**Project Initialization and Planning Phase**

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| Date | 7 June, 2024 |
| Team ID | xxxxxx |
| Project Title | Rice Type Classification Using CNN |
| Maximum Marks | 3 Marks |

**Project Proposal (Proposed Solution)**

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

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| **Project Overview** | |
| Objective | * Develop a Convolutional Neural Network (CNN) based model to classify 5 different rice varieties. * Evaluate the model's performance using relevant metrics to assess its accuracy and reliability |
| Scope | * Developing a CNN model specifically tailored for rice grain classification. * Collecting and preprocessing a high-quality dataset of rice grain images. * Implementing and testing the model to ensure high accuracy and reliability. * Integrating the model into a user-friendly application for use by rice mills and quality control managers. |
| **Problem Statement** | |
| Description | Current rice classification methods are often manual, time-consuming, and prone to errors, which leads to inefficiencies and inconsistencies in quality.  An autonomous solution is required to classify the rice grains. It should be reliable, accurate and efficient. |
| Impact | Solving the problem of rice classification has a range of benefits: -   * Improve the accuracy and efficiency of rice classification. * Reduce labor costs and human error in the classification process. * Enhance the overall quality control in rice production, leading to higher market standards and customer satisfaction. |
| **Proposed Solution** | |
| Approach | We will tackle the project in 5 phases: -   * Data Collection: Gathering a large dataset of rice grain images. This is taken from the Kaggle dataset mentioned below * Data Preprocessing: Cleaning, augmenting, denoising, labelling the dataset. * Model Development: Designing and training a CNN model for rice classification. * Model Optimization and Fine Tuning: Fine tuning the model to improve it’s performance. * Model Evaluation: Testing the model for accuracy and reliability. * Application Integration: Developing a user-friendly interface using Flask for deploying the model in real-world scenarios. |
| Key Features | * High Accuracy: Leveraging CNN's capabilities to ensure precise classification. * Efficiency: Automating the classification process to save time and reduce manual labor. * User-Friendly Interface: Providing an easy-to-use application for non-technical users. |

**Resource Requirements**

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| **Resource Type** | **Description** | **Specification/Allocation** |
| **Hardware** | | |
| Computing Resources | CPU/GPU specifications, number of cores | T4 GPU |
| Memory | RAM specifications | 8 GB |
| Storage | Disk space for data, models, and logs | 1 TB SSD |
| **Software** | | |
| Frameworks | Python frameworks | Flask |
| Libraries | Additional libraries | tensorflow, numpy, pandas, keras, scikit-learn, cv2, matplotlib |
| Development Environment | IDE, version control | Jupyter Notebook |
| **Data** | | |
| Data | Source, size, format | Kaggle dataset.  This dataset contains 75,000 images of 5 types of rice –  Arborio, Basmati, Ipsala, Jasmine, Karacadag  230MB |