Software Requirements Specification

for

SRUTHI – A MALAYALAM VOICE ASSISTANT FOR NATIVE LANGUAGE USERS

Version 1.1 approved

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07 July 2022

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Revision History

Name	Date	Reason For Changes	Version
Sruthi	13/06/22	Initial release	1.0
Sruthi	07/07/22	Updated System Features	1.1

1. Introduction

1.1 Purpose

The purpose of this document is to build a voice recognition system that would process real time speech in Malayalam and perform the required computational task specified by the user. The system would also provide real time feedback as speech in Malayalam.

1.2 Document Conventions

The document uses the following conventions:

Type	Font Style	Font Size
Main Heading	Times	18
Sub Heading	Times	14
Content	Times	12

1.3 Intended Audience and Reading Suggestions

The project is intended for the elderly or anyone who has trouble using the conventional English based systems. The project would also benefit the blind users who know Malayalam.

1.4 Product Scope

The project would be of great help to those users whose native language is Malayalam. We hope to provide a comfortable user experience at zero cost.

1.5 References

- Kurian Benoy, Jiby J Puthiyidam - *A Study of Text to Speech Systems for Non-English Languages*, IJRAR June 2019, Volume 6, Issue 2
- Preena Johnson, Jishna K C, Soumya S - *Speech to Text Conversion in Malayalam*, IJLERA July 2017, Volume 2, Issue 7
- Nivedita Singh, Diwakar Yagyasen, Surya Vikram Singh, Gaurav Kumar, Harshit Agrawal – *Voice Assistant using Python*, IJIRT July 2021, Volume 8, Issue 2

2. Overall Description

2.1 Product Perspective

Though there exists Malayalam based voice assistants for smartphones, the concept is new for desktop computers or laptops. The user will be able to perform basic functions on a computer through voice as opposed to using a mouse or keyboard.

2.2 Product Functions

These are some of the tasks that can be done with the help of the voice assistant:

- Search the web
- Run any program or application
- Fetch articles from Wikipedia
- Play any YouTube videos
- Get current weather
- Get current date and time
- Tell jokes, etc.

2.3 User Classes and Characteristics

End User: The user will be able to interact with the computer using their voice. The major user demography will comprise of the native language users especially the elderly and the visually challenged. Normal users will also be able to benefit from this project.

2.4 Operating Environment

- Operating system: Windows, Linux
- Database: MySQL database
- Platform: Python 3
- Web Browser: Chrome, Firefox

2.5 Design and Implementation Constraints

The project uses the keywords found in the speech input to generate the action to be performed. This technique may have certain limitations in correctly understanding the user input. Besides, this is not an AI based project that can adaptively respond to user needs.

2.6 User Documentation

- https://blog.doist.com/voice-assistant/
- https://wonderopolis.org/wonder/how-can-voice-assistants-understand-us

2.7 Assumptions and Dependencies

It is assumed that the user should be able to speak and understand Malayalam. The working environment for the system must include a microphone and a speaker. Internet connection is also required for the software to run.

3. External Interface Requirements

3.1 User Interfaces

The user interface for the voice assistant must be minimal as this is a voice recognition system. The GUI consists of a simple window with a button. When the button is pressed, it listens to the speech input provided by the user. This minimal UI can be implemented using the Tkinter library.

3.2 Hardware Interfaces

The software is intended to work on a desktop computer or laptop with minimum system specifications. The software is not resource heavy and will even work in older computers. Microphone and speaker are mandatory hardware requirements.

System:	AMD or Intel i3
RAM:	256 MB
Memory:	100 MB free space
Operating System:	Windows XP and up, Linux OS

3.3 Software Interfaces

The computer must have Windows or Linux installed. The voice assistant is implemented in Python (version 3). STT conversion is done using the speech_recognition library that supports Google Cloud Speech API and TTS conversion is performed using the gTTS library.

3.4 Communications Interfaces

An internet connection is required for the software to work. Tasks such as searching on the web, playing a youtube video, fetching articles from wikipedia, etc requires a fairly good network connection. All the connections are via HTTPS protocol.

4. System Features

The system will have the following features:

4.1 Search the Web

This feature allows the user to search the web using voice. This can be implemented using the googlesearch library that uses BeautifulSoup to scrape Google search results.

4.2 Fetch articles from Wikipedia

This feature reads out loud the Wikipedia article requested by the user in Malayalam.

4.3 Tell Jokes

This feature would enable the voice assistant to tell a Malayalam joke if the user requests for a joke. The selection of the joke would be random from a collection that is carefully curated by the developers.

4.4 Get current date and time

Current date and time can be read aloud to the user.

4.5 Get current weather

Current weather can be read aloud to the user.

4.6 Play any YouTube videos

This feature would play the YouTube video requested by the user.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The software uses minimal resources and is expected to perform well in various situations. However, the voice assistant can go on to listen endlessly if the button is pressed but no voice

input is provided. This condition can be avoided by using a timer that timeout after certain seconds if no input is received.

5.2 Safety Requirements

Possible safety measures are taken to prevent the loss or misuse of data. Voice inputs as well as the search history of the users are protected and prevented from misuse.

5.3 Security Requirements

Privacy of the users is given highest priority and the software adheres to Industry standard practices for security. The user log and the search history is secured and cannot be accessed by the developers or any third parties.

5.4 Software Quality Attributes

Various methods are adopted to ensure the quality of the software. The software system will undergo feature testing, load testing and regression testing prior to release or deployment.

5.5 Business Rules

Currently there aren't any users with special privileges. However, in future, certain roles may be specified so that a user with administrative privileges may set parental controls or may prevent certain search results.

6. Other Requirements

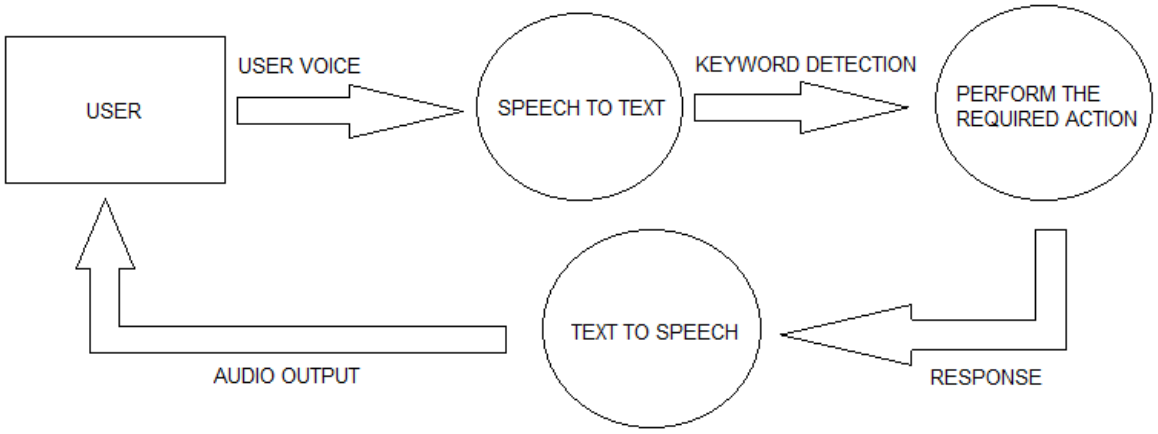
6.1 Database Requirements

The voice data as well as the search history of the user must be stored in a database. If there are multiple users accessing the software system, separate user logs have to be maintained.

Appendix A: Glossary

- AI - Artificial Intelligence
- UI - User Interface
- STT - Speech-to-Text
- TTS - Text-to-Speech
- API - Application Programming Interface
- HTTPS - Hypertext Transfer Protocol Secure

Appendix B: Analysis Models



Appendix C: To Be Determined List