Model Development Phase Template

Date	13-07-24
Team ID	SWTID1720433291
Project Title	CovidVision: Advanced COVID-19 Detection From Lung X-Rays With Deep Learning
Maximum Marks	5 Marks

Model Selection Report

In the model selection report for future deep learning and computer vision projects, various architectures, such as CNNs or RNNs, will be evaluated. Factors such as performance, complexity, and computational requirements will be considered to determine the most suitable model for the task at hand.

Model Selection Report:

Model	Description
CNN	This is a deep learning model built using TensorFlow and Keras. The preprocessing stage includes data augmentation techniques such as random rotations and rescaling to enhance the dataset. The model architecture follows a Keras Sequential design, consisting of data augmentation layers, two Conv2D layers with ReLU activation, each followed by MaxPooling2D layers, a Flatten layer, a Dense layer with 32 units, a Dropout layer with a 20% dropout rate, and a final Dense layer with a sigmoid activation for binary classification. The model is compiled using the Adam optimizer with a learning rate of 0.0001, binary cross-entropy loss, and accuracy as the evaluation metric. The data is loaded and augmented in real-time using ImageDataGenerator, with a 70-30 split for training and validation. The model is trained for 25 epochs, but the results show a training accuracy of around 80-81%.

XCEPTION	The proposed deep learning model is designed for classifying chest X-ray images, with a focus on detecting COVID-19. It employs the Xception architecture, a deep convolutional neural network pre-trained on the ImageNet dataset, known for its high accuracy and efficiency in image classification tasks. The input layer accepts 150x150 pixel images with 3 color channels (RGB), and the Xception model outputs a 2048-dimensional feature vector after the global average pooling layer. A fully connected dense layer with 2 output units and a sigmoid activation function is added to predict the probability of the input image belonging to each class, such as Normal or Pneumonia. The data preparation process involves using image data generators for the training, validation, and test sets, with augmentation techniques like zooming, brightness adjustment, and width and height shifts applied to enhance the model's generalization capability. The model is trained using the Adamax optimizer with a learning rate of 1e-4 and binary cross-entropy loss function for 30 epochs, resulting in high accuracy on both the training and validation datasets, with the validation accuracy peaking around 98%.