Project Initialization and Planning Phase

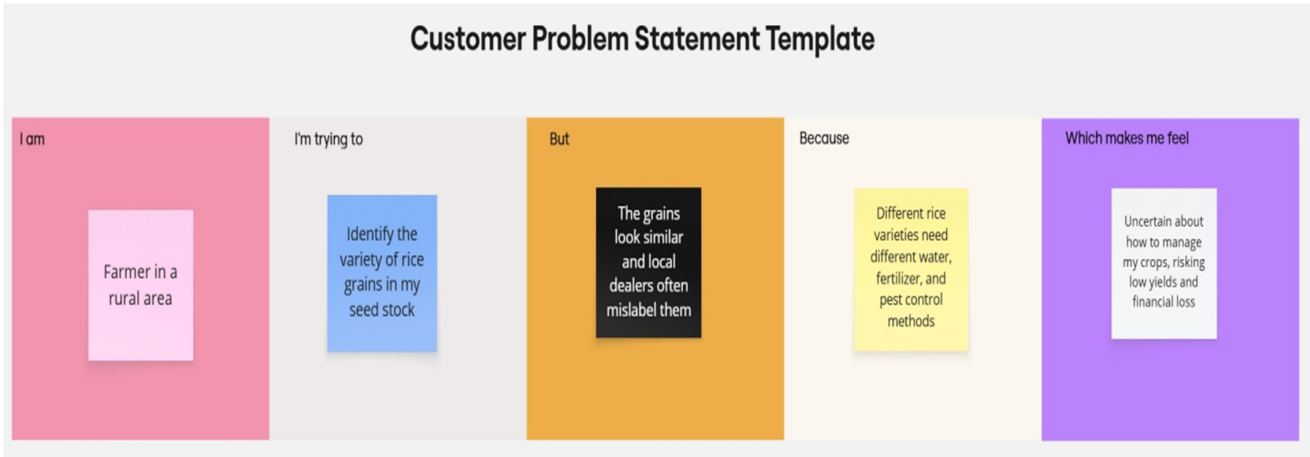| Date	27 June 2024
Team ID	LTVIP2025TMID41438
Project Name	GrainPalette - A Deep Learning Odyssey In Rice Type Classification Through Transfer Learning
Maximum Marks	2 Marks

Define Problem Statements (Customer Problem Statement Template):

India, being an agrarian economy, relies heavily on rice cultivation. However, in both small-scale and commercial farming, identification of rice grain types remains a challenge, especially when farmers purchase unlabeled or mixed seed stocks. Misidentification leads to incorrect farming methods, such as improper irrigation, fertilization, or pest control—directly affecting productivity and income.

GrainPalette aims to bridge this gap using deep learning and transfer learning to build an intelligent image-based rice classification system. With just a photo of a rice grain, users can instantly know the rice variety and access guidance on cultivation practices. This benefits not only farmers but also agricultural researchers and gardening enthusiasts who want to better understand rice diversity.

The model uses MobileNetv4, a lightweight and efficient convolutional neural network, fine-tuned on rice grain images to classify up to five rice types. The solution is accessible via a web interface that requires only basic system setup (Windows 8+, modern browser, 30 Mbps internet) and no prior technical knowledge.

Customer Problem Statement Template

I am	I'm trying to	But	Because	Which makes me feel
Farmer in a rural area	Identify the variety of rice grains in my seed stock	The grains look similar and local dealers often mislabel them	Different rice varieties need different water, fertilizer, and pest control methods	Uncertain about how to manage my crops, risking low yields and financial loss

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PS-1 Farmer in a rural area	Identify the variety of rice grains in my seed stock	The grains look similar and local dealers often mislabel them	Different rice varieties need different water, fertilizer, and pest control methods	Uncertain about how to manage my crops, risking low yields and financial loss
PS-2 Agriculture extension officer	Help farmers identify rice types during field visits	Manual identification is slow and often inaccurate	I need to assist many farmers quickly and effectively	Frustrated with the lack of fast, accurate tools that can help in the field
PS-3 Agriculture student or gardener	Learn more about different rice types from seed packets	I can't tell them apart visually and books are limited	I want to learn and grow rice with the right knowledge and care	Curious and eager to explore but overwhelmed by the lack of accessible learning tools
PS-4 Agri startup or seed company	Verify the variety of rice in our distribution batches	Manual verification is time-consuming	Customers expect purity, and wrong seeds can damage our credibility	Concerned about trust and reputation; need fast validation for quality assurance