**Project Design Phase**

**Proposed Solution Template**

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| Date | 25 June 2025 |
| Team ID | LTVIP2025TMID44331 |
| Project Name | GrainPalette - A Deep Learning Odyssey In Rice Type Classification Through Transfer Learning |
| Maximum Marks | 2 Marks |

**Proposed Solution Template:**

Project team shall fill the following information in the proposed solution template.

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| **S.No.** | **Parameter** | **Description** |
|  | Problem Statement (Problem to be solved) | Farmers and agriculturalists struggle with accurately identifying rice varieties, leading to incorrect farming practices that reduce crop yield and quality. There's a need for a fast, reliable, and accessible identification tool to prevent these losses. |
|  | Idea / Solution description | We propose an AI-powered web application where users upload an image of a rice grain. A Convolutional Neural Network (CNN), built with MobileNetv4, instantly analyzes the image and predicts the rice type, providing guidance for proper cultivation. |
|  | Novelty / Uniqueness | The novelty lies in using the highly efficient MobileNetv4 transfer learning model, which provides state-of-the-art accuracy in a lightweight package. This makes the tool fast and accessible on various devices, including mobile phones, directly in the field. |
|  | Social Impact / Customer Satisfaction | This model empowers farmers with technology to increase their yield and profitability, contributing to food security and sustainable agriculture . Users gain immediate, accurate classifications, leading to high satisfaction and better decision-making. |
|  | Business Model (Revenue Model) | A freemium model would be effective: offer basic identification of a few rice types for free to attract a large user base. Charge a subscription for premium features like unlimited classifications, detailed analytics, crop-specific advice, and API access for agribusinesses. |
|  | Scalability of the Solution | The solution is highly scalable by training the model on more rice varieties or even other types of grains with minimal architectural changes. Deploying it on a cloud-based server ensures it can handle a growing number of global users and requests seamlessly. |