Module 5: Introduction to Convolutional NN - Assignment

Problem Statement:

The task at hand involves classifying images of cats and dogs using a Convolutional Neural Network (CNN). We have a dataset containing images of cats and dogs and the objective is to train a CNN model to accurately predict the class of each image.

Objectives:

Data Preparation:

- Download and extract the cats vs. dogs dataset.

- Organize the dataset into a structured directory format suitable for TensorFlow's ImageDataGenerator.

- Split the dataset into training and testing sets.

Data Augmentation and Preprocessing:

- Implement data augmentation techniques to increase the diversity of the training dataset, aiding in the model's ability to generalize.

- Normalize the pixel values of the images for optimal model performance.

Model Building:

- Construct a Convolutional Neural Network using TensorFlow and Keras.

- The model should contain multiple convolutional layers, pooling layers, and fully connected layers.

Training:

- Compile the model and train it on the prepared dataset.

- Utilize categorical cross entropy as the loss function and stochastic gradient descent as the optimizer.

- Train the model for a sufficient number of epochs to achieve good performance.

Evaluation:

- Evaluate the model's performance on the validation set during training to monitor for overfitting.

- After training, assess the model's accuracy and make predictions on the test set.

Prediction:

- Implement a system to make predictions on new images, categorizing them as either cat or dog.

- The system should be able to take an image (or a batch of images), preprocess it, and pass it through the model for prediction.