# Real Time Translation using Syllable Comparison

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*Abstract*: **Google has introduced its new real time translation service in almost all its devices. It's very good with most of the western languages very close to English. But the most important problem with that is the whole process fails when it comes to the other languages including the regional languages of India, the problem lies in the efficiency of conversion and capacity of languages. The project focuses on translation of source language to the target language. This project comes under the domain of language processing and machine learning d; so when the translator is used in real time it compares the word with the data set available. It breaks the whole world into different syllables and then compares it. Therefore, here the conversion is perfect and finds the exact word from the language's dictionary and again break it down into syllables and spell it out. Here the machine or system is trained to compare this (data set contents) and the input given by the user. Therefore, we will be able to reduce the problems in the translator and errors that arise in interpret the words into different languages.**

*Keywords*: **translation, machine learning, neural network, data set**

## 1. Introduction

### A. Translation

It is the process of changing or converting words or text from one language into another [3]. Translation is a mental activity in which a meaning of given linguistic discourse is rendered from one language to another. [1] It is the act of transferring the linguistic entities from one language in to their equivalents in to another language. Translation is AN act through that the content of a text is transferred from the language in to the target language. [1] The language to be translated is called the source language (SL), whereas the language to be translated into or arrived at is called the target language (TL) [2]. The translator must have smart information of each the supply and therefore the target language, in addition to a high linguistic sensitivity as he should transmit the writer's intention, original thoughts and opinions within the translated version as exactly and reliably as doable.
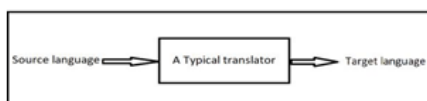


Fig. 1. A basic translator

### B. Real time translation

Communication access period of time translation (CART), additionally known as open captioning or period of time stenography, or just period of time captioning, is that the general name of the system that court reporters, closed captioners and voice writers, et al use to convert speech to text. A trained operator uses keyboard or stenography strategies to transcribe spoken speech into written communication. Speech to text software package is employed once voice writers give CART. While period of time speech-to-text serves several with hearing impairment and hearing loss, it is also useful for people whose first language is different from the language being used, to understand speakers with different voices and accents in several cluster things (at work, in education, community events), to have a "transcript", and for learning languages. CART professionals have qualifications for added expertise (speed and accuracy) as compared to court reporters and other stenographers [5]. Remote CART is completed with the trained operator at a distant location. A voice connection such as a telephone, cell phone, or computer microphone is used to send the voice to the operator, and the real-time text is transmitted back over a modem, Internet, or other data connection. Some people use CART as the short form of computer assisted real-time transcription. The service is identical. In some countries, CART is also said as Palantype, Velotype, STTR (speech to text reporting).

### C. Google translate

Google Translate may be a free multilingual artificial intelligence service developed by Google, to translate text. It offers a web site interface, mobile apps for mechanical man and iOS, associate degree an API that helps developers build browser extensions and software system applications. Google Translate supports over one hundred languages at numerous levels and as of might of 2017, serves over five hundred million individuals daily. Launched in Apr 2006 as an applied mathematics artificial intelligence service, it used world organization and European Parliament transcripts to assemble linguistic knowledge. Rather than translating languages directly, it 1st interprets text to English and so to the target language. During a translation, it's for patterns in immeasurable documents to assist want the simplest translation. Its accuracy

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has been criticized and ridiculed on many occasions. In Nov 2016, Google proclaimed that Google Translate would switch to a neural artificial intelligence engine - Google Neural artificial intelligence (GNMT) - that interprets whole sentences at a time, rather than just piece by piece. It uses this broader context to assist it discover the foremost relevant translation, that it then rearranges and adjusts to be additional sort of a human speaking with correct grammar. Translating the specified text into English before translating into the chosen language was a compulsory step that it had to require [3]. Since SMT uses prognostic algorithms to translate text, it had poor grammatical accuracy. However, Google at first didn't rent specialists to resolve this limitation because of ever-evolving nature of language [3]. In January 2010, Google has introduced humanoid app and iOS version in Gregorian calendar month 2011 to function a conveyable personal interpreter [3].

As of Gregorian calendar month 2010, it absolutely was integrated into browsers such as Chrome and was able to pronounce the text, mechanically acknowledge words within the image and spot unfamiliar with text and languages [3]. In May 2014, Google acquired Word Lens to improve the quality of visual and voice translation [4]. It is able to scan text or picture with one's device and have it translated instantly. Moreover, the system mechanically identifies foreign languages and interprets speech while not requiring people to faucet the mic button whenever speech translation is required [4]. In Gregorian calendar month 2016, Google has transitioned its translating technique to a system known as "Neural MT" [5]. It uses Deep Learning techniques to translate the complete sentences at a time and ensures greater accuracy of the context [3].

*D. Syllable*

A language unit may be a unit of organization for a sequence of speech sounds. It is usually created of a language unit nucleus (most usually a vowel) with elective initial and final margins (typically, consonants). Speech will typically be divided into a full range of syllables: as an example, the word immune gamma globulinnite consists of 2 syllables: ig and nite.

Syllabic writing began many hundred years before the primary letters. The earliest recorded syllables are on tablets written around 2800 BC within the Sumerian town of urban center. This shift from pictograms to syllables has been referred to as "the most significant advance within the history of writing" [2].

A word that consists of one language unit (like English dog) is termed a monosyllabic word (and is claimed to be monosyllabic). Similar terms embody word (and disyllabic; conjointly disyllable And disyllabic) for a word of 2 syllables; word (and trisyllabic) for a word of 3 syllables; and polysyllabic word (and polysyllabic), which may refer either to a word of over 3 language units or to any word of over one syllable.Syllable is an Anglo-Norman variation of Old French sillabe, from Latin syllaba, from Koine Greek means "what is taken together", referring to letters that are taken together to

make a single sound [3].

## 2. Solution

When it comes to regional language translation, the google translate is not accurate enough. This paper suggests a possible solution for regional language to language translation. Google gets its training data by crawling and saving texts from about a trillion of web pages which results in translational errors when it comes to regional languages. Our solution is to create a dataset of all the syllables using the supervised learning algorithms we are going to compare the data and try to resolve the issue efficiently.

*A. Machine learning*

Machine learning is the ability of a machine to learn by itself. It is solely focused on writing software that can learn from past experience. Machine learning is more closely related to data mining and statistics than it is to artificial intelligence. A computer program is said to learn from experience 'E' with respect to some class of tasks 'T' and performance measure 'P', if its performance at tasks in 'T', as measured by 'P', improves with experience 'E'. Google translate uses deep learning to translate from a given language to the desired language and that is how google is able to achieve state of the art performance.

*B. Machine translation*

Machine translation is a form of computational linguistics and language engineering which uses software to translate text or speech from one language to another. The most commonly used machine translations are rule based engine and statistical, these engines differ in the way that they process and analyze content. There are different types of machine translation engines, Neural machine translation system is being used in this proposed system and is a new approach to machine translation that uses a large neural network to enhance performance in other words the computer uses deep learning to build an artificial neural network to teach itself how to translate between languages. Neural machine translation is the more natural and appropriate machine translation engine. Neural machine translation is based upon neural networks, the idea behind neural networks is to take a large number of training examples and then develop a system which can learn from those examples. More the examples, more the accuracy of the neural network.

*C. Google neural machine translation system*

Google released the google translate which is based on neural machine translation in 2016. The google neural machine translation system reduces the translation errors by an average of 60% compared to the phrase based machine translation engine which google used before. Earlier to translate a word from one language to another, the google translator first had to translate the source word to English from which it is converted to the desired language. The architecture of the Google neural network was built on the seq2seq model. A basic seq2seq model

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is made up of two recurrent neural networks, an encoder network that is used for processing the input and a decoder network for generating the output.

Difference is, there are 8 layers of long short term memory recurrent neural networks with some tweaks between the encoder and the decoder. The google translate currently supports 103 languages, so there would be 103*102 different models for each pair of languages. The quality of the models varies according to the popularity of the language and the number of training examples given to the network. The disadvantage of google translate when it comes regional language translation (Indian languages) using this approach is that not all the languages are popular nor do they have enough training documents to train the network therefore resulting in translational errors.
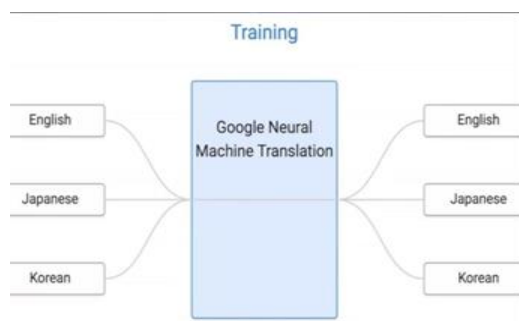

Fig. 2. Google translation algorithm

## 3. Module description

The proposed model basically has three different modules:

### A. Syllable breaking

Here the words from the language of the user will be broken down into individual syllables and sent as input to the next model for analysis.

### B. Comparison module

here we will have an audio dataset of the syllables used in the language of the user. Now the user's words broken into syllables will be compared with this particular dataset to avoid existing linguistic errors.

### C. Output syllable

Now the exact word in the desired language will be found and again broken into syllables while pronouncing it out to avoid pronouncing error.

## 4. Advantages and disadvantages

### A. Disadvantages of existing system.

Google Translate does not have a system to correct for translation errors. There is no way of reporting errors in order to avoid having them repeated, nor is there a way to proof read what has been translated unless one is fluent in both the source and the target language.

Google Translate often produces translations that contain significant grammatical errors. This is due to the fact that Google's translation system uses a method based on language pair frequency that does not take into account grammatical rules.

The quality of translation is dependent on the language pair The Google's web-based translation database is built primarily from existing online translations, common translations for languages e.g. Spanish to English or vice versa tend to be more accurate while translations for other languages that are not as available in Google's database are less likely to be accurate.

### B. Advantages of proposed system

This system has algorithm to correct for translations errors:

This will first translate the language with 99% of accuracy. The source language text will be sent to a language expert who is fluent in both the source and the target language, so one can crosscheck it.

This system will produce no grammatical error as it will first translate each word into its target language and then classify and identify each word in its grammatical form and finally create the sentence in correct sorted order of its root form. This language system will perform the translation in following algorithm:

It will first split the word into syllables then performs translation by comparing each sequence of letters in its destination language with the dataset it is provided with and will give the best result.

There will be guarantee that output is correct here as the source language will be sent to an expert who will be fluent in both sides of language.

No need to connect to internet when the entire package or module has been downloaded in your device.
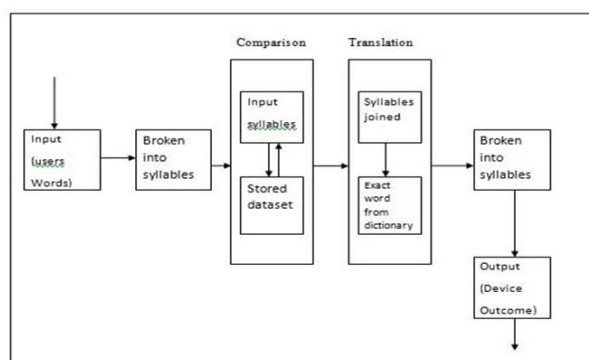

Fig. 3. System architecture

## 5. Conclusion

Through this project we try to solve the problem statement of real time translation using comparison of the datasets of syllables with the help of organized or specialized algorithms of machine learning. Now any regional language not associated with English in any way can also be translated in real time

efficiently than before without any linguistic errors.

## 6. Future Works

Later using the system, we can work on various decibel ranges of the syllables to further improve the efficiency of the translation as this is a huge industry worth a turnout of 40 billion dollars.

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