**MODEL SUMMARY:**

A Convolutional Neural Network (CNN) was employed for image classification. CNNs are powerful for image analysis, extracting features through convolutional layers, introducing non-linearity with activation functions, and reducing parameters via pooling layers.

MODEL ARCHITECTURE

Layer 1: Conv2D

- Filters: 32

- Kernel Size: (3, 3)

- Activation: ReLU

Layer 2: MaxPooling2D

- Pool Size: (2, 2)

Layer 3: Flatten

Layer 4: Dense

- Units: 256

- Activation: ReLU

Layer 5: Dropout

- Rate: 0.5

Layer 6: Dense

- Units: 512

- Activation: ReLU

Layer 7: Dense (Output)

- Units: 5 (for multi-class classification)

- Activation: Softmax

MODEL COMPILATION

Optimizer: Adam

Loss Function: Sparse Categorical Cross-Entropy

Metrics: Accuracy

DATA PROCESSING:

1. Image Loading and Conversion:

- Read and convert images to RGB.

- Resize images to (128, 128).

- Convert images to NumPy arrays.

2. Data Split:

- Train-Test split with a ratio of 80:20.

3. Normalization:

- Normalize pixel values in the range [0, 1].

MODEL TRAINING:

- Train for 300 epochs with a batch size of 128.

- Utilize 10% of the training data for validation.

MODEL EVALUATION:

- Evaluate the model on the test set.

- Report accuracy and generate a classification report.

MODEL PREDICTION:

- Demonstrate model prediction on a sample image.

INSIGHTS:

- The model achieved an accuracy of 84% on the test set.

- Considerations for improvement:

- Expand and diversify the training dataset.

- Experiment with regularization techniques to prevent overfitting.