**CS 487 – SOFTWARE ENGINEERING**

**Homework - 1**

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**1. Remove Ambiguity from Requirements**

a. **Original Requirement:**

“AI-RE must proactively identify high-level requirements based on an assessment of the current request as compared to previously analysed systems.”

**Revised Requirement:**

Through analysis of the current project request and comparison with a database of needs from systems that have been previously evaluated, the AI-RE system should automatically provide a list of high-level requirements. To guarantee thorough consideration of all possible criteria, this procedure should involve pointing out parallels and contrasts.

b. **Original Requirement:**

“AI-RE must interact with users to identify a complete set of their requirements.”

**Revised Requirement:**

Users should have a structured conversation with the AI-RE system in order to compile an exhaustive list of their requirements. Asking clarifying questions is a necessary part of this interaction to make sure that all user demands are appropriately recorded.

c. **Original Requirement:**

“AI-RE must document each requirement as a concise and unambiguous statement.”

**Revised Requirement:**

Every recognized requirement should be recorded by the AI-RE system in a clear, succinct, and unambiguous manner, guaranteeing that every statement is clearly comprehensible and free from any possibility of misunderstanding.

**2. Document Test Cases**

**a. Test Cases for Requirement a:**

**Test Case 1:** Evaluate the AI-RE system's ability to identify requirements for a unique Indian festival management app.

**Expected Result:** The system should generate relevant high-level requirements by drawing parallels with existing event management systems while accounting for cultural specificities.

**Test Case 2:** Test the AI-RE system's performance when analyzing a project request for a multilingual educational platform catering to various Indian states.

**Expected Result:** The system should identify requirements that address language diversity and regional educational needs based on similar systems in its database.

**b. Test Cases for Requirement b:**

**Test Case 1:** Assess the AI-RE system's capability to gather requirements from a diverse group of stakeholders for a smart city project in India.

**Expected Result:** The system should engage effectively with urban planners, government officials, and citizens, asking relevant questions to each group and compiling a comprehensive set of requirements.

**Test Case 2:** Test the AI-RE system's ability to handle requirement gathering for a traditional Indian medicine (Ayurveda) tracking app.

**Expected Result**: The system should ask domain-specific questions, recognize unique terminologies, and prompt for clarifications on unfamiliar concepts to ensure a complete set of requirements.

**c. Test Cases for Requirement c:**

**Test Case 1:** Evaluate the AI-RE system's performance in documenting requirements for a complex Indian tax compliance software.

**Expected Result:** Each requirement should be documented clearly and unambiguously, accurately capturing intricate tax rules and regulations without room for misinterpretation.

**Test Case 2:** Test the AI-RE system's ability to document non-functional requirements for a high-traffic e-commerce platform during Indian festival seasons.

**Expected Result:** The system should produce concise, measurable statements for performance, scalability, and reliability requirements that address peak usage scenarios.

3. **Propose an H-C-I Protocol for AI-RE**

a. **“Hears” and Comprehends User Statements:**

- **Protocol**: Utilize natural language processing (NLP) to understand input from users. Speech-to-text technology should be used by the AI-RE system to translate spoken words into text. Semantic analysis should then be performed to ascertain the meaning and context of user statements.

- **Explanation**: NLP enables the system to precisely "hear" and understand human words, enabling it to react accordingly and guaranteeing that all user inputs are read correctly.

b. **Handles “Follow-up” Questions from Engineers:**

- **Protocol**: Provide a feedback loop so that engineers can ask the AI-RE system questions about needs. When appropriate, the system ought to ask consumers for further information or offer thorough explanations.

- **Explanation**: By following this protocol, engineers can communicate with the AI-RE system and get any questions answered. The system will be able to revise specifications and make sure they satisfy engineering, and user demands thanks to its capacity to manage follow-up queries.

By implementing these protocols, the AI-RE system will facilitate effective communication between users and engineers, ensuring that all requirements are accurately captured and documented.