**Task-4**

**Introduction**This project implements an English-to-Hindi speech recognition and translation tool using Python. The program takes user speech input, converts it into text, and automatically translates it into Hindi, displaying the output in a graphical user interface (GUI) built using Tkinter.**Background**With the increasing demand for multilingual communication, tools that facilitate language translation and speech recognition are invaluable. This project combines speech recognition technology with translation capabilities, focusing on converting spoken English into written Hindi.**Learning Objectives**

* Understand how to implement speech recognition using the speech\_recognition library.
* Learn how to integrate Google Translate services for automatic translation.
* Gain experience in building a functional GUI using Tkinter.
* Implement time-based conditions to control the availability of the translation service.

**Activities and Tasks**

* Capturing speech input through the microphone and converting it into text using Google’s Speech Recognition API.
* Using Google’s Translator API to translate the recognized English text into Hindi.
* Developing a simple and user-friendly interface using Tkinter to display both the input speech (as text) and the translated output.
* The app restricts functionality, allowing translation only after 6 PM IST, as per a predefined condition.

**Skills and Competencies**

* Working with speech\_recognition to convert speech to text accurately.
* Leveraging Google’s Translator API for real-time text translation.
* Using Tkinter to create an interactive interface, including text areas, buttons, and messages
* .Implementing logic to check if the current time meets the condition for translation (after 6 PM IST).

**Feedback and Evidence** If speech recognition fails (e.g., due to poor audio input), the user is prompted with error messages like "Timeout waiting for audio" or "Could not understand audio."If the system is accessed before 6 PM IST, users are notified with a message to try after the specified time.

**Challenges and Solutions**

* Speech recognition errors, such as timeouts and misheard input, are addressed using error messages that guide the user to retry.
* The program uses a time-check function to restrict speech input and translation functionality to after 6 PM IST, enhancing control over service availability.
* Ensuring that both English and Hindi text can be handled effectively within the GUI's input and output fields using Tkinter’s scrolled text widget.

**Outcomes and Impact**This tool successfully combines speech recognition and language translation, offering a practical solution for converting spoken English into Hindi text. The project demonstrates how real-time language tools can enhance communication and assist non-native speakers. The time-based restriction offers an additional layer of functionality, showcasing how external conditions can control service access.**Conclusion**This project provides a functional and interactive way to recognize spoken English and translate it into Hindi using Google’s APIs. The implementation of a user-friendly GUI makes the tool accessible to users, while the added feature of time-based availability introduces an interesting control mechanism. Future improvements could include expanding language options and removing time-based constraints for broader usability.