Team 11

Architectural Thinking Assignment 5

1. **Decide for two - a primary and a secondary - non-functional requirements (Quality attributes) that you will put into the focus of attention. Why did you choose these requirements?**

   Primary NFR: The Intelligent Assistant system should generate correct solutions to user queries very quickly.

   Secondary NFR: The multimodal interaction between the user and the system should be natural.

   The above 2 Non-functional requirements are very crucial for the success of our system. Because, even if our system is providing 100 different features (Functional requirements) such as Home Automation, Booking Cab/Flight Tickets and so on. If the system wouldn't respond to user's basic queries in the stipulated time (say <1000ms) or if the input speech recognition model of the system doesn't understand different user speech dialects (accents: English - US, British, Indian). The system might generate consistently wrong responses to user's queries (by getting confused to recognize the phonemes). Due to all these reasons, the user would get frustrated to even open the system altogether and therefore he/she might not even bother/consider to explore all those 100 different features provided to him/her.

2. **Write at least 2 scenarios for each of the two non-functional requirements. Make sure you specify all 6 elements of a scenario description. Pay attention to make the response measurable?**

A. **Scenarios for Primary non-functional requirement:**

   a) **Scenario 1:**

Part of the Scenario	Description
Stimulus source	End User/Public
Stimulus	User asks (by voice) the system about the weather forecast for the next day
Environment	Context Sensitive Intelligent Assistant
Artifact	Input Speech Recognition component of Intelligent System
Response	The weather forecast report summarized both in voice and on the display
Response measure	The forecast report for that particular location should be generated and summarized in less than 1000ms

b) Scenario 2:

Part of the Scenario	Description
Stimulus source	End User/Public
Stimulus	User queries (by text) the system about the weather forecast for the next day
Environment	Context Sensitive Intelligent Assistant
Artifact	Input Text Parser component of Intelligent System
Response	The weather forecast report summarized both in voice and on the display
Response measure	The forecast report for that particular location should be generated and summarized in less than 1000ms

c) Scenario 3:

Part of the Scenario	Description
Stimulus source	IT Manager
Stimulus	An IT company Manager requests (either by voice or through GUI) to book a meeting room if it is vacant
Environment	Context Sensitive Intelligent Assistant
Artifact	Input Speech/Text Recognition component of Intelligent System
Response	The meeting room is booked if it is vacant
Response measure	The room should be booked 100% of all the times it is available in just 4-5 seconds

d) Scenario d: (Complex scenario for our system!)

Part of the Scenario	Description
Stimulus source	End User/Public
Stimulus	User asks the system if he/she should carry an umbrella today (Context sensitive question)
Environment	Context Sensitive Intelligent Assistant
Artifact	Input Speech Recognition & Context Parser component of Intelligent System
Response	Based on the result from the Context parser, the system generates a YES/NO answer
Response measure	The response to this question should be similar/identical to the response generated for previous 3 'weather' queries. Also, the accuracy of the response should be >60% (computed using Confusion matrix/logarithmic loss)

The above scenario faces with an issue known as '**Cold Start**'

B. Scenarios for Secondary non-functional requirement:

a) Scenario 1:

Part of the Scenario	Description
Stimulus source	End User/Public
Stimulus	A user with 'British' speech dialect/accent queries (by voice) the system about his next day's schedule
Environment	Context Sensitive Intelligent Assistant
Artifact	Input Speech Recognition component of the Intelligent System
Response	The system should retrieve the data from the cloud server component & summarize the user's schedule either by voice/GUI
Response measure	The speech recognition component should have a 85% word accuracy rate for every dialect/accent of English

b) Scenario 2:

Part of the Scenario	Description
Stimulus source	IT Manager
Stimulus	An IT Manager sitting in a conference hall asks the system to initiate a video conference with his colleague
Environment	Context Sensitive Intelligent Assistant
Artifact	Input Speech Recognition component of the Intelligent System
Response	The video conference is initiated with the desired person
Response measure	Even if the user is sitting up to 25 meters away from the intelligent system (device), his/her voice should be recognized correctly

3. You will find the following non-functional requirement again and again in student projects. "The system should be easy and intuitive to use." Suggest specific scenarios for an improved formulation of this requirement in the context of your project?

[Please turn the page over!]

a) Scenario 1:

Part of the scenario	Description
Stimulus source	End Users
Stimulus	Understand the user's input regardless of the dialect during voice input recognition
Environment	After waking up the Context Sensitive Intelligent Assistant through activation keyword by the user
Artifact	Input Speech Recognition component
Response	• Provide contextual information regarding the query done by the user • Wait for an another input (up to 2 seconds) and if there is no further input, go to standby
Response metrics	• Should provide the response within 1-2 seconds. • Tolerable error rate while listening to the user is 15% of the input phrase (Example: The system should understand the sentence eve if it is uttered in American or Indian accent)

b) Scenario 2:

Part of the scenario	Description
Stimulus source	Context Sensitive Intelligent Assistant
Stimulus	A voice output with generic dialect from the Intelligent Assistant
Environment	Interaction between the Context Sensitive Intelligent System & User
Artifact	Voice Output component of the system
Response	• If there is any further query, wait for 2 seconds and answer • If there is no further query, provide proper feedback and go to standby
Response metrics	The user speech perception levels to the systems voice output should be >85%

c) Scenario 3:

Part of the scenario	Description
Stimulus source	End User
Stimulus	Any query by the user (either through Voice/GUI)
Environment	Context Sensitive Intelligent Assistant
Artifact	Input Speech Recognition + Input Text Parser Component
Response	Provide contextual response based on the query
Response metrics	Should generate the same output response regardless of the mode of user input (i.e. User input can be either through voice or text, in both cases the system should be able to respond with the same result within the stipulated time period of 1-2 seconds)

d) Scenario 4:

Part of the scenario	Description
Stimulus source	End User
Stimulus	Any query by the user
Environment	Context Sensitive Intelligent Assistant - Runtime
Artifact	The GUI of the system
Response	• UI of the screen provides proper indication of listening phase in case of voice input • Generates representable output on the GUI apart from the voice output • Provides hyperlinks in a different color than text
Response metrics	The GUI of the intelligent system should launch within fraction of a second after encountering the activation word