North East University Bangladesh

Project Proposal for Cats and Dogs Image Classification

Course Title: Deep Learning

Course Code:CSE-460

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Introduction:

Image classification is a fundamental problem in computer vision. This project focuses on developing a machine learning model that can accurately distinguish between images of cats and dogs. The project will utilize Convolutional Neural Networks (CNN), which are especially effective for image-based tasks, and will be implemented using Python and TensorFlow in Google Colab.

Problem Statement:

Many organizations and apps require efficient and automatic image recognition systems. Differentiating between cat and dog images is a common beginner's problem in image classification. The goal is to build a model that can automatically identify the category of a given image (cat or dog) with high accuracy.

Objectives:

- To collect and preprocess image data for cats and dogs.

- To design and train a CNN model for binary classification.

- To evaluate model performance using accuracy and confusion matrix.

- To provide a user interface for uploading images and getting real-time predictions.

Methodology:

- Dataset Collection: 50 cat and 50 dog images will be uploaded manually.

- Data Preprocessing: Resize images to 150x150 pixels and normalize pixel values.

- Model Building: Use Keras Sequential API to build a CNN with Conv2D, MaxPooling2D, Flatten, and Dense layers.

- Training: Train the model with early stopping and evaluate it on validation data.

- Prediction: Allow users to upload their own images and predict category (cat/dog).

Tools & Technologies:

- Programming Language: Python
- Libraries: TensorFlow, Keras, NumPy, Pillow
- Platform: Google Colab
- Image Format: JPG, JPEG, PNG

Conclusion:

This project will serve as a foundational step into the world of computer vision using deep learning. By successfully building a CNN model to classify cat and dog images, it will demonstrate the practical application of AI in real-world image recognition tasks.