PROJECT REQUIREMENTS SPECIFICATION

Voice Interface for PESU using AI

UE20CS390A – Capstone Project Phase – 1

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1. Introduction

A voice assistant is an artificial intelligence (AI) technology that enables users to interact with a device or system through natural spoken language. Voice assistants use machine learning and natural language processing to understand and respond to user requests, making it possible for users to control devices, access information, and perform tasks with just their voice.

1.1. Project Scope

1. Pesu assistance: Voice assistants can help individuals manage their personal lives by setting reminders, scheduling appointments, showing results ,reminding about attendance and read notifications to students.

The scope of a pesu voice assistant is vast and continues to expand as new use cases and functionalities are developed. The potential for voice assistants is limited only by the imagination of developers and the needs of users.

2. Product Perspective

Integration: pesu voice assistant will be seamlessly integrated into the product ecosystem, whether it is a standalone device or part of a larger system.

Compatibility: pesu voice assistant will be designed to work with a wide range of devices and platforms, including smartphones, tablets, smart speakers, and other connected devices.

User interface: The user interface of our pesu voice assistant will be intuitive and easy to use, allowing users to interact with the device using natural language commands.

Functionality: pesu voice assistant will be designed to perform a wide range of tasks, from simple tasks like setting reminders and playing music to more complex tasks .

Performance: pesu voice assistant will be designed to provide fast, accurate, and reliable performance, even in complex and dynamic environments.

2.1. Product Features

1. Speech recognition: The assistant will have ability to understand and interpret spoken language.
2. Natural language processing: The assistant will have ability to understand and interpret human language, including the nuances of grammar and context.
3. Text-to-speech synthesis: The assistant will have ability to convert written text into spoken language.
4. Voice commands: The assistant will have ability to respond to spoken commands and perform tasks based on those commands.
5. Personalization: The ability to recognize individual users and provide personalized responses based on their preferences and past behaviour.

1.2. Operating Environment

1. Power source: Many voice assistants are designed to be always-on and require a stable power source to operate reliably.
2. Internet connectivity: A voice assistant needs a reliable and stable internet connection to function properly.
3. Compatibility with devices: Voice assistants are designed to work with various devices such as smartphones, smart speakers.
4. Access to data: To function effectively, a voice assistant needs access to data such as user preferences, history, and other relevant information.

2.3. General Constraints, Assumptions and Dependencies

General Constraints:

1. Time constraints: The project has a specific deadline or timeline that must be met.
2. Resource constraints: The project has limited resources such as budget, team members.
3. Technical constraints: The project may have technical limitations such as compatibility with existing systems or security requirements.
4. Organizational constraints: The project may be limited by organizational policies or procedures.

Assumptions:

1. User assumptions: The voice assistant may make assumptions about user behaviour, preferences, or needs.
2. Technical assumptions: The assistant may assume certain technical capabilities, such as compatibility with specific hardware or software.

3. Process assumptions: The project may assume certain project management or development methodologies, such as Agile or Waterfall.
4. Environmental assumptions: The assistant may assume certain environmental conditions, such as network connectivity or infrastructure reliability.

Dependencies:

1. External dependencies: The project may depend on external factors such as third-party libraries, APIs, or services.
2. Internal dependencies: The project may depend on other internal systems or components.
3. Resource dependencies: The project may depend on specific resources, such as hardware or software licenses.
4. Organizational dependencies: The project may depend on organizational structures, such as the availability of data or resources.
5. Process dependencies: The project may depend on specific project management or development methodologies, such as Agile or Waterfall.

2.4. Risks

1. Technical risks: Technical risks arise due to the complexity of the software and the technology used to develop it. These risks may include software bugs, performance issues, integration problems, and security vulnerabilities.
2. Schedule risks: Schedule risks arise due to the uncertainty associated with project timelines. These risks may include delays in development, testing, or deployment, unexpected changes in project requirements, and unforeseen events that impact project timelines.
3. Resource risks: Resource risks arise due to the availability and skills of the project team. These risks may include the loss of key team members, skill gaps, and resource constraints that impact project delivery.
4. Communication risks: Communication risks arise due to the difficulty in conveying information effectively between team members

2. Functional Requirements

1. Voice Authorization
2. Generating Intents and Arguments Then sending Arguments to database
3. Caching most asked Queries
4. NLP module for extracting intents and arguments
5. Contextual awareness

4. External Interface Requirements

4.1. User Interfaces

1. The project will be GUI bases and will also support voice commands.
2. It will support all types of screen configuration be that phone screen or desktop screen as long as it has internet and can support browsers it can be used.

4.2. Hardware Requirements

Any device with internet connection and has a screen with working microphone can use the voice assistant.

4.3. Software Requirements

- Python programming language
- Version 3
- Databases
- Windows
- Open cv among few other modules

4.3. Communication Interfaces

Internet connectivity is required for all functionalities to work

5. Non-Functional Requirements

Security for student's Data
It must have user friendly ui
Must Be Accurate with the information it provides
And Must authorize Correct user according to their SRN

5.1. Performance Requirement

1. Response Time: The voice interface must respond to user requests within a specific time frame, usually measured in seconds or milliseconds.
2. Throughput: The voice assistant must be able to handle a certain number of requests or transactions per second, depending on the expected usage.
3. Availability: The assistant must be available for use during certain hours of the day, with a defined percentage of uptime (e.g., 99.9% uptime).
4. Scalability: The project must be able to handle an increasing number of users or requests without sacrificing performance or reliability.
5. Resource utilization: The project must use system resources efficiently, such as CPU, memory, and network bandwidth, to avoid performance degradation or system crashes.

5.2. Safety Requirements & 5.3. Security Requirements

1. Security and Data Integrity: The assistant must be secure, with measures in place to prevent data breaches or unauthorized access, and must ensure the integrity of data.

2. Maintenance and Support: The assistant must be easy to maintain, and support should be readily available in case of issues or bugs.