

Ambiguity in Different Types of Question Translation: An Experimental Analysis

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Abstract- In Word Sense Disambiguation (WSD) much research has been carried out and are still being made today. If a sentence has ambiguity or ambiguous word, then the meaning of this sentence may or may not differ from context. If the meaning of the sentence is inferred from the context, then the concept of WSD comes to remove the ambiguity. Here we will discuss ambiguity which comes after Machine translation. In our experiment, we have collected different types of questions for analyzing the impact of ambiguity for wh-questions with respect to other questions (objective, match, fill in the blank and keyword specific). Some machine translators do not understand the type of the question and treated as a normal question/sentence. In this paper, we will discuss the five different types of questions and their machine translation with five standard online/offline translators. This paper describes our work on the impact of ambiguity from English to Hindi translation of different types of questions and main focus on wh-questions versus other questions translation. In this paper also have some experimental analysis and their result.

Keywords: Ambiguity, Questions, BLEU score, Machine translation, English Language and Hindi language.

I. Introduction

This paper discusses the issue which arises wh- question and other questions translation through machine. Ambiguity in Question paper translation is the big issue because they deal with the examination. The comparative exam has the different type of questions from the different area. Most of the competitive exam has two or more than two languages such as English, Hindi and regional language. But academic/ School/ University/ Educational Institute and others paper have only one language which is English. In competitive examination papers have the manual translation of English version that's why these have strictly instructed that the English version is valid if another version (languages) has any kind of mistake. In the academic examination, the paper has English as a language so students do not understand the question properly and they give the incorrect answer. If ever academic exam paper has both languages, then a student easily and correctly understands the paper and they give the correct answer.

Most of the competitive exam has very tough Hindi translation of the question papers exam, we do not understand those question papers and give the wrong answer.

Removal of this type of language barrier is possible only MT translations which translate the English version without ambiguity. MT translation saves time, money as well as energy also. There are many Indian languages MT tools

available such as Anusaaraka [20], Babelfish [19], Babylon [18], Bing [17], Google [21] etc.

This paper discusses the experimental analysis of ambiguity in question paper translation using MT and mainly focused on wh-question versus other examination questions. This paper has five different types of questions which come examinations such as wh-question, objective, match-questions, fill in the blank and keyword specific questions. We have been collecting these questions, from various sources [11][12][13][14][15][16]. We have worked in English to Hindi translation through the machine, so English as a source language and Hindi as a target language.

II. Related Work

Much more work done on question answering system (QAS) with same and different language. For online QAS question may or may not in structure format. The format of the question has included structure, semi-structured and unstructured data for question answering system. Many types of question-answering systems are available such as ontology-based QAS, question answer for different natural languages; vector space based [4], classification based [5] and a text-based question answering system [1]. In question answering field some system deals with automatic question answering and these systems also deal with wh questions [2]. Some question answering systems are domain specific to this kind of system used pre-constructed knowledge source.

These systems required extensive technology to provide a correct answer [3]. Some researcher has been dealing with the challenges for multi-domain and multi-language question answering system [8].

In question answering system many time users faced ambiguity issue which is handled by word sense disambiguation. Similarly, question paper translation is not free from ambiguity so, we worked on it and find some question translation related issues from one language to other language and also discuss the classification of question paper translation [6][7]. Some researcher work on automatic question translation, which is based on semantic pattern and this pattern use three steps for better translation these steps is structure analysis, pattern matching and word sense selection [9].

III. Types of question

In Question paper translation we collect 150 questions and these questions have both versions such as English and Hindi where English version is taken as the source language and Hindi version is taken as reference sentence. These questions are divided into five different types of questions such as Wh-question, Objective question, Match question, Fill in the blank question and keyword specific questions. Categorization of questions is shown in figure 1. Here we will discuss one by one, firstly we will discuss wh-question after that other type question.

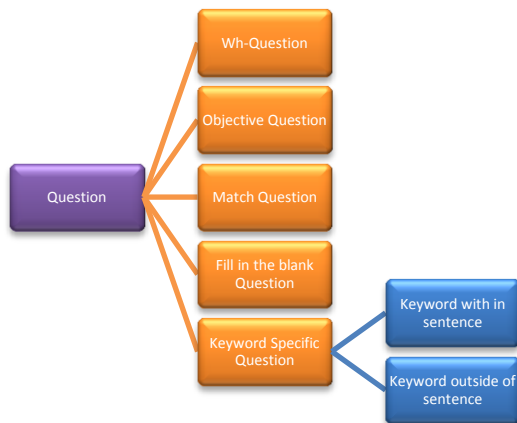


Figure 1. Questions categorization

Five types of questions come under this category they are Wh question, objective, match, fill in the blank and keyword specific question. Keyword specific question again divide into two categories one is keyword present within one sentence and other type of the question has keyword present outside of the question. Here we show all types of questions such as objective and fill in the blank question.

3.1 Wh-Question

In this question has wh-word such as “what, why, whom, who, how, where, which” and interrogative symbol (?)

comes at the end of the sentence. These wh-words also knew as “question words” and most of the time these words come at the starting position of the question sentences. Here we consider an example which has the “wh” word.

English version: What are the *strengths* and *weaknesses* of participant observation as a method?

Reference: एक पद्धति के रूप में सहभागी प्रेक्षण की क्या-क्या खूबियाँ और कमियाँ हैं?

MT Anusaaraka: प्रणाली के रूप में भाग लेने वाले पर्यवेक्षण की तीव्रताँ और निर्बलता क्या हैं?

MT Babelfish: एक विधि के रूप में भागीदार प्रेक्षण की शक्तियाँ और कमजोरियाँ क्या हैं?

MT Babylon: *क्या हैं? पद्धति की कमजोरियों को भागीदार के रूप में टिप्पणी

MT Bing: एक विधि के रूप में भागीदार प्रेक्षण की शक्तियाँ और कमजोरियाँ क्या हैं?

MT Google: एक विधि के रूप में प्रतिभागी अवलोकन की ताकत और कमजोरियाँ क्या हैं?

This question also has ambiguity, but every MT translators understands this type of question. There is no any dictionary and transliteration problem, but it is not free from ambiguity. Here the word “strengths” and “weaknesses” are ambiguous. All machine translated questions has a different meaning of the word “strengths” as “तीव्रताँ, शक्तियाँ, ताकत” and the word “weaknesses” as “निर्बलता, कमजोरियाँ” so, we can say that wh-questions do not free from ambiguity. The correct context related meaning of these words “strengths” and “weaknesses as “खूबियाँ” and “कमियाँ”.

In addition to ambiguity, machine translated sentences face some other problem. When machine translation is used for question paper translation, then it faced many types of problems such as ordering problem, gender problem etc.

3.2 Objective-Question

English Version: Which among the following services is not provided under Integrated Child Development Service [ICDS] scheme?

- Supplementary feeding
- Immunisation
- Distribution of free books and dress to the children
- Health and Nutrition Education to 3-6 year old children

Reference: निम्नलिखित में समन्वित बाल विकास सेवा (आई. सी. दी. एस.) योजना के अंतर्गत कौन सी सेवा नहीं प्रदान होती है ?

- पूरक आहार

- (ख) रोग प्रतिरक्षण
 (ग) बच्चों को निशुल्क पुस्तकों एवं विद्यालय पोशाक का वितरण
 (घ) 3-6 वर्ष की आयु के बच्चों को स्वास्थ्य एवं पोषण शिक्षा

MT Anusaaraka: जो निम्नलिखित सेवाओं के बीच में b प्रतिरक्षण को डिस्ट्रिब्यूशन (सी) freebooks का और बच्चों को लिबास एजुकेशन नूट्रिशन और हेल्थ (डी) 3-6 वर्ष पुराने बच्चों को 9 खाना खिलाता हुआ इन्टरनेट चाइल्ड डिवेलपमेंट सर्विस फ्रॉम 14 इन्टरनेट फ्रॉम 16 योजना? a सप्लेमेंटरी के नेतृत्व में नहीं दिया गया है.

MT Babelfish: जो निम्नलिखित सेवाओं के बीच एकीकृत बाल विकास सेवा [आईसीडीएस] योजना के तहत उपलब्ध नहीं है? (क) अनुपूरक आहार (ख) असंक्रमीकरण (ग) बच्चों को freebooks और पोशाक का वितरण (घ) स्वास्थ्य और पोषण शिक्षा के लिए 3-6 वर्ष पुराने बच्चों

MT Babylon: *जो निम्नलिखित सेवाओं में एकीकृत बाल विकास सेवा उपलब्ध नहीं है। है योजना [एस.डी.सी.आई] [? (क-रोग के वितरण*(ग) और (ख) पर फीडिंग अनुपूरक*(*प्रतिरक्षण freebooks पोशाक के बच्चों के लिए (घ) 3-6 वर्ष की आयु के बच्चों के लिए शिक्षा, स्वास्थ्य एवं पोषण*

MT Bing: जो निम्नलिखित सेवाओं के बीच एकीकृत बाल विकास सेवा [आईसीडीएस] योजना के तहत उपलब्ध नहीं है?

- (क) अनुपूरक आहार
 (ख) असंक्रमीकरण
 (ग) बच्चों को freebooks और पोशाक का वितरण
 (घ) स्वास्थ्य और पोषण शिक्षा के लिए 3-6 वर्ष पुराने बच्चों

MT Google: इंटीग्रेटेड चाइल्ड डेवलपमेंट सर्विस (आईसीडीएस) योजना के तहत निम्नलिखित सेवाओं में से कौन सी सेवाएं उपलब्ध नहीं हैं?

- (ए) पूरक आहार
 (ख) प्रतिरक्षण
 (सी) बच्चों को मुफ्त किताबें और पोशाक का वितरण
 (डी) 3-6 साल के बच्चों को स्वास्थ्य और पोषण शिक्षा

Only two MT (Bing and Google) understands this question as the objective question and remaining translator treated as simple sentences. Some translator does not translate the English word “freebook” Except MT (Google), so we can say this is dictionary issues not an ambiguity related issue. In

this example, all MT does not free from transliteration problem. Now, we move to the next type of question.

3.3 Match-Question

English version: Match list I with List II and select the correct answer using the code given below:

List I [Tirthankara]

- (a) Adinatha
 (b) Mallinatha
 (c) Parshvanath
 (d) Sambhavnatha

List II [Cognizance]

- (i) Bull
 (ii) Horse
 (iii) Snake
 (iv) Water Jar

Reference: सूची- I को सूची- II से सुमेलित कीजिये तथा सूचियों के नीचे दिये गए कूट से सही उत्तर चुनिए ।

सूची- I (तीर्थकर)

- (क) आदिनाथ
 (ख) मल्लिनाथ
 (ग) पार्श्वनाथ
 (घ) सम्भवनाथ

सूची- II

- (अ) वृषभ
 (आ) अश्व
 (इ) सर्प
 (ई) जल-कलश

MT Anusaaraka: मैच लिस्ट ईई के साथ मुझे सूचीबद्ध करता है और दिया हुआ के नीचे संहिता का उपयोग करते हुए सही वह : जॉर है चुनता उत्तर 8 वाटर कॉग्निजन्स फ्रॉम 43 (अंग्रेजी वर्णमाला का नवाँ अक्षर) व्यक्ति जन्मा में राशि वृष (ii को) होर्स (iii) स्नेक (iv) ईई फ्रॉम 41 सम्भावनाथ लिस्ट को मल्लिनाथ आ c परश्वनाथ फ्रॉम (को डी) 20 तिर्थानकर फ्रॉम 22 a आदिनाथ को b मुझे लिस्ट .

MT Babelfish: सूची में द्वितीय सूची के साथ मैच और सही नीचे दिए गए कोड का उपयोग उत्तर का चयन करें: सूची में [तीर्थकर] (क) Adinatha (ख) Mallinatha (ग) पार्श्वनाथ (घ) Sambhavnatha सूची द्वितीय [संज्ञान] (i) बुल (ii) हार्स (iii) साँप (iv) जल जार

MT Babylon: मैच सूची I और II सूची से चयन का सही उत्तर निम्नानुसार है। मैं हूँ करते प्रयोग का संहिता----:Setup] *निर्माण तीर्थकरों की सूची **पार्श्वनाथ (घ) (ग) (ख) (क) Mallinatha सूची

2 (*Sambhavnatha संरान) सांड* [i] (ii) (iii) घोड़े सांप**
)iv)*जल जार

MT Bing: सूची में द्वितीय सूची के साथ मैच और सही नीचे दिए गए कोड का उपयोग उत्तर का चयन करें:

सूची में [तीर्थकर]

(क) Adinatha

(ख) Mallinatha

(ग) पार्श्वनाथ

(घ) Sambhavnatha

सूची द्वितीय [संज्ञान]

(i) बुल

(ii) हार्स

(iii) साँप

(iv) जल जार

MT Google: लिस्ट II के साथ मिलान सूची I और नीचे दिए गए कोड का सही उत्तर का चयन करें:

सूची I [तीर्थकर]

(क) आदिनाथ

(ख) Mallinatha

(ग) पार्श्वनाथ

(घ) Sambhavnatha

सूची द्वितीय [संज्ञान]

(I) बुल

(Ii) घोड़े

(Iii) नाग

(iv) जल जार

Let us, we consider match-question and also search for ambiguity related issues. Only MT (Bing and Google) understands the question is related to match-question and translate as reference, translation with respect to structure, but they do not free from a dictionary and ambiguity related issues. The words “Adinatha”, “Mallinatha” and “Sambhavnatha” have dictionary related issue arises for all MT and they also have transliteration related issues. Now we have taken some example for another type of question.

3.4 Fill in the blank Question

We consider some an example related to fill in the blank question.

English version: Banks *charge* a higher interest rate on loans than what they offer on _____.

Reference: बैंक _____ पर देने वाले ब्याज से ऋण पर अधिक ब्याज *लेते* हैं।

MT Anusaaraka: बैंक की अपेक्षा ऋण पर एक अधिक ऊँचा ब्याज दर *आरोप* लगा वे जो फ13 फ14 दे .

MT Babelfish: बैंकों _____ पर क्या वे प्रस्ताव से ऋण पर एक उच्च ब्याज दर *चार्ज*।

MT Babylon: * _____ केन्द्रीय सरकार की ओर से नोटों मुद्रों

MT Bing: बैंकों _____ पर क्या वे प्रस्ताव से ऋण पर एक उच्च ब्याज दर *चार्ज*।

MT Google: बैंक _____ पर जो पेशकश करते हैं, उसके मुकाबले ऋण पर उच्च ब्याज दर *लेते* हैं।

The word “charge” is ambiguous so this produces meaning “आरोप” for MT (Anusaaraka) which is different from context. All MT understands the type of the questions except MT (Anusaaraka) and treated as fill in the blank question. Fill in the blank questions do not free from transliteration related issue. Poor translation produced by MT (Babylon) and MT (Google) translate the word “charge” as reference translation. Now we move on other type of question.

3.5 Keyword present within one sentence

In this question have some keywords so it is known as a keyword specific question.

English: *Discuss* the concept of air *mass* and explain its role in macro-climatic changes.

Reference: वायु *संहिता* की संकल्पना की *विवेचना* कीजिये तथा विस्तृत क्षेत्री जलवायवी परिवर्तन में भूमिका को स्पष्ट कीजिये।

MT Anusaaraka: हवा परिमाण की सङ्कल्पना के विषय में *चर्चा* कीजिए और macro-climatic बदलावों में उसकी भूमिका समझाइए .

MT Babelfish: हवा *द्रव्यमान* की अवधारणा पर *चर्चा* करें और मैक्रो में अपनी भूमिका-जलवायु परिवर्तन समझाओ.

MT Babylon: *चर्चा* की *संकल्पना* को हवा में अपनी भूमिका स्पष्ट और जन बढाने चाहिए। परिवर्तन जलवायु-

MT Bing: हवा *द्रव्यमान* की अवधारणा पर *चर्चा* करें और मैक्रो में अपनी भूमिका-जलवायु परिवर्तन समझाओ.

MT Google: वायु *द्रव्यमान* की अवधारणा पर *चर्चा* करें और मैक्रो-जलवायु परिवर्तनों में इसकी भूमिका की व्याख्या करें।

All MT understands the structure of the question and translated as reference, translation but these are not free from ambiguity. The word “mass” and “discuss” are ambiguous and all MT gives different meaning of these words.

3.6 Keyword present outside of the question

In this question have some keywords outside of the question so it is known as a keyword specific question.

English version: The effective management of land and water resources will drastically reduce the human *miserias*. Explain.

Reference: भूमि एवं जल संसाधनों का प्रभावी प्रबन्धन मानव विपत्तियों को प्रबल रूप से कम कर देगा। स्पष्ट कीजिये।

MT Anusaaraka: भूमि और पानी संसाधन का प्रभावकारी प्रबन्ध मानवीय दुःख जबरदस्त रूप से कम करेगा. समझाइए.

MT Babelfish: भूमि और जल संसाधनों के प्रभावी प्रबंधन काफी मानव दुख कम हो जाएगा. समझाने.

MT Babylon: के प्रभावी प्रबंध भूमि तथा जल संसाधन कम हो जाएँगी मानव परेशानियाँ होती है। स्पष्ट है।

MT Bing: भूमि और जल संसाधनों के प्रभावी प्रबंधन काफी मानव दुख कम हो जाएगा. समझाने.

MT Google: भूमि और जल संसाधनों का प्रभावी प्रबंधन मानव दुखों को काफी कम करेगा। के बारे में बताएं।

All MT understand the pattern of the question and translated to reference sentences regarding to structure. The word “*miserias*” have ambiguous meaning as “दुःख”, and “परेशानियाँ”, whereas “विपत्तियों” is the correct context related meaning.

IV. Experiment and Result

In our test as of now examined we took 150 different types of questions which are classifications into five distinct categories. Among these every category has 25 questions, sample questions under every category alongside reference, translation have appeared in the previous. BLEU matrix has been utilized as the measurement for finding the accuracy of translations using five popular translators.

Figure (2) shows the mean BLEU score of different type of questions using five translators. The results show that for all categories of questions Anusaaraka MT has the poorest translation accuracy. Father, among all questions Anusaaraka has given the poorest translations for match questions that are 0.265 whereas the highest accuracy is

achieved for wh-questions. For keyword specific questions, all other translators have shown poor translations compare to other type of questions except Anusaaraka the other translators have shown the best performance for objective type questions among all questions categories.

In the figure (2) graphs show the comparison among all types questions. Whereas wh-questions perform better than other questions (except objective-questions) for all MT (except MT Anusaaraka). As our result shows only MT Google shows wh-questions perform poorly with respect to all questions (except keyword specific questions. Fill in the blank questions slightly better than wh-questions only for MT Babelfish).

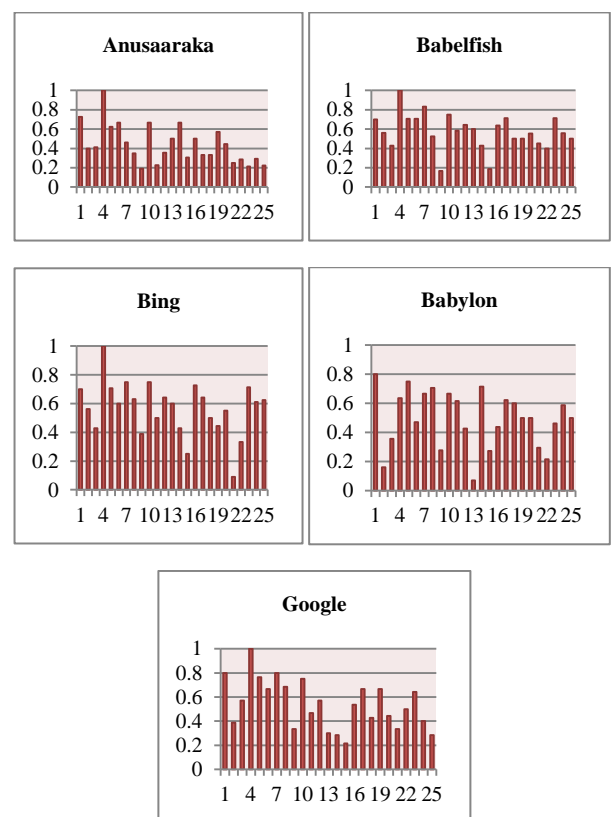
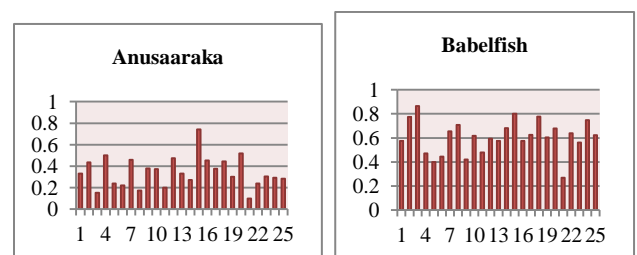


Figure 2 (a). Wh questions



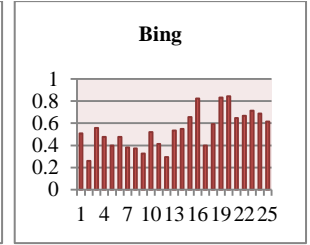
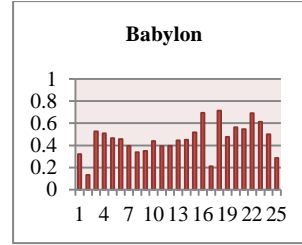
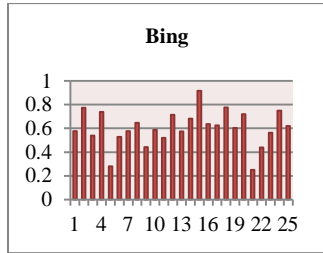
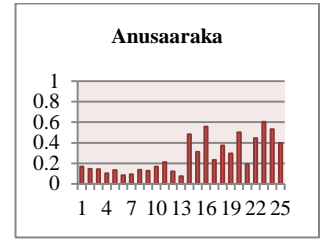
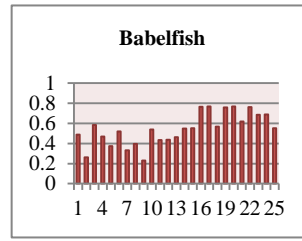
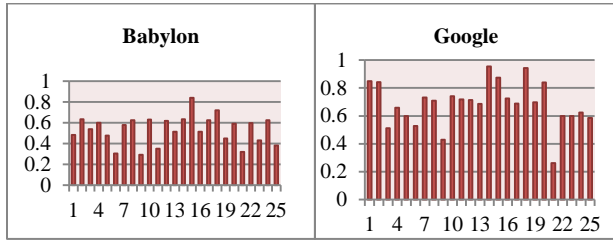


Figure 2 (b). Objective Question

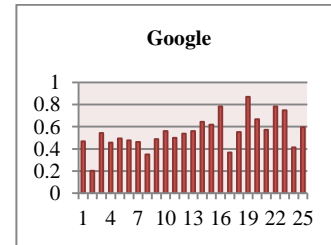
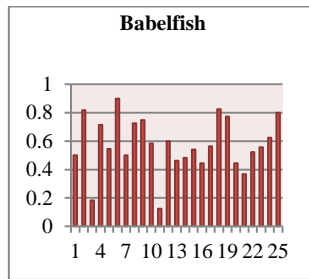
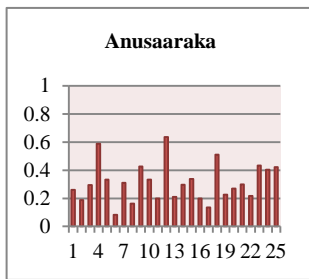


Figure 2(d). Match Question

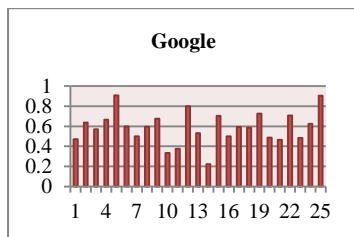
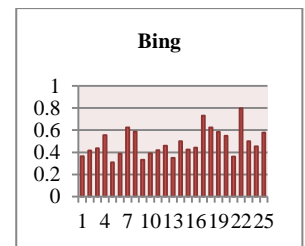
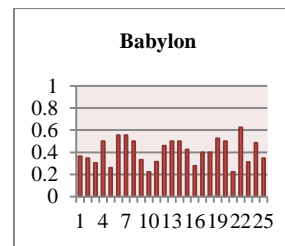
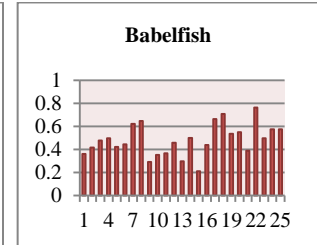
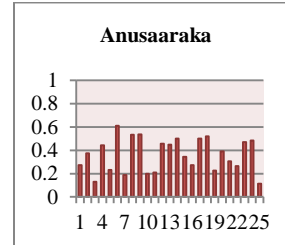
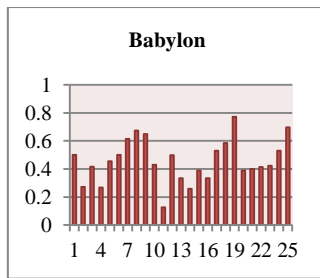
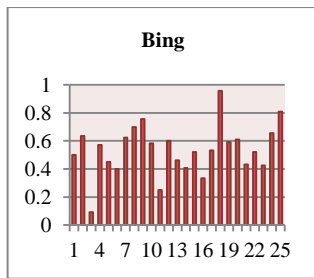


Figure 2 (c). Fill in the blank

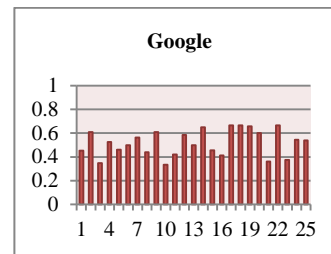


Figure 2 (e). Keyword present within one sentence

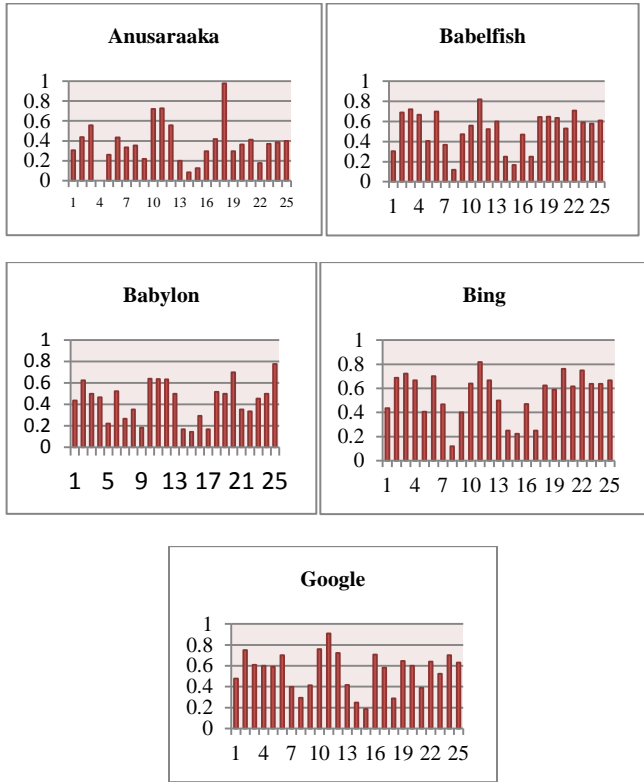


Figure 2(f). Keyword present outside of the question

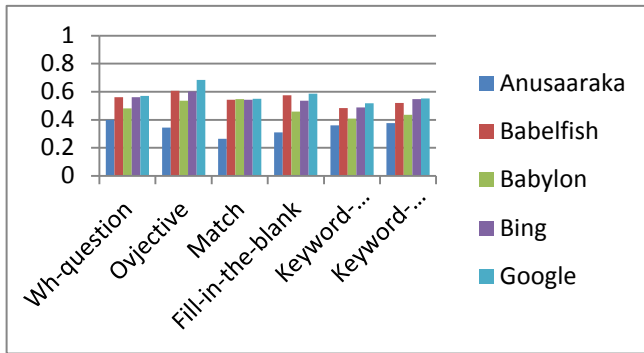


Figure 3. Mean value for all types questions

V. Conclusion

In this paper, we have tried to analyze the translation accuracy of questions paper through different translators for more robust analysis questions were categories into all possible types as may appear in different examination. The main objective of the work to understand how empty tools behave while translating these categories of questions. Our result indicates that translator behave differently for different types of questions which clearly indicates that the translation of question sentences is a more challenging task compare to other sentences as they required a high degree of accuracy.

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