# Rice Type Classification Project: Requirements Analysis

## 1. Introduction

This document outlines the requirements for developing a system capable of classifying different types of rice grains. The project aims to leverage image processing and machine learning techniques to accurately identify and categorize rice varieties based on their visual characteristics.

### 1.1 Project Purpose

The rice classification system will provide an automated solution for identifying rice varieties, which can benefit agricultural businesses, quality control processes, and research institutions. This system will help reduce manual classification errors and increase efficiency in rice processing and trading.

### 1.2 Scope

The system will be designed to classify major commercial rice varieties including but not limited to Basmati, Jasmine, Arborio, and Brown rice. The classification will be based on visual characteristics such as shape, size, color, and texture of rice grains.

## 2. Functional Requirements

### 2.1 Image Acquisition

- The system shall accept high-resolution images of rice samples
- The system shall support common image formats (JPEG, PNG, TIFF)
- The system shall have guidelines for optimal image capture conditions

### 2.2 Preprocessing

- The system shall perform image enhancement to improve quality

- The system shall segment individual rice grains from the

Here's a continuation of the Rice Type Classification Project Requirements Analysis document:

## 2.2 Preprocessing (continued)

- The system shall segment individual rice grains from the background

- The system shall normalize images to account for lighting variations

- The system shall filter out noise and irrelevant objects from the image

## 2.3 Feature Extraction

- The system shall extract morphological features (length, width, area, perimeter)

- The system shall analyze color properties (mean color, color distribution)

- The system shall examine texture characteristics (smoothness, regularity)

## 2.4 Classification

- The system shall implement machine learning algorithms for rice type classification

- The system shall achieve minimum 95% classification accuracy

- The system shall provide confidence scores for each classification result

- The system shall be able to detect unknown or mixed rice varieties

# 3. Non-Functional Requirements

## 3.1 Performance

- The system shall process and classify a single image within 5 seconds

- The system shall handle batch processing of up to 100 images concurrently

## 3.2 Usability

- The system shall provide an intuitive user interface for uploading images

- The system shall display classification results in a clear, understandable format

- The system shall include user documentation and help guides

## 3.3 Reliability

- The system shall maintain consistent classification accuracy across different lighting conditions

- The system shall include error handling for poor quality images

## 3.4 Scalability

- The system shall be designed to accommodate additional rice varieties in the future

- The system architecture shall support integration with other agricultural systems