A Management and Evaluation Framework for English to Urdu Translation

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Abstract:

The success of a translation project is largely dependent on the overall project management and quality assurance of the translated text. In this paper, we present a framework for carrying out English to Urdu translation projects systematically and efficiently. Different processes involved during the life cycle of a translation project have been explained in detail. To make the translation process significantly efficient, we have developed automatic systems for managing and evaluating translations. We have implemented the framework on 2164 sentences. A detailed analysis and classification of the glossary usage errors have been carried out on 540 sentences. We have obtained a very timely and high quality translation output at the end of the project, indicating the robustness of the presented framework.

1. Introduction:

Translation is defined as the communication of the meaning of a source-language text by means of an equivalent target-language text [1]. The translation process is generally assumed to be a very simple activity, in which translators carry out the task with the help of references, such as dictionaries, thesaurus, online resources etc. [2]. However, the translation activity has undergone significant changes in the last few decades, which has made a translation project more than just a translation task [3]. Over the years, translation has become an economic activity, which is concerned with the output of a specified product, based on existing corpora and information technology [4]. As a result of this evolution, translators are now expected to deliver larger translation volumes within shorter deadlines [2].

Urdu is the national language of Pakistan, as well as one of the twenty three official languages of India [5]. There are around 11 million native speakers. Urdu, and around 105 million speakers who speak it as a second language [6]. The official language of Pakistan is English, since the country was under British rule as a part of British India [7]. But recently, the supreme court of Pakistan has ordered the government to adopt Urdu as an official language [8]. This shift of language requires the translation of all official documentation from English to Urdu. Translation is also a basic requirement for making English content available for the Urdu speaking population, who do not understand English language. A considerable amount of translated data is also required for the development of English to Urdu parallel corpora, which is a prerequisite for many NLP applications, such as machine translation, multilingual information retrieval [9], automatic construction of lexicons and comparative analyses of the structure of languages [10]. Such translation projects may require very large volumes of English text to be translated into Urdu, which are difficult to manage by translators. The quality assurance of the translated text also becomes a very challenging task, when large amount of data is required to be translated.

In this paper, we have discussed different tasks that are involved in the life cycle of a translation project in detail. We present a semi automated management and evaluation framework for the efficient and accurate translation of English text into Urdu.

2. Literature Review:

In the recent years, the translation activity has become very popular for cross cultural understanding and communication, and has emerged as a very significant field of study. Dunne [11] has pointed out

the following eight characteristics for the overall

i. Providing clear instructions.
ii. Managing people (by creating a schedule and monitoring).
iii. Quality assessment to clarify expectations.
iv. Reliable documentation.
v. Risk management by reducing uncertainty.
vi. Efficiency.
vii. Energy and focus.

In order to complete a translation project successfully, a set of guidelines should be provided to the translators for clarifying client's requirements and the purpose of translation. Such guidelines should help the translators in decision making, and give them an insight about the user demands. The performance of the individual team members should be evaluated for managing the translation deliverables according to committed deadlines. Regular review of the translated text should be carried out, and feedback should be given to the translators to maintain the quality of translation according to client's expectations. The client should be informed about the progress of the project by documenting interim reports. The chances of uncertainty and surprises should be reduced through regular quality assessment and better communication with the client and the team. The project should be made efficient by extracting glossaries for specific terminologies and developing a detailed plan at the beginning of the project. The team will be able to work with great energy and focus when the issues regarding purpose, terminology, communication, deadlines and deliverables will be resolved with the development of guidelines, glossaries and a realistic project plan.

Lauffer [12] has carried out a detailed analysis of the translation process. A translation process can be broken down into three general stages:

i. Understanding and reasoning
ii. Searching
iii. Revising

During the "Understanding and reasoning" stage, the translators read and familiarize themselves with the source text to produce translated text. The translation is usually done at word or sentence level. The translators have to undergo a lot of decision making about the structure of the translated text, to ensure consistency. During the "Searching" stage, the translators look for words, terms and expressions using resources such as dictionaries and glossaries. The "Revising" stage consists of re-reading the translated text for accuracy, grammatical structure, word order, idiomatic language, lexical choices, syntax and the flow of the text.

Sprung [13] has emphasized on the need of organizing translation projects for time and budget success of a translation project as a learning activity: management. Other than the linguistic processes involved in a translation project, processes such as preparing products for translation, extracting sentences to be translated, scheduling, testing and evaluation of the translated text are also very critical for the successful completion of a translation assignment. Software engineering and service management can play a very important role for delivering a high quality of translated text and making the translation process efficient.

Pérez [4] has outlined the framework for translation project management. A translation project's life cycle consists of different phases, including commissioning, planning, ground work, translation and wind up. The ground work consists of terminology extraction and research, segmentation of source text into sentences, and the preparation of work packages. The translation phase is usually carried out with the help of Computer Aided Tools (CAT) and translation memories. During the wind up phase, the consistency and completeness of the translated text are evaluated.

Makoushina [14] has conducted a survey for comparing the approaches and functions of quality assurance CAT tools, available for conducting translation projects. The tools included in the survey are Deja Vu, SDLX QA Check, Star Transit, SDL Trados QA Checker, Wordfast, Error Spy, QA Distiller, and XBench. The survey results have shown that over 81% of the respondents use QA Automation tools for translation. The survey demonstrates an urgent need of providing support for more languages, encodings and file formats by CAT tools. These tools lack the optimal support that is required for right to left languages, such as Urdu. The users generally lack skills required to perform additional customization for achieving higher level of error detection. The error level of the tools is very high, and users have to spend a lot of time for deciding whether a reported error needs correction or not.

Moses is a machine translation tool, used for automatic translation that requires a large parallel corpus for training. The existing English to Urdu parallel corpora are not large enough to train a system for automatic machine translation.

Sere [2] has described translation project as a succession of fast-paced activities, which requires issues to be resolved as rapidly as possible in order to meet the deadlines. A translation project is considered a failure if it is not delivered to the client on time or the quality of the translation does not meet the client's requirements.

There are also some challenges faced by the translators during the process of translation. These challenges include language specific challenges and

are cited by [15] during the process of mapping Urdu words from Urdu WordNet to Princeton WordNet. These challenges include morphological challenges e.g. Causitivization in which causative infixes such as لا/lɑ: and وا/ vɑ: change the verb into its causative form such as سونا (so: nɑ:/sleep) is changed into سلانا (sʊlɑ:nɑ:/ to make someone sleep). These morphological causative are not found in English hence making it difficult for translators to find a single translation of such verbs from source to target language. The translation of such verbs can result into multiple translations by the translators and can affect the quality of the output by causing inconsistency. There are other similar syntactic and semantic challenges cited in the work [15]. These issues can be solved by identifying them at the stage of guidelines development and setting a formula for the translations of such words.

3. Methodology:

For the translation of English source text into Urdu, we have developed a framework for the overall translation project management, as well as the quality evaluation of the translated text. The presented framework comprises of a list of sequential tasks, in order to carry out the translation project in an efficient and orderly fashion.

The presented translation framework consists of the following tasks:

i. Acquisition of the source data to be translated.
ii. Glossary extraction.
iii. Development of translation guidelines.
iv. Word counts computation.
v. Division of source sentences into work packages.
vi. Translation.
vii. Automatic evaluation of translated work packages.
viii. Automatic evaluation of glossary usage in translated text.
ix. Manual review of translated text.
x. Automatic reformatting of the translated text according to source text.

The detail of these tasks is given as follows:

i. Acquisition of the Source Data to be Translated:

As a first step, the English text to be translated is acquired. The source data may consist of a single or multiple folders, containing a single or multiple files. The text inside the source files is usually in the form of paragraphs containing multiple sentences. Sometimes, there are empty lines present in between these paragraphs. For the presented framework, the files containing source text should be in .txt format.

ii. Glossary Extraction:

A detailed analysis of the source data is carried out by translators for the manual extraction of glossary items. The specific terms in the data are included in the glossary, along with their standard Urdu translations. This is a very critical step, as it involves a lot of decision making for selecting the most appropriate translations of glossary items.

The glossary items can be divided into the following categories:

a) Frequently occurring terms (having greater than or equal to 10 instances). For example, the word "title" occurs 225 times in the source text. It is included in the glossary with a standard translation, "عنوان"(*unwaan*). The glossary usage will ensure that all the 255 instances get consistently translated as "عنوان"(*unwaan*), instead of any other alternative translation.

For example, consider the translation of the following two sentences:

English:

"The guests arrived at the closing ceremony."

"They were closing the windows."

Urdu:

"مہمان اختتامی تقریب پر پہنچ گئے۔"(*mehmaan ikhtataami taqreeb per puhanch gae.*)

b) Terms having multiple senses. For example, the word "approve" occurs 8 times in the source text. It has two senses i.e. "Officially agree to or accept as satisfactory" and "archaic Prove; show" [16]. In the glossary, it is included with the standard translation, "توثیق"(*tauseeq*), meaning "Officially agree to or accept as satisfactory", based on the context of the source text.

There can be terms occurring multiple times, and having multiple senses in the source text. "وہ کھڑکیاں بند کر رہے تھے۔"(*woh khirrkian bund ker rahe thay.*)

In the above example, the word "closing" has been correctly translated as "اختتامی"(*ikhtataami*) and "بند"(*bund*) in two different sentences. For the word "closing", the glossary contains both "اختتامی"(*ikhtataami*) and "بند"(*bund*) as standard translations, separated by a comma.

c) Terms without standard Urdu translations. For example, the term, "under the patronage" occurs only 2 times in the source text. Since, there is no standard Urdu translation for this term, the translators themselves have coined its standard translation, "زیر سرپرستی"(*zair-e-sarparasti*), and added it in the glossary.

The extracted glossary is evaluated by language experts for finalization. The format of glossary is given as follows:

English	Urdu
Title	عنوان
Core	مرکزی، بنیادی
Responsible	ذمہ دار

iii. Development of Translation Guidelines:

A set of guidelines is developed for the translators by language experts in order to ensure consistency in translated text. These guidelines are developed in accordance with the requirements of a particular project, and can vary for different projects. The guidelines provide clarification related to the following issues:

a) The usage of diacritics. For example, "مکمل"(*mukammal*)" should be used in the translated text instead of "مکمّل"(*mukammal*, containing a diacritic "ّ").

b) Transliteration of English words (such as proper nouns etc.). For example, "United Group", being a proper noun, should be transliterated as "یونائٹڈ گروپ"(*united group*), instead of being translated as "متحد گروہ"(*muttahid groah*).

c) Spelling consistency. For example, "کے لیے" (*ke liay*, with a space between "*ke*" and "*liay*") should be used in the translated text instead of "کیلیے" (*keliay*, with all joined characters).

d) Date number format. For example, "11/03/2005" should be translated as "۲۰۰۵/۰۳/۱۱", instead of "۱۱ مارچ،۲۰۰۵ء".

e) Numerical representations. For example, the alphanumeric characters "a, b, c" should be transliterated as "اے، بی، سی".

An identifier is assigned to each sentence e.g. S1, S2, S3 etc., and a sentence log file is automatically generated. Each row of the sentence log file contains a sentence identifier, along with its source sentence and its corresponding source file and folder information. The format of the sentence log file is given as follows:

f) Text that will not be translated, such as abbreviations, web addresses, email addresses etc. For example, "UET", "www.abc.com" and "xyz@yahoo.com" should not be translated.

g) Treatment of special symbols. For example, "&" should be translated as "اور"(*aur*), "?" should be translated as "؟" and "*" should not be translated.

h) Consistency of the translated sentence structure with the source sentence structure i.e. if a source sentence is in passive voice, its translation should also be in passive voice. For example, the sentence, "A road was constructed." should be translated as "ایک سڑک تعمیر کی گئی۔"(*aik sarrak taameer ki gae*) instead of "انہوں نے ایک سڑک تعمیر کی۔" (*unhoon ne aik sarrak taameer ki*).

i) Usage of glossary i.e. if a glossary item is found in the source text, it should only be translated as its standard glossary translation. For example, a glossary word "mission" having a standard glossary translation "مقصد"(*maqsad*), should not be translated as "مہم"(*mohim*).

iv. Word Counts Computation:

In order to manage the translation assignment, an estimate about the amount of work required is very critical for the timely completion of task. The knowledge about the number of words in the source text is also very important for the budget allocation. For this purpose, the total number of words present in the source data are automatically computed, by segmenting the text on white spaces and counting the number of segments for each source file.

v. Division of Source Sentences into Work Packages:

The source text is segmented into sentences, on the basis of carriage return and punctuation marks, such as ".","?","!" etc. Sentence segmentation is important because we want to ensure that all sentences in the source.

Sentence ID	Sentence	Source Folder Name
S1.	Page Title:	Profile
S2.	About EPG	Profile
S30.	Banner Title:	Services

After sentence segmentation, the source data is automatically divided into work packages. Each work package may contain a single or multiple text files. The number of text files inside each work package, as well as the number of words contained inside each text file are variable entities, that can be set according to the project plan. Each text file inside a work package is assigned sentences according to the word count limit. For example, for a project having a word count of 20,000 words, 5 work packages are generated. Each work package contains 8 text files, and each text file contains around 500 words.

We have developed a naming convention in order to keep a record of the work packages and the text files contained in them. The naming convention for the work packages is given as follows:

PKG<Package Number>_F<Starting File Number>-<Ending File Number>_WC<Package Word Count>_T<Translator Identification Number>

For example, work package number 2, having 9 to 16 files, and a word count of 1000 words is to be assigned to translator number 3. The name of the package will be:

PKG2_F9-16_WC1000_T3

The naming convention for text files is given as follows:

F<File Number>_S<Starting Sentence Number>-<Ending Sentence Number>_WC<File Word Count>_T<Translator Identification Number>

For example, file number 3, having 20 to 43 sentences, and a word count of 500 words is to be assigned to translator number 1. The name of the file will be:

F3_S20-43_WC500_T1

A management log file is maintained for keeping a record of the dates on which the work packages are "assigned to" and "received from" each translator.

vi. Translation:

The work packages are assigned to a team of expert translators, who use Omega T[9] for translation. Omega T is a translation memory tool that is used for ensuring overall consistency in the translation. Each sentence is individually translated, and the context of the sentence is also taken into consideration while translating. During the translation process, the translators also give their opinion about the inclusion of words in the glossary. The glossary is updated after the consultation of language experts accordingly.

vii. Automatic Evaluation of Work Packages:

After the translation of a work package is completed, it is automatically evaluated to ensure that the translated package received from a translator contains the complete translation of the assigned source package.

The automatic work package evaluation system checks for the following errors:

a) Missing files inside work packages.
b) Extra files inside work packages.
c) Wrong files inside work packages.
d) Missing sentences in files.
e) Extra sentences in files.
f) Missing sentence identifiers.
g) Duplicated sentence identifiers.
h) Wrong sentence identifiers.
i) Missing translations.

An error log file is generated by the work package evaluation system, and the indentified errors are fixed accordingly. In case the translation of a sentence is missing, the package is returned to the translator along with feedback, until all sentences are translated.

viii. Automatic Evaluation of Glossary Usage in Translated Text:

In order to ensure the usage of glossary by the translators, an automatic evaluation system has been employed. Each source sentence is checked for the presence of glossary items. If any glossary items are found in a source sentence, the corresponding translated sentence is checked for the presence of the glossary item translation, as mentioned in the glossary.

It has been observed that, sometimes, a glossary item is not exactly translated as its glossary translation, but as an inflected form of the root word of glossary translation, depending upon the context. For example, we have a glossary item "stories", with a glossary translation "کہانیاں"(*kahanian*), which is an inflected form of the root word "کہانی"(*kahani*). Consider the following case of English to Urdu translation:

English:

[9] http://www.omegat.org/

"It is a collection of stories."
Urdu:
"یہ کہانیوں کا ایک مجموعہ ہے۔" (*ye kahanioun ka aik majmua hay*).

The translated Urdu sentence contains the word "کہانیوں"(*kahanioun*) instead of "کہانیاں"(*kahanian*) as a translation of "stories". The word "کہانیوں"(*kahanioun*) is also an inflected form of the root word "کہانی"(*kahani*). Therefore, the automatic evaluation system should consider the presence of an inflected form of the root word of a glossary translation as correct glossary usage.

This has been done by incorporating an Urdu stemmer[10] to get the root word of a glossary translation. If an inflected form of the root word is found in the translated sentence, its glossary usage is marked as correct. Otherwise, the glossary usage is marked as incorrect.

ix. Manual Review of Translated Text:

After ensuring the glossary usage in the translated text, a manual review pass is carried out by a team of language experts, who critically evaluate the translation of each sentence individually. The language experts finalize the translation by making the required changes in the translated text. In order to deliver high quality translation, a detailed feedback is given to the translators by the language experts, based on their performance.

x. Reformatting of the Translated Text according to Source Text:

The finalized translated text needs to be formatted according to the source text received from the client. An automatic reformatting tool has been developed, that takes the sentence log file generated in step (v) as input. As the formatting information of each source sentence is recorded in the sentence log file, it is utilized to format the corresponding translated text accordingly. The reformatting tool also generates output folders in accordance with the source data, and places the reformatted translated text files, having the same names as their corresponding source files, inside their respective folders.

After this step, the translated Urdu data is ready for shipment to the client.

A set of guidelines have been developed, covering all the issues related to the consistency and completeness of translation. With the help of automatic counts computation utility, it has been found that 2164 sentences contain a total of 30334 words. The sentences have been automatically divided into 8 work packages. Each work package contains 8 text files, and each text file contains around 500 words. These work packages have been assigned to a team of expert translators. The translated work packages have been automatically evaluated for completeness and consistency of the translated text, followed by a detailed manual evaluation by language experts.

The language experts have reported that the translation guidelines have a very positive impact on the quality of the translated text. The following issues have been correctly addressed by the translators, due to the clarification provided in the translation guidelines:

i. The date number format has been found consistently correct in the translated text.
ii. The numerical representations are consistent throughout the translated text.
iii. The abbreviations, web addresses and e-mail ids have not been translated, as per project requirement.
iv. The special symbols are treated correctly in the translated text.
v. The sentence structures of the translated sentences are in accordance with the source sentences.

After translation, the following issues have been detected in the work packages received from translators by the automatic evaluation system:

Error Type	Error Count
Missing sentence identifiers	26
Wrong sentence identifiers	12
Duplicate sentence identifiers	2

These errors have been fixed in the work package files, and the translated data is automatically evaluated for glossary usage.

For analyzing the output of automatic glossary usage evaluation in the translated text, we have taken a subset 540 sentences. The following table shows the data counts that have been obtained after the automatic evaluation for glossary usage:

10 http://www.cle.org.pk/software/langproc/UrduStemmer.htm

Glossary Items in Source Data	Correct Glossary Translations in Translated Data	Exact Glossary Translations in Translated Data	Inflected forms of the Glossary Translation root words in Translated Data	Glossary Usage Errors
612	429	351	78	183

We have carried out an error analysis of the 183 glossary usage errors, and found out that these errors can be categorized as following:

1. Transliteration of English words into Urdu instead of translation. For example, the word "vision" is translated as "وژن"(*vision*) instead of its glossary translation "تصور"(*tasawur*).
2. Translation of English words into Urdu instead of transliteration. For example, the word "network" is translated as "جال"(jaal) instead of its glossary translation "ورک نیٹ"(network).
3. Similar but different translation of English words. For example, the word "landscapes" is translated as "مناظر"(*manazir*) instead of its glossary translation "قدرتی مناظر"(*qudrati manazir*).
4. Different spelling of Urdu translation. For example, the word "license" is translated as "لائسنس"(*license*) instead of its glossary translation "لائسینس" (*license*, containing an additional character "ی" in Urdu spelling).
5. Addition of diacritics in translation. For example, the word "ذمّہ دار" (zimmadar, containing a diacritic "ّ") instead of its glossary translation "ذمہ دار"(zimmadar).
6. Different translation of English words. For example, the word "joint" is translated as "درمیان"(*darmiyan*) instead of its glossary translation "مشترکہ"(*mushtarka*).
7. English word used in a different sense than its glossary item translation. For example, the word "cover" has been translated as "پورا کرنا"(*poora kerna*) instead of its glossary translation "لفافہ"(*lifafa*).

The following table shows the number of occurrences of the each of the above mentioned glossary usage errors in the translated text:

Error Number	Number of Occurrences
1	78
2	1
3	13
4	27
5	3
6	54
7	7

From the table, it can be observed that the most glossary usage errors have occurred by the transliteration of English words instead of translating them into Urdu.

From the manual review of the translated text, it has been observed that the transliteration of English words instead of translation can be further categorized as follows:

i. Correct transliteration
ii. Correct transliteration with inconsistent spellings
iii. Incorrect transliteration

The detail of these categories is given as follows:

i. Correct Transliteration:

At some instances, the transliteration has been used instead of translation, depending upon the context of the source text. For example, the glossary translation of the word "philately" was "ٹکٹ"(ticket), but in the context, it was used as a proper noun, "Philately Club". According to the translation guidelines, all proper nouns are to be transliterated. Therefore, the transliteration of "Philately Club" as "فلاٹیلی کلب"(*philately club*) has been considered as correct translation by the language experts, although it is an incorrect glossary usage.

ii. Correct Transliteration with Inconsistent Spelling:

The translated text contains such instances of incorrect glossary usage, where the transliteration is correct based on the context of the source text, but the spellings of the transliterated words are not consistent throughout the translation. For example, the word, "exchange" has a standard glossary translation "تبادلہ"(*tabaadla*). In the context, it has been used as "Wall Street Exchange", which is a proper noun. The translators have transliterated it as "اکسچینج"(*exchange*) at some places, and "ایکسچینج"(*exchange*, with an additional "ی" character

spellings as correct translation, and all other spellings as errors. In case of the proper noun "Exchange", "ایکسچینج"(*exchange*, with an additional "ی" character in spelling) has been marked as correct translation, whereas "اکسچینج"(*exchange*) has been marked as an error.

iii. Incorrect Transliteration:

There are certain glossary usage errors where the English words have been incorrectly transliterated instead of using their standard glossary translations. For example,"foreign exchange" has been transliterated as "فارن ایکسچینج"(*foreign exchange*), instead of using its glossary translation, "زرِمبادلہ"(*zar-e-mubadla*). Since it is not a proper noun, the language experts have marked all such cases as translation errors.

During manual review, It has been observed that there are certain English words that occur in a different sense in context than their glossary translations. For such cases, the glossary has been updated by the addition of glossary translations of all senses.

The language experts have suggested 156 additions in the glossary. The updated glossary consists of 474 words.

After the completion of manual review process, the translated text has been automatically formatted according to source text. The reformatted translated text files have been manually evaluated for formatting errors. The manual evaluation showed that the automatic reformatting system does accurate formatting of the translated text, and does not produce any additional errors.

4. Conclusion:

The presented translation management and evaluation framework can be implemented for the translation projects involving large volumes of data. The automatic evaluation of glossary usage has a significant impact on ensuring the consistency of the translated text. The development of glossary for a translation project is an evolutionary process that requires incremental input from the translators and feedback from the reviewers. A lot of manual effort can be saved by implementing the automatic reformatting system that gives an accurate output.

5. Future Work:

In future, the developed framework can be implemented for the translation of English content into other local languages of Pakistan such as Punjabi, Sindhi etc. An automatic translation framework can be developed for managing and evaluating translations of multiple languages. The presented framework can be extended for different file formats, such as xml, html, php. etc.

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