BUSINESS REQUIREMENTS   
DOCUMENT – POC Chatbot for Fab Queries

## Document Control

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | Revision Date | Description of Change | Author | Approved By |
|  | 24/03/25 | Initiated | Sejal Sharma |  |
|  | 31/03/25 | Completed | Sejal Sharma |  |

## Approvals

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Role | Name | Approval Status | Date | Approval link |
| Project Sponsor |  |  |  |  |
| Program/Business Owner |  |  |  |  |
| Resource Administration |  |  |  |  |
| Decision Maker |  |  |  |  |

## Key Stakeholders

|  |  |
| --- | --- |
| Role | Name(s) |
| Project Sponsor |  |
| Program/Business Owner |  |
| Project Manager |  |
| Subject Matter Experts (SMEs) |  |
| Development Team |  |
| Testing Team |  |
| UAT Team |  |
| Deployment Team |  |
| Application Owner[[1]](#footnote-1) |  |

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## 

## Project Description/Background

In semiconductor fabrication (Fab), equipment engineers face frequent technical challenges related to machinery and process operations. Resolving these issues requires accessing extensive documentation, consulting experts, or searching historical records, which can be time-consuming and inefficient. To streamline this process, a chatbot powered by AI/Large Language Models (LLMs) and a structured dataset of queries and solutions is proposed. This AI-powered chatbot will assist engineers by providing instant troubleshooting solutions, reducing downtime, and enhancing operational efficiency.

## Goals

* To offer accurate and efficient troubleshooting guidance for various equipment-related issues.
* Minimize dependency on human experts for common and repetitive queries.
* Automate issue resolution for equipment engineers in the Fab.

## Business Drivers

* **Increased Operational Efficiency:** Reducing equipment downtime by providing instant troubleshooting guidance.
* Improved Decision-Making

## Present Process (As-Is)

Currently, equipment engineers follow a manual troubleshooting process:

1. **Identify the Issue:** Engineers detect a problem in the Fab equipment through alarms, monitoring systems, or direct observation.
2. **Search for Solutions:** Engineers look up manuals, reference past incidents, or consult senior engineers to determine the best troubleshooting approach.
3. **Trial and Error:** Solutions are tested iteratively until the issue is resolved.
4. **Escalation:** If engineers cannot resolve the problem, it is escalated to senior engineers or external support teams.
5. **Documentation:** After resolution, engineers may document the solution for future reference, but this is often inconsistent.

## Proposed Process (To-Be)

With the introduction of the AI-powered chatbot, the troubleshooting process will be streamlined as follows:

1. **Issue Identification:** Engineers detect a problem as before.
2. **Query the Chatbot:** Instead of searching manuals or consulting experts, engineers input their issue into the chatbot.
3. **Instant Response:** The chatbot retrieves relevant solutions from the existing dataset and enhances responses using LLM-based understanding.
4. **Guided Troubleshooting:** The chatbot provides interactive step-by-step troubleshooting guidance.
5. **Escalation if Needed:** If the chatbot cannot resolve the issue, it suggests escalation steps or directs engineers to the appropriate expert.

## Assumptions

* The provided dataset of queries and solutions is comprehensive and sufficient for training the chatbot.
* Internet connectivity in the Fab environment will be stable enough to support real-time chatbot responses.

## Functional Requirements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | Title | Details | Priority | Notes |
| 1 | Accept User queries | The chatbot should accept user queries in natural language. | High |  |
| 2 | Generating relevant responses | The chatbot should retrieve relevant responses from the provided document and LLM-generated insights. | High |  |
| 3 | Displaying the troubleshooting guidance | The chatbot should display responses with references to the source data and provide interactive troubleshooting guidance where applicable. | High |  |
| 4 | Logging | Log user interactions for continuous improvement. | *Medium* |  |
| 5 | Real time Integration | Optionally integrate real-time data from Fab monitoring systems in later stages. | Medium |  |

## Non-functional Requirements

* Ensure fast response time (<3 seconds per query).
* Easily extendable to new data sources and LLM models.

## Out-of-Scope Items:

* Scalable to support multiple users concurrently.
* Secure access control to prevent unauthorized usage.

## Glossary

|  |  |
| --- | --- |
| Term/Abbreviation | Explanation |
| LLM | Large Language Models |
| AI | Artificial Intelligence |

## Priority Table

*{Use the following priority table. It allows you to apply a ratings system to your requirements, so you have the visibility (into the value, status, and description of each requirement) that is necessary for determining whether a particular requirement is essential to project success}*

|  |  |  |
| --- | --- | --- |
| *Value* | *Rating* | *Description* |
| 1 | Critical | The requirement is critical to the project’s success. Without fulfilling this requirement, the project is not possible. |
| 2 | High | The requirement is high priority re the project’s success, but the project could still be implemented in a minimum viable product (MVP) scenario. |
| 3 | Medium | The requirement is important to the project’s success, as it provides value, but the project could still be implemented in an MVP scenario. |
| 4 | Low | The requirement is low priority (i.e., it would be nice to have), but the project’s success is not dependent upon it. |
| 5 | Future | The requirement is outside of the project’s scope and is included as a possible component of a prospective release and/or feature. |

1. [↑](#footnote-ref-1)