Project Initialization and Planning Phase

Date	08 June 2024
Team ID	SWTID1720201335
Project Title	Rice Type Classification Using CNN
Maximum Marks	3 Marks

Project Proposal (Proposed Solution):

Project Overview	
Objective	The primary objective of this project is to develop an AI-based solution to identify different types of rice grains. This solution will assist farmers, agricultural scientists, home farmers, and gardeners in accurately identifying rice types without the need for expert consultation.
Scope	The project will focus on building a Convolutional Neural Network (CNN) model using transfer learning with MobileNetv4 to classify up to five different types of rice grains. The solution will be integrated into a Flask application, providing a user-friendly interface for uploading images and receiving predictions. The project will cover data collection, model training, testing, and application development.
Problem Statement	
Description	There are many types of rice available for production. It is essential to identify the type of rice as each produce needs different amounts of water, manure, etc.It is not possible for the farmers to pay the agriculture experts hefty fees every time they have a new produce. As a solution we have trained an AI model which can be used by farmers to check the type of rice. The users need to upload image of a rice grain and click on the submit button. Our model will give its prediction for probable rice type based on the image. Our model can predict up to 5 different types of rice. This model is useful for farmers, agriculture scientists, home farmers, gardeners, etc. This AI model is made using Convolutional Neural networks and under CNN we will be using transfer learning. Transfer learning has become one of the most common techniques that has

	achieved better performance in many areas, especially in image analysis and classification. We used Transfer Learning technique MobileNetv4 that is more widely used as a transfer learning method in image analysis, and it is highly effective.
Impact	Solving this problem will empower farmers to optimize their farming practices, ensuring the best yield and quality of their crops. Agricultural scientists will be able to conduct more efficient and accurate research, leading to advancements in agricultural knowledge and practices. This solution will reduce costs and improve decision-making for all users.
Proposed Solution	
Approach	The proposed solution involves: 1. **Data Collection:** Gather a diverse dataset of rice grain images. 2. **Data Pre-processing:** Create training and test datasets, apply data augmentation techniques. 3. **Model Building:** Utilize MobileNetv4 for transfer learning, configure and train the CNN model. 4. **Model Evaluation:** Test the model to ensure accuracy and reliability. 5. **Application Development:** Develop a Flask-based web application to allow users to upload images and receive predictions.
Key Features	The project features high accuracy and reliability using MobileNetv4 with transfer learning for precise classification of up to five rice types. It offers a user-friendly Flask web application for seamless image uploads and immediate predictions, making it a cost-effective alternative to agricultural experts. The solution is scalable for future expansion to classify additional grain types. It integrates modern AI technologies like TensorFlow, Keras, and Flask, providing real-time predictions and thorough data pre-processing. Comprehensive documentation and support ensure easy adoption, with a focus on data security and privacy.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	NVIDIA RTX 2070 @3.0GHZ
Memory	RAM specifications	16 GB DDR4X
Storage	Disk space for data, models, and logs	512 GB SSD
Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	TensorFlow,MobileNetV4 Keras, OpenCV
Development Environment	IDE, version control	Google Collaboratory, Spyder,Git
Data		
Data	Source, size, format	Kaggle dataset, (https://www.kaggle.com/datasets/muratkokludataset/rice-image-dataset), The dataset has 75K images including 15K pieces from each rice variety.