Project Details

- Assignment Available - March 23, 2024.

- Submission Deadline: April 10, 11:59 PM PST.

- Total Marks: 15.

- Submission Type: Submit your .ipynb file with the following naming format: yourname_P.ipynb

Project: Image Classification for Beginners

For our upcoming machine learning project, we'll be delving into image classification, a fascinating application of machine learning. In this project, we'll explore how to build an image classification model from scratch, allowing you the flexibility to choose the best model for the task.

Problem Statement: Our goal is to develop a machine learning model to classify images into different categories. This project will challenge us to leverage our knowledge of machine learning techniques to build a robust image classifier.

Dataset: You can choose any of the following popular image datasets like CIFAR-10, CIFAR-100, MNIST, or Fashion-MNIST. Alternatively, we can curate a custom dataset relevant to a specific domain or application.

Project Tasks:

1. **Data Exploration:** Let's start by exploring the image dataset to understand its structure, image dimensions, and the number of classes/categories. (3 marks)

2. **Model Selection:** Now comes the exciting part – choosing the best model for image classification! You have the freedom to experiment with various machine learning and deep learning models, including but not limited to Support Vector Machines (SVMs), Decision Trees, Random Forests, Convolutional Neural Networks (CNNs), and more. (5 marks)

3. **Model Evaluation:** Evaluate the trained model's performance on a separate validation set and fine-tune its hyperparameters to optimize performance further. (3 marks)

Deliverables:

- Jupyter Notebook or Python script containing code for data preprocessing, model training, evaluation, and visualization.

- Presentation summarizing the project, including problem statement, dataset description, methodology, results, and conclusions.

Marking Rubric:

Criteria	Description	Marks
Project Understanding	Understanding of the problem statement and objectives.	3
Data Exploration	Thorough exploration of the dataset, including understanding its structure and characteristics.	3
Model Selection and Experimentation	Experimentation with various machine learning/deep learning models for image classification.	5
Model Performance	Evaluation of model performance using appropriate metrics.	3
Presentation and Documentation	Quality of the Jupyter Notebook or Python script, including clear documentation and organization.	1
Total Marks		15

Table 1: Marking Rubric