

# GrainPalette - A Deep Learning Odyssey In Rice Type Classification Through Transfer Learning

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**Team Size:** 4

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## **Project Overview:**

Rice is a staple food for more than half of the world's population, and identifying different rice varieties is crucial for ensuring quality, price regulation, and distribution. This project, titled "GrainPalette", leverages deep learning and transfer learning to build a robust model for classifying various rice types. The project applies convolutional neural networks (CNNs) with pre-trained architectures to improve accuracy and reduce training time.

## **Methodology:**

1. Data Collection and Preprocessing: We curated a diverse dataset of rice grain images representing multiple rice varieties. Data augmentation techniques were applied to enhance generalization.
2. Transfer Learning: Pre-trained models such as ResNet50 and VGG16 were fine-tuned for rice classification. Layers were unfrozen strategically to balance learning and overfitting.
3. Evaluation Metrics: Accuracy, confusion matrix, and F1-score were used to evaluate performance. The best-performing model was deployed for demonstration.

## **Outcome:**

The final model achieved high classification accuracy on test data, demonstrating the effectiveness of transfer learning in agricultural image classification. This approach reduces the time and data needed to build performant models and showcases potential for broader applications in agri-tech.