PROJECT PRESENTATION

By Krishna Priya

INTRODUCTION

I am Krishna Priya , a student passionate about Machine Learning and Data Science. This project, Rice Classification Using Machine Learning, automatically identifies rice varieties like Arborio and Jasmine by extracting simple image features (area, perimeter, aspect ratio, color) and using models like Logistic Regression, KNN, Decision Tree, and SVM for accurate and interpretable classification.

BACKGROUND

GENERAL OVERVIEW

Rice is a staple food with many varieties. Traditional manual classification is slow and error-prone, but using image features and machine learning, rice can be classified quickly and accurately.

HISTORY

Traditionally, rice classification was done manually by experts, which was time-consuming and subjective. With advances in image processing and machine learning, automated methods now allow fast, accurate, and scalable identification of rice varieties.

GOALS

GOAL 01

The goal is to automate rice variety classification using images.

GOAL 02

Another goal is to create a simple, interpretable ML model using features like area, perimeter, and color.

PROBLEMS

- Manual rice classification is time-consuming, labor-intensive, and prone to errors. Large datasets make it difficult to maintain consistency, and traditional methods cannot easily scale. Automating the process using image features and machine learning addresses these challenges

HYPOTHESIS

- Hypothesis 1: Rice varieties like Arborio and Jasmine can be accurately classified using simple image features such as area, perimeter, aspect ratio, and color.
- Hypothesis 2: Classical machine learning models like Logistic Regression, KNN, Decision Tree, and SVM can achieve high accuracy without using complex deep learning models.

METHODOLOGY

METHOD 01

Rice grain images are collected and preprocessed (grayscale conversion, noise removal, segmentation). Key features like area, perimeter, aspect ratio, and mean color are extracted for each grain.

METHOD 02

The extracted features are used to train machine learning models such as Logistic Regression, KNN, Decision Tree, and SVM. The trained models are then evaluated and used to predict the rice variety of new grains

DATA ANALYSIS

The extracted features of rice grains, such as area, perimeter, aspect ratio, and mean color, were analyzed using descriptive statistics and visualizations. Boxplots and histograms helped identify differences and outliers between rice varieties. Feature correlations were also studied to understand which features contribute most to classification, providing insights for effective model training.
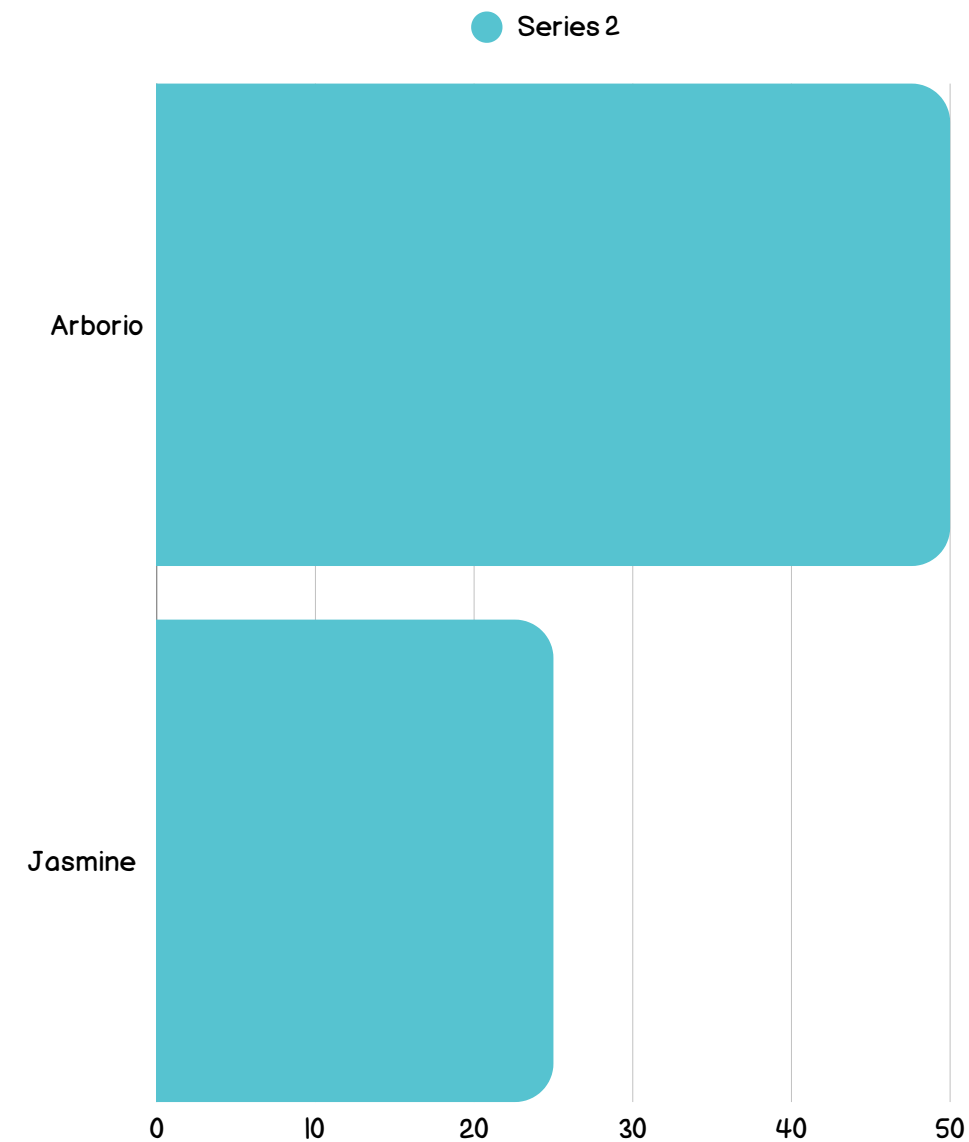
CONCLUSION

This project demonstrates that rice varieties like Arborio and Jasmine can be accurately classified using simple image features such as area, perimeter, aspect ratio, and color. Models like KNN, Decision Tree, and SVM achieved high accuracy (~99%), while Logistic Regression was slightly lower but interpretable. The study shows that classical machine learning with feature extraction provides a fast, reliable, and transparent solution for rice classification, which can be extended to other varieties or agricultural applications.

THANK YOU

By Krishna Priya