**Project Design Phase-II**

**Solution Requirements (Functional & Non-functional)**

|  |  |
| --- | --- |
| Date |  |
| Team ID | LTVIP2025TMID38966 |
| Project Name | GRAINPALETTE |
| Maximum Marks | 4 Marks |

**Functional Requirements:**

Following are the functional requirements of the proposed solution.

| **FR No.** | **Functional Requirement (Epic)** | **Sub Requirement (Story / Sub-Task)** |
| --- | --- | --- |
| FR-1 | User Registration | Registration through Form |
|  |  | Registration through Gmail |
|  |  | Registration through LinkedIn |
| FR-2 | User Confirmation | Confirmation via Email |
|  |  | Confirmation via OTP (optional/future enhancement) |
| FR-3 | Image Upload | Upload rice image via file input |
|  |  | Validate file type (image only) |
| FR-4 | Rice Type Prediction | Preprocess uploaded image using OpenCV and TensorFlow |
|  |  | Predict rice type using MobileNetV2-based model |
|  |  | Display predicted rice type to user |
| FR-5 | Result Display | Show uploaded image and predicted result |
|  |  | Provide “Try Again” or “Upload New Image” option |
| FR-6 | Navigation | Nav bar linking Home, About, Testimonials, Contact, Predict |
| FR-7 | UI/UX Design | Clean and user-friendly design using HTML/CSS |
|  |  | Responsive layout for desktop and mobile |
| FR-8 | Error Handling | Show meaningful errors on invalid file upload or prediction fail |
| FR-9 | Performance Monitoring (Optional) | Log prediction time or server performance |

**Non-functional Requirements:**

Following are the non-functional requirements of the proposed solution.

| **FR No.** | **Non-Functional Requirement** | **Description** |
| --- | --- | --- |
| **NFR-1** | Usability | The application provides a clean and intuitive interface for easy interaction, even for non-technical users. |
| **NFR-2** | Security | The system validates all file uploads, uses HTTPS for secure communication (recommended in deployment), and prevents malicious file access. |
| **NFR-3** | Reliability | The prediction logic is built on a well-tested TensorFlow model, ensuring consistent and dependable output. |
| **NFR-4** | Performance | The application responds with predictions within a few seconds, and image preprocessing is optimized for speed. |
| **NFR-5** | Availability | The system should be deployable on a 24/7 server with minimal downtime using platforms like Heroku, Render, or AWS. |
| **NFR-6** | Scalability | The architecture allows the model to be upgraded or extended to support more rice types or other grains without major code changes. |