things that have Japanese nuances and are written in Japanese in Indonesia. However, to fully enjoy and understand Japanese, many people rely on google translate without learning Japanese grammar first. The reason is that this is considered much more practical and easier to do. Siregar (2017:6) explains that "translation allows us to discover that certain ways of human behavior and interactions around us take very different forms in other parts of the world. This knowledge can help to understand other cultures through language that can provide a broader view." In short, translation products expand and deepen one's world of consciousness in indescribable ways. Therefore, the translation results using google translate become an essential point in delivering information received and developed in a person. The quality and accuracy of the results of the Japanese translation using google translate must be appropriate to convey information or knowledge. If there is an error in the translation of google translate, there will

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be receiving the wrong information. In this study, the authors are interested in examining the accuracy of the translation results using google translate. The author will examine the semantic error of google translate, analyze how accurate the results of the google translate translation are in terms of semantics, and the results of the BLEU value of google translate.

2. Literature Review

The result of translating Japanese into Indonesian is a broad subject, including the structure of the language and the translation machine used. This research focuses on the semantic elements of Machali (2009) and the BLEU algorithm (2002). In reviewing these two things, the authors study some literature that can help research. First, research by Wang, H., Wu, H., He, Z., Huang, L., & Ward Church, K. (2021) entitled "Progress in Machine Translation." This study discusses the workings and development of a neural machine translation. In the research of Wang, H., Wu, H., He, Z., Huang, L., & Ward Church, K. (2021), the authors study the working system, history, and model components of a neural machine translation machine in general. Second, Machali's (2009) book entitled "Guidelines for Translators." In this book, Machali (2009) provides a criterion for assessing a translation result. In this book, the author uses the semantic side described in one of the assessment criteria as the basis for the researcher's assessment. The author also gets a big picture of a translation in this book. Third, the fourth edition of the Standard Indonesian Grammar book. This book explains Indonesian grammar coherently and transparently. The author learns about the lexical division of words and phrases in this book. This division helps the author's research process in assessing the semantic aspect of the results of the google translate translation. Fourth an explanation article about the BLEU algorithm. Papineni, K., Roukos, S., Ward, T., & Zhu, W. J. (2002) articles. In this article, explain the explanation of the BLEU algorithm, how to get the BLEU value, the advantages of BLEU assessment, and comparison with human assessments. In this article, the authors study the steps of the BLEU assessment that are also used in research.

3. Methods

The focus in this research is on the results of the semantic values and the results of the BLEU scores from the results of the Japanese to Indonesian translation using google translate. These two values can show the accuracy of the results of the google translate translation. The following are the steps and methods taken to get these values.

3.1 Determine Topic

In the first stage, the writer starts by determining the research topic. The topic under study is the accuracy of google translate. Then the authors determine the research problem and develop a research framework. The problem to be investigated is the accuracy of google translate in translating Japanese text. This study aims to examine and deepen the accuracy of the results of the google translate translation in terms of semantics and BLEU.

Based on the description of the problem and research objectives above, the most suitable approach is the combined research method. Research produces values that aim to get a better picture of understanding the research problem. In addition, other results are in the form of detailed, complete, in-depth sentence descriptions that describe the actual situation to support the presentation of the data.

3.2. Data Collection

The data studied in this study is the text of the Minister of Foreign Affairs of Japan by Mr. Kanasugi Kenji, entitled "Possible as Wide as the Ocean." This text data was obtained from the website link https://www.id.emb-japan.go.jp/about_id_amb_kompas2021_3.html. The following are the types and sources of the data studied, including:

1. Japanese text
   https://www.id.emb-japan.go.jp/about_jp_amb_kompas2021_3.html
2. Translator's translated text
   https://www.id.emb-japan.go.jp/about_id_amb_kompas2021_3.html
3. Google translate translation of a text

The Japanese text was translated into Indonesian using google translate on 15 May 2022.
Based on the division of sentences, there are as many as 34 sentences from each data.

Before starting to process data, there are several provisions that are applied to the study of research data, including:

1. The title of the article is not used as research data
2. The division of the amount of data is based on the dot breaks between sentences of the original Japanese text.
3. Research data will be entered into a predetermined table.
4. In 1 assessment table, there are four sentences. There is an exception for the last table, which contains two sentences.

3.3. Data Evaluation

Compiling and managing data consists of data reduction, data presentation, and drawing conclusions. Assess the accuracy of the results of the google translate translation, review, and conclude based on the semantic aspects of the assessment criteria of Machali, R. (2009) and the BLEU algorithm (2002).

The following is an explanation of the steps taken in analyzing the accuracy of the results of the google translate translation.

1. Assessment of the semantic aspect of the assessment criteria of Machali, R. (2009) on google translate a text is done by splitting the three data in the form of words or phrases that have at least one grammatical function. Followed by comparing the data that has been split into tables. In this study, a total of 9 tables were obtained. Then proceed by looking at the similarities that exist between the google translate text and the translator text.

If there is google translate data that does not match the translator's text, the assessment will continue by looking at the Japanese text. Validation of data that does not match the translator's text by using a dictionary of meanings from the Japanese language. The google translate text can be declared wrong if it does not match the translator's text and the Japanese text. The results of the assessment are in the form of true and false percentages in one table.

2. BLEU Algorithm Assessment

The following is the equation of the BLEU algorithm by Kishore Papineni, Salim Roukos, Todd Ward, and Wei-Jing Zhu (2002)

- First equation

$$BP_{BLEU} = \begin{cases} 1 & jika\ c\ > r \\ e^{\left(1-\frac{r}{c}\right)} & jika\ c\ \leq r \end{cases}$$

- Second equation

$$p_n = \frac{\sum_{C\in\{Candidates\}} \sum_{ngram\in C} Count_{clip}(ngram)}{\sum_{C'\in\{Candidates\}} \sum_{ngram'\in C} Count_{clip}(ngram')}$$

- Third equation

$$BLEU = BP.\exp\left(\sum_{n=1}^{N} W_n.\log p_n\right)$$

The BLEU assessment was carried out using the python programming language. BLEU assessment is also carried out at the table stage, such as semantic assessment. Assessment is done by writing a string as below

```
from nltk.translate.bleu_score import sentence_bleu
reference = [['saya', 'pergi', 'ke', 'pasar', 'di', 'hari','minggu']]
candidate = ['saya', 'pergi', 'ke', 'pasar', 'di', 'hari', 'senin']
score = sentence_bleu(reference, candidate)
print(score)
```

From the writing above, it has the following information:

1. Reference contains a reference translation or translator's translation. This data will be the assessor for the candidate data.
2. The candidate contains google translate translation. This data will be assessed.
3. To prevent errors in writing strings. The author omitted some symbols contained in both the reference and candidate, namely [ ], ( ), ' ', and " ".

Based on the writing above, the results or output of the score command is 0.8091067115702212. BLEU assessment will also be carried out on each table. The results of the BLEU assessment are 0 -1. The BLEU results from each table will be multiplied by 100.

Both assessments were also carried out with the assumption that the translator's translation results were the relevant and appropriate translation results to convey the meaning of the Japanese text. However, keep in mind that the translator's text is also not an "absolute price" to judge the results of google translate translations.

3.4. Drawing Conclusion

Based on the data assessment stage, the overall results of the semantic and BLEU values will be drawn from the translation using google translate and the semantic translation error with google translate. Then classify and sort all the results obtained according to the type and assessment criteria. After that, the author gets the value of accuracy and accuracy of google translate translation.

4. Results and Discussion

Based on the results of the research conducted, the results obtained for the accuracy of google translate in the results of the Japanese to Indonesian translation. Obtained nine tables containing 293 words or phrases based on the division of grammatical functions. The following is a discussion of the semantic assessment of Machali, R. (2009) and BLEU (2002):

4.1 Correct Semantic Assessment

Based on the results of 9 tables, it was found that the google translate translation text can be said to be correct with the explanation below

1. Google Translate text has the same translation result as the translator's text and has the same meaning as the Japanese text.
2. Google Translate text which has a similar translation meaning to the Japanese text, but the translation results are different from the translator's text. In this case, the use of different words or phrases between the google translate text and the translator's text does not indicate a shift in meaning. Because there are similarities in the meaning of the Japanese text to the google translate translation text. This is also in accordance with the opinion of Catford (1978) in Hartono's book (2017: 7), which is that "translation is the replacement of textual material in one source language with equivalent textual material in another target language."

Altogether in 9 tables, the number of correct semantic results is 256 words or phrases.

4.2 Incorrect Semantic Assessment

Based on the results of the study, google translate data that is different from the translator's data and the meaning of the translation is also different from the Japanese text can be declared as incorrect data. This explanation is in accordance with the opinion of Machali, R. (2009) in his first assessment criteria, namely functional assessment assessing the general meaning of the translation results to see whether the general purpose of the source language text has deviated or not. Where the google translate experienced text deviations in conveying the meaning of the Japanese text and the difference with the translator text.

Then based on the results of the semantic assessment, the types of semantic errors that occur in the google translate text are also obtained. Based on nine research tables, 37 words were declared wrong. The following is a list of the number and types of errors that occur.

1. Malformations that are different from the translator's text and cannot convey the meaning of the Japanese text, totaling 21 data.

2. Mistranslation for place names, totaling 5 data.
3. Errors in the omission or reduction of translation for one word, totaling 5 data.
4. Errors of omission or reduction of translation to the fullest, totaling 6 data.

4.3 BLEU Assessment

The results of the assessment using the BLEU algorithm from Papineni, K., Roukos, S., Ward, T., & Zhu, W. J. (2002). In evaluating the BLEU algorithm, the PYTHON application will be used. The results of the BLEU algorithm are 0 – 1. These numbers indicate the similarity between google translate data and translator data. The closer the value to 1 indicates, the better the results of the google translate translation. In this study, the results will be multiplied by 100.

4.4 Table of Overall Results

Number	Semantic Value		BLEU Value
	Right	Wrong	
1.	91.6 %	8.3%	29
2.	94.44 %	5.55 %	36
3.	90.32 %	9.67 %	22
4.	92.85 %	7.14 %	52
5.	76.66 %	23.33 %	35
6.	84.21 %	15.78 %	45
7.	85.41%	14.58 %	19
8.	85.18 %	14.81 %	48
9.	91.66 %	8.33%	48
Semantic correct mean of data		792.33: 9	88.03 %
Incorrect mean of semantic data		107.49: 9	11.94 %
Average BLEU score		334: 9	37.11

Based on the table above, it has the following information:

1. The highest correct semantic value data is 94.44 % and the lowest is 76.66 %
2. The average value of the correct semantics is about 88.03% of the total.
3. The average value of the wrong semantics is about 11.94% of the whole.
4. The average value of the BLEU algorithm is about 37.11

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5. Conclusion

The conclusions of this study indicate the accuracy of google translate in the translation results from Japanese into Indonesian for article data. The analysis carried out shows that google translate can provide a correct translation result in terms of semantics or meaning. This is indicated by the average correct semantic value is around 88.03%. Then the occurrence of shifting or incorrect translation results is about 11.94% of the total.

Then the results of the semantic assessment above are different from the results obtained from the BLEU assessment for google translate text, where the average BLEU algorithm assessment produces a value of around 37.11 out of 100. This BLEU algorithm average value is a low value, which means it shows a difference the structure is quite far between the google translate text and the translator text. In other words, it can be said that the results of google translate are suitable for conveying the meaning of the results of the translation, but it is essential to pay attention to and improve the sentence structure of the results of google translate translations.

From the research conclusions that have been described. The author realizes that there are still many shortcomings that can be found due to the limited time and data studied by the author. Especially in the amount of reference data or translator data which is used as a comparison for the assessment of google translate results. Therefore, for future research, the authors suggest taking more diverse data with more than one reference data to get more accurate results. Also analyze other linguistic aspects contained in the results of the google translate translation. In addition, the results of this study are expected to help the general public and future research. With the results of the assessment in terms of semantics, Machali, R. (2009) and the BLEU algorithm to be able to help further understand the good results of google translate and become a theoretical basis that can be developed for future research.

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Dr. Elisa Carolina Marion graduated from BINUS University's Japanese Department for her bachelor's degree, the University of Indonesia for her master's degree, University of Padjadjaran for her doctoral degree. In 2013, she joined Japanese Language Training at Japan Foundation Training Center Kansai Japan for six weeks, funded by Osaka Gas Foundation. Dr. Elisa has been a Japanese language lecturer for more than ten years. She is often invited as a guest speaker and trainer for Japanese language, made speeches in international conferences in several universities such as Atmajaya, Diponegoro University Semarang, University of Indonesia, Maranatha Cristian University, University Muhammadiyah Prof. Hamka, and conferences held by Asosiasi Studi Jepang Indonesia (ASJI) and Asosiasi Pengajar Bahasa Jepang Seluruh Indonesia (ASPBJI). Elisa has had working experiences in several Japanese companies in Jakarta and West Java. With her experiences in Japanese companies and higher education, she now teaches and focus on research on Japanese Corporate culture topics area.