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Homework 1 A20435453

**Robot Instructor**

Functional Requirements:

Requirement:

* human–robot communication framework:
* The robot instructor must be able to communicate with students using text to speech techniques.
* The robot instructor must be able to process real-time speech data from student and respond to it (speech recognition techniques).

Test case:

Input: Sample lecture material is added to the robot instructor’s database.

Output: The robot instructor converts the written text to spoken words i.e., the starts reading the saved information to the students a loud and clear.

Input: Sample voice data is played.

Execution steps:

* Robot gets the input by mic.
* Speech recognition by robot.
* Convert speech to text, connect to internet/database and search for information
* Output through speaker

Output: the robot instructor correctly recognizes and converts human speech data to text and responds to it.

Requirement:

* The instructor must be able to assign project to the students and grade it according to a grading criteria.

Test case:

Input: Sample homework data is updated into robot instructor’s database.

Output: Robot instructor assigns the homework to student (via email) and specifies the grading criteria.

Input: The robot instructor receives sample homework from a student.

Execution Step:

* Robot checks if the homework is submitted within the due date.
* Robot checks if the homework is submitted in correct format.
* Robot grades the homework according to the grading criteria.

Output: The robot instructor grades the homework and updates grade in database.

Requirement:

* The instructor must be able to meet students as per scheduled office hours.

Test case:

Input: A student makes an appointment with the robot instructor.

Execution step:

* Robot checks if the appointment is made within the office hours and there is no conflict.
* If yes, robot accepts the appointment.

Output: The robot instructor is available at the office during specified time to meet the student.

Non-Functional Requirements:

1. Performance – The robot instructor must have a response time of 4 seconds.
2. Reliability/efficiency – The number of failures/crashes must be less than 2 times in one hour. The system restart time in case of crash must be in less than 60 seconds.
3. Security – the robot instructor must be password protected.
4. Usability – easy to learn and operate.

Test Cases for Non-Functional Requirement:

1. Sample speech data of different duration is played, and the time taken for the robot instructor to respond is measured.

* The robot instructor is given multiple tasks to convert text to speech, speech recognition tasks etc. and the number of failures/crashes in one hour is measured.
* The system is restarted, and the restart time is measured.
* Input: valid username and password is entered.

Output: Authentication Successful.

* Input: Invalid username and password is entered.

Output: Authentication failure.

1. A set of users are asked to operate the robot instructor. Time taken to learn is measured. Time taken to learn and operate each task is measured.

Briefly explain how writing the test cases helps to *verify* that the requirements are effective

* Test cases are written around the documented requirements so that the system will satisfy the given requirement. Also, test cases are written from end-user perspective, so they verify real world scenarios. Therefore, it forces to have a detailed look at requirements which can help in finding the conflicting, unclear, incomplete or missing requirements.
* Each requirement must have at least one test case to verify it. If the testers are struggling to define a test case, it means that the requirement is poorly specified.
* One of the ways to document a better requirement and tests is to define the requirement and associated test cases at the same time. It helps to verify the correctness completeness and consistency of the requirement. It helps to overcome the disconnect between what the customer wants and the software that is developed.