OLIVIA – A Voice Assistant

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Project Category: Artificial Intelligence / Machine Learning / Human–Computer Interaction

Problem Statement:

With the increase in the use of computers in everyday life, people rely on desktop systems and personal computers for work, studies, and entertainment. The traditional way of interaction through the keyboard and mouse proves inconvenient at times when the user intends to perform a speedy job or prefers working hands-free. Herein, voice as input makes computer interaction quicker and easier.

Commercial voice assistants, such as Siri, Alexa, and Google Assistant, are already there. However, this is mainly oriented to either mobile devices or smart home applications. The systems in use are closed source and hog system resources, with very limited customization options. They also do not provide full control over desktop-level operations. Due to these limitations, the user/learner needs a lightweight and flexible solution adaptable to their own requirements.

There exists a huge demand for a desktop voice assistant application that can be used for controlling the computer by simply using voice commands. Such a system should ideally listen for spoken input, convert speech to text, understand what the user's intention is, and act through the desktop. Also, building this application does reveal some real-world uses of Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML) concepts.

This project proposes the design and development of a simple, efficient, and customizable voice assistant to enhance the way desktops interact, thereby acting as a learning aid in the latest technologies in the AI sector.

Proposed Solution:

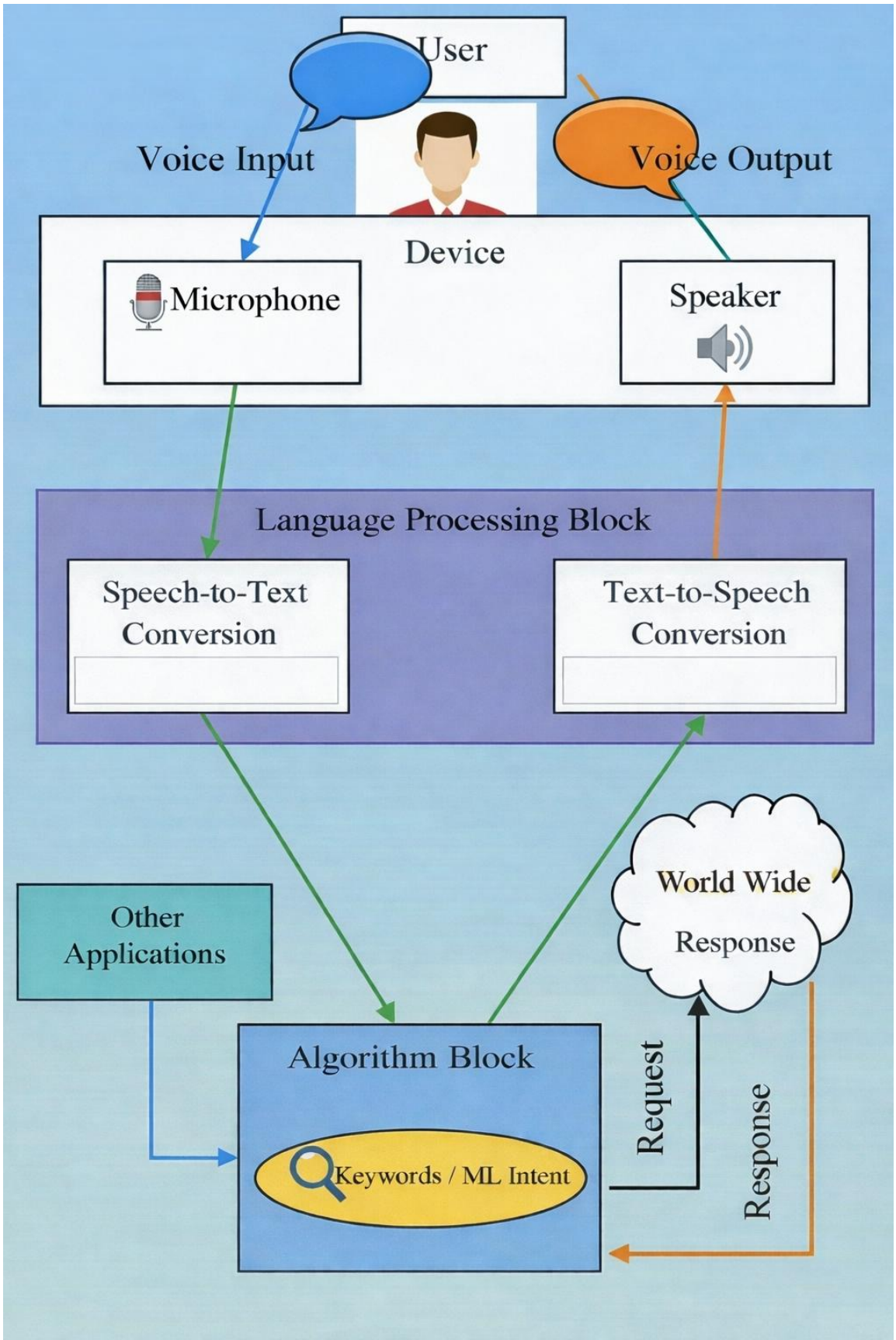
In the proposed project, “Olivia – A Voice Assistant,” the goal would be to design and develop an intelligent voice assistant that would be capable of understanding voice commands and executing system-related as well as web-related tasks on a personal computer. Olivia, the voice assistant, would be listening to the voice inputs from the user, and based on the voice inputs, she would be executing the necessary tasks.

Objectives:

1. **Enable voice**
   Add the ability to provide oral commands to the desktop client instead of just the mouse and keyboards.
2. **Develop modules for converting Speech to Text and Text to Speech**
   The user’s voice will be converted into texts through Speech to Text (STT) technology, while a response to the queries will
3. **Building the intent classification**
   Employ the use of Machine Learning (ML) to understand the intended action the user wants to do based on the verbal commands.
4. **Automate**
   Permit performing basic tasks for a desktop computer, for example, launching applications and checking system details.
5. **Integrate Flask**
   Use Flask, which is a Python Web Framework, to handle the logic for the backend and connect all components of the app.

System Architecture:

User Voice → STT → NLP → ML Intent → Action → TTS → Output



Technology Stack:

Frontend

These are intended for user interaction and output:

1. Python: Applied while building the GUI of the desktop user interface, handling user inputs
2. Speech Recognition: This is utilized for speech input from the user
3. pyttsx3: This is utilized for text-to-speech transformation to make answers

Backend

These are used for processing, logic, and system actions:

1. Flask: This is used to develop the server part of the project.
2. Scikit-learn: Utilized to implement Machine Learning Models.
3. NLP (Natural Language Processing): This is applied in the interpretation of commands given by User

Tools:

1. Docker: This tool helps package and execute the application inside an isolated setup.
2. GitHub: It allowed code storage and version control

Expected Outcome:

A functional AI voice assistant for automating desktop and laptop operations.

Limitations

1. Limited dataset
2. Internet dependency for Speech Recognition
3. English language support only

Conclusion:

One example of the actual achievements of AI and ML is the work of Olivia, which provides effective implementations of AI