

Crop Recommendation Model Architecture (Deep Neural Network)

This diagram visualizes the structure of the multi-class classification model defined in your TensorFlow/Keras script. The model is a fully connected Deep Neural Network (DNN) designed to predict the optimal crop label based on seven environmental and soil input features.

Architecture Breakdown

Component	Layer Type	Node Count	Activation Function	Purpose
Input Layer	Dense (Implicit)	7	N/A	Receives the 7 scaled and normalized input features: N, P, K, temperature, humidity, pH, and rainfall.
Hidden Layer 1	Dense	128	ReLU (relu)	First layer for learning complex, non-linear relationships within the input data.
Hidden Layer 2	Dense	64	ReLU (relu)	Further refinement of features and dimensionality reduction.
Hidden Layer 3	Dense	32	ReLU (relu)	Final feature abstraction before the classification decision.
Output Layer	Dense	22*	Softmax (softmax)	Produces a probability distribution over the 22 possible crop classes. The class with the highest probability is the predicted crop.

*Note: The number of classes (22) is inferred from the original script's target variable encoding (num_classes).

Training and Optimization Details

- Optimizer:** Adam (Adaptive Moment Estimation)
- Loss Function:** Categorical Crossentropy (Standard loss for multi-class classification with one-hot encoded targets)
- Evaluation Metric:** Accuracy
- Data Preparation:** Features are scaled using MinMaxScaler , and the target labels are converted to one-hot vectors using LabelEncoder followed by tf.keras.utils.to_categorical .
- Epochs:** 50
- Batch Size:** 32