**System Requirements**

**P08 - agriQual**

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| **Student ID** | **Name** |
| **26100370** | **Zarak qadir khan** |
| **26100219** | **syeda umaima hasan** |
| **26100247** | **mishaal usman** |
| **26100259** | **muhammad walid khalid** |
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# Introduction

The project is an innovative AI driven system designed to support farmers by providing personalized agricultural advice. This project will incorporate a multi agent system where specialized AI agents work together to provide comprehensive solutions. These agents include vision, climate and advisory agents that can provide real time recommendations tailored to the needs of the farmers. Together, these agents work in sync to improve decision making, reduce crop losses and optimize resource use.

# System Actors

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| --- | --- |
| **Actor Name** | **Description** |
| Farmer | Uses the system to get personalized advice by providing crop images, soil data and queries. |
| Quality Inspector | Validates crop assessments and ensures accuracy of recommendations. |
| AI Agents | Vision, Climate and Advisory agents that analyze data and generate insights for farmers. |
| System Administrator | Manages system operations, security and technical issues at the back end. |

# Functional Requirements

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| --- | --- |
| **Requirements of Farmer** | |
| **Sr#** | **Requirement** |
| 1 | I want to register for this app. |
| 2 | I want to upload images of my crops for feedback and pest diagnosis |
| 3 | I want to receive weather forecasts to plan my irrigation and fertilizer application |

|  |  |
| --- | --- |
| **Requirements of Quality Inspector** | |
| **Sr#** | **Requirement** |
| 1 | I want to use the system to speed up inspection at checkpoints |
| 2 | I want to crosscheck official grading systems |
| 3 | I want to verify large batches of crop and ensure product meets export requirements |

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| **Requirements of AI Agents** | |
| **Sr#** | **Requirement** |
| 1 | |  | | --- | | I want to process uploaded crop images to detect diseases, pests and nutrient deficiencies. | |
| 2 | I want to analyze weather and climate data to provide timely forecasts and risk alerts. |
| 3 | I want to generate personalized recommendations by combining vision and climate insights. |
| 4 | I want to continuously learn from new data and expert feedback to improve accuracy. |
| 5 | I want to provide accurate responses to farmers queries in a clear and actionable format. |

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| **Requirements of Syestem Administrator** | |
| **Sr#** | **Requirement** |
| 1 | |  | | --- | |  |   I want to manage user accounts and access permissions. |
| 2 | I want to maintain data integrity, backups, and security. |
| 3 | I want to monitor system performance and ensure smooth operation. |
| 4 | I want to update and configure AI models when improvements are available. |
| 5 | I want to troubleshoot and resolve technical issues reported by users. |

# Non-functional Requirements / Quality Attributes

|  |  |
| --- | --- |
| **Sr#** | **Requirements** |
| 1 | The system should process and classify an uploaded image in less than 15sec |
| 2 | The system should support at least 100 concurrent users (ASK SIR) |
| 3 | The system should provide a confidence score for each prediction |
| 4 | The system should have a simple and intuitive interface that can be used by non-technical users |
| 5 | The system shall handle an increase in dataset size(adding new crops) |
| 6 | The system should provide clear error logs for troubleshooting |
| 7 | The system should retrieve weather data within 30 seconds of a request from the advisory agent to ensure timely recommendations for farming activities |

# Security Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr#** | **Security Risks** | **Potential Losses** | **Controls** |
| 1 | Unauthorized access to farmers' private data such as location | Breach of trust could tarnish the project’s reputation and lead to lawsuits | Malware scanning |
| 2 | Malicious file uploads | The app will be corrupted and can crash | Only allow specific file types such as .jpg or .png |
| 3 | Denial of Service on image upload | Attackers could flood the system with large or fake image uploads, exhausting resources and making the system unavailable | Reject file size larger than a set size and deny uploads over a certain size and multiple uploads within a certain period |

# Security Engineer

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| **Name of the Security Engineer** | Syeda Umaima Hasan |

# Use of Generative AI

Generative AI was used to assist in drafting and refining this document. The core idea and content were provided by the respective team members while the AI helped with structuring, elaborating and simplifying the text. It was also used to generate alternative phrasings to improve readability.

# Who Did What?

|  |  |
| --- | --- |
| **Name of the Team Member** | **Tasks done** |
| Zarak Qadir Khan | Functional Requirements |
| Syeda Umaima Hasan | Security requirements |
| Mishaal Usman | Non-Functional Requirements |
| Muhammad Walid Khalid | Introduction + Use of generative AI |

# Review checklist

Before submission of this deliverable, the team must perform an internal review. Each team member will review one or more sections of the deliverable.

|  |  |
| --- | --- |
| **Section** **Title** | **Reviewer Name(s)** |
| Introduction | umaima |
| Actors | umaima |
| Functional Requirements | walid |
| Non-functional requirements | zarak |
| Security Requirements | mishaal |
| Use of Generative AI | mishaal |