**Project Proposal:**

**Introduction to Computer Vision - Project**

**Project Title: Wild cats detection and classification**

**Due: Week 7**

**1. Introduction**

This project focuses on the domain of computer vision, specifically targeting the challenge of detecting and classifying cats in wild settings. The purpose of this project is to develop a robust model that can accurately identify and classify cats in various outdoor environments.

**2. Problem Statement**

The specific challenge this project addresses is the classification of cats in wild environments from images. This involves not only identifying the presence of a cat within a complex background but also classifying the detected cat based on specific traits, if applicable. This task encapsulates image classification, given the natural camouflage and varied lighting conditions in outdoor settings.

**3. Objectives**

The primary goal of this project is to develop a computer vision model capable of accurately detecting and classifying cats in wild settings. In the short term, the aim is to achieve a model with high accuracy and reliability in diverse environmental conditions, surpassing existing benchmarks set by current models like efficientnetb0 on similar tasks.

**4. Methodology**

The approach to solving this problem will involve a comparative analysis between the performance of an existing state-of-the-art model, EfficientNet-b0, MobileNetV3, and a custom model developed or adapted specifically for this task. The methodology will encompass:

1. **Data Preparation**: Using available dataset from Kaggle, with addition of my own data for validation and testing.
2. **Model Development**: Developing or fine-tuning a custom model tailored to the challenges presented by the dataset.
3. **Training and Evaluation**: Training model on the dataset, followed by a comprehensive evaluation to compare their performances.
4. **Optimization**: Based on the comparative analysis, further optimize the better-performing model to enhance its accuracy and efficiency.

**6. Data**

The project will utilize the dataset available on Kaggle at [Cats in the Wild Image Classification](https://www.kaggle.com/datasets/gpiosenka/cats-in-the-wild-image-classification/data). This dataset will be crucial for training and evaluating the models. Preprocessing steps will include:

* **Data Augmentation**: To enhance model robustness against various lighting, scales, and orientations.
* **Normalization**: Standardizing image sizes and pixel values for consistent model input.
* **Splitting**: Dividing the dataset into training, validation, and test sets to ensure fair evaluation.

**7. Evaluation Metrics**

The success of the project will be assessed using a combination of metrics, including:

* **Accuracy**: To measure the overall correctness of the model in detecting and classifying cats.
* **F1-score**: Providing a balance between precision and recall, especially useful due to the potential class imbalance in the dataset.

These metrics will provide a comprehensive overview of the model's performance, allowing for targeted improvements and optimizations.