Some of the common approaches on how language translation technology implements the machine translation process are:

Rule-based Machine Translation

Machine translation mechanism began with rule-based machine translation (RBMT). This consisted of the use of a bilingual dictionary with a set of linguistic rules for each language. Language experts develop built-in linguistic rules and bilingual dictionaries for specific industries or topics. Rule-based machine translation uses these dictionaries to translate specific content accurately. The steps in the process are:

- The machine translation software parses the input text and creates a transitional representation
- It converts the representation into target language using the grammar rules and dictionaries as a reference

Statistical Machine Translation

Statistical Machine Translation (SMT) suggested the splitting of identical sentences into words which can be matched together without any rules. Hence the conclusions were drawn by the machine itself. Instead of relying on linguistic rules, statistical machine translation uses machine learning to translate text. The machine learning algorithms analyze large amounts of human translations that already exist and look for statistical patterns. The software then makes an intelligent guess when asked to translate a new source text. It makes predictions on the basis of the statistical likelihood that a specific word or phrase will be with another word or phrase in the target language.

Syntax-based Machine Translation: Syntax-based machine translation is a sub-category of statistical machine translation. It uses grammatical rules to translate

syntactic units. It analyzes sentences to incorporate syntax rules into statistical translation models.

Neural Machine Translation

Currently machine translation uses neural machine translation considering the emergence of neural networks (NMT) [27]. Neural machine translation uses artificial intelligence to learn languages, and to continuously improve that knowledge using a specific machine learning method called neural networks. It often works in combination with statistical translation methods.

Neural Machine Translation vs Other Translation Methods

Neural networks consider the whole input sentence at each step when producing the output sentence, Other machine translation models break an input sentence into sets of words and phrases, mapping them to a word or sentence in the target language. Neural machine translation systems can address many limitations of other methods and often produce better quality translations.

Hybrid Machine Translation

Hybrid machine translation tools use two or more machine translation models on one piece of software. Hybrid approach can be used to improve the effectiveness of a single translation model. This machine translation process commonly uses rule-based and statistical machine translation subsystems. The final translation output is the combination of the output of all subsystems.

recognize_sphinx(): CMU Sphinx - requires installing PocketSphinx
recognize_wit(): Wit.ai

Of the seven, only recognize_sphinx() works offline with the Carnegie Mellon University (CMU) Sphinx engine. The other six all require an internet connection.

Some of the audio file formats that SpeechRecognition supports are WAV (Waveform audio), AIFF (Audio Interchange File Format), and FLAC (Free Lossless Audio Codec) (must be native FLAC format).

Using record() to Capture Data from a File

```
>audio_file = sr.AudioFile('audio.wav')
>with audio_file as source:
  audio = r.record(source)
```

The context manager opens the file and reads its contents, storing the data in an AudioFile instance called source. Then the record() method records the data from the entire file into an AudioData instance.
recognize_google() will then attempt to recognize any speech in the audio.

Working With Microphones

To access the system's microphone with SpeechRecognizer, PyAudio package is used.over the Debian-based Linux system, PyAudio can be installed using the command:

```
$ sudo apt-get install python-pyaudio python3-pyaudio
```

Now, instead of using an audio file as the source, default system microphone can be used. This microphone can be accessed by creating an instance of the Microphone class.

translated into another language. This helps people facing communication issues due to their language.

Artificial intelligence-grounded machine translation has fundamentally changed public awareness and attitudes towards multilingual communication. In some language pairs, the accuracy, quality and efficiency of machine-translated texts of certain types can be quite high. Hence, the end-user acceptability and reliance on machine-translated content could be justified. However, machine translation in small and/or low-resource languages might yield significantly lower quality, which in turn may lead to potentially negative consequences and risks if machine translation is used in high-risk contexts without awareness of the drawbacks, critical assessment and modifications to the raw output. The current study, which is part of a more extensive project focusing on the societal impact of machine translation, is aimed at revealing the attitudes towards usability and quality as perceived from the end-user perspective. The use of speech to text conversion and translation increases convenience by reducing the consumption of resources. Some of examples include [35] -

Reduce Written and Printed Materials

Instead of typing and printing version after version of a document to share with colleagues collaborating on a project, team members can use web-based voice software to accurately capture spoken notes that are converted into text and then routed for review, editing and approval before a final version is completed.

Digitize and Streamline Workflows

Taking advantage of automation capabilities available in advanced voice technologies mitigates the use of memos, process forms and similar paperwork. By connecting with existing systems within the IT stack, these technologies make it possible to convert voice notes into immediately usable information without the need for paper forms.

Avoid Unnecessary File Management

Using flexible voice software compatible with any device or platform, team members can work on files across their phones, laptops or tablets (without the need to remember to print before leaving the office or worry about file accessibility). Files can also be securely and digitally stored for easy retrieval in the cloud.

Some of the concerns related to the use of speech to text conversion and translation are [36]:

The Problem of Accuracy

While trying to improve the accuracy of a speech recognition model, background noise can be a significant barrier. When the system is exposed to the real world, there are a lot of background noises, such as cross-talk, white noises, and other distortions that can disrupt the SRS.

Field Specificity

Field-specific terms and jargon can also cause hindrances to the accuracy of such systems. For instance, complicated medical or legal terms can be difficult for the model to understand and can further decrease its accuracy.

The Challenge of Data Privacy and Security

Another barrier that causes hindrance in the development and implementation of voice tech is the security and privacy-related issues attached to it. A voice recording of someone is used as their biometric data; therefore, many people are hesitant to use voice tech since they do not want to share their biometrics.

Reliable Use of Machine Translation in Medical field

Language barriers between patients and clinicians contribute to disparities in quality of care. Machine Translation (MT) tools are widely used in healthcare settings, but even small mistranslations can have life-threatening consequences [37].

Human Translators Losing Recognition

Due to the increase in machine translation systems like Google Translate, more people use this service as the use of smartphone has become common in current times. This has lead to a rise in problems for the human translators who do not receive any recognition or compensation for their work.

3.4 Conclusion

With the increasing developments observed in the field of artificial intelligence, there are a lot of improvements that are taking place in the field of speech recognition and translation services. These Services try to provide more accuracy in their conversions and translations. Their accuracy increases with the use of more datasets. This helps in increasing their training datasets.Improving model training helps in providing more accurate results.