**Ideation Phase**

**Define the Problem Statements**

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| --- | --- |
| Date | 28 June 2025 |
| Team ID | LTVIP2025TMID40163 |
| Project Name | grainpalette - a deep learning odyssey in rice type classification through transfer learning |
| Maximum Marks | 2 Marks |

**GrainPalette– Problem Statement Template**

👤 Statement

| **Element** | **Content** |
| --- | --- |
| I am | A rice mill operator, trader, or quality control officer. |
| I’m trying to | Accurately identify and separate different rice types in bulk batches. |
| But | Manual sorting is slow, subjective, and requires expert supervision. |
| Because | Different rice varieties often look similar in color, shape, and size. |
| Which makes me feel | Frustrated with inefficiencies, and worried about losing buyer trust and revenue. |

PS-1 (Rice Producer/Miller View)

| **Element** | **Content** |
| --- | --- |
| I am | A rice miller trying to maintain quality and consistency. |
| I’m trying to | Automate the identification of rice varieties during processing. |
| But | Human workers struggle with consistent and accurate visual classification. |
| Because | The distinctions between Arborio, Basmati, Jasmine, etc. are subtle. |
| Which makes me feel | Pressured to keep up with demand while ensuring high product standards. |

**👨‍💻 PS-2 (Technical Team View)**

| **Element** | **Content** |
| --- | --- |
| I am | A machine learning developer building intelligent agriculture solutions. |
| I’m trying to | Develop a high-accuracy rice classification model using image data. |
| But | Training a model that handles different lighting, angles, and grain overlap is hard. |
| Because | Real-world data is messy and diverse in appearance. |
| Which makes me feel | Determined to improve efficiency and reduce manual dependency in agri-tech. |

**💡 Problem Statement:**

In rice production and distribution, misidentifying rice types leads to inconsistencies, decreased trust, and financial loss. Traditional visual classification is inefficient and error-prone. There is a strong need for an automated system that can accurately and consistently classify rice varieties based on grain images.

**✅ Proposed Solution:**

GrainPalette leverages deep learning—specifically transfer learning with CNN architectures—to classify rice grains into predefined categories such as Arborio, Basmati, Jasmine, Ipsala, and Karacadag. This system automates the process of rice type detection by analyzing grain images, improving accuracy, consistency, and efficiency in rice sorting and packaging workflows.