Model Development Phase Template

Date	19 JUNE 2025
Team ID	SWTID1749825524
Project Title	Deepfruitveg: Automated Fruit and Veg Identification
Maximum Marks	6 Marks

Model Selection Report

To select the most appropriate machine learning model for classifying images of fruits and vegetables based on accuracy, performance, and suitability for image-based data.

Model	Type	Notes
Logistic Regression	Classical ML	Not suitable for high-dimensional image data. Requires flattened input .
Support Vector Machine (SVM)	Classical ML	Performs well on small datasets but slow and inefficient on large image datasets.
K-Nearest Neighbors (KNN)	Classical ML	Simple but computationally expensive for image data.
Decision Tree / Random Forest	Classical ML	Poor performance due to lack of spatial feature handling.
Convolutional Neural Network (CNN)	**Deep Learning**	**Chosen model**; best suited for image tasks. Learns spatial features automatically.

Why CNN Was Selected

- **Specialized for images**: CNNs are designed to handle spatial information in image data through convolutional filters.
- **Automatic feature extraction**: No need to manually extract colour, texture, or shape—CNN learns them during training.
- **High accuracy**: CNNs consistently outperform traditional ML models in visual recognition tasks.
- **Scalability**: Works well with large datasets and can be extended using pretrained models like MobileNet or ResNet.
- **Adaptability**: Easily deployable on edge devices (e.g., smartphones or Raspberry Pi) using TensorFlow Lite.

CNN Architecture Used

- **Input Layer**: 64x64x3 RGB images
- **Convolutional Layers**: For learning spatial features
- **MaxPooling Layers**: For down sampling
- **Dropout**: For preventing overfitting
- **Dense Layers**: For final classification

Metric	Result
Training Accuracy	~95% (after tuning)
Validation Accuracy	~90%
Test Accuracy	~88–92%
Loss Trend	Decreasing over epochs, no overfitting observed with Dropout enabled