Assignment

Project 1: Image Manipulation and Background Replacement

Objective:

You have been provided with a set of car images, each accompanied by relevant information. Your task is to recreate the provided sample output by manipulating the images based on the following instructions.

https://drive.google.com/file/d/1FSq7BzhJjhz4UnRgkv4hR7QKZS_7vDcu/view?usp=sharing

Tasks:

1. **Background Replacement:**
    - Use the provided background removal mask to replace the existing background of the car image with the given floor and wall image.
    - The background removal masks may contain noise, so you should implement methods to handle any imperfections.
2. **Shadow Placement:**
    - Utilize the shadow mask cutouts to place realistic shadows under the car. Ensure that the shadows appear natural and aligned with the lighting conditions.
3. **Perspective Matching:**
    - Ensure that the perspective of the car and the floor align correctly in the final output, creating a realistic composition.

Project 2: Car Image Classification

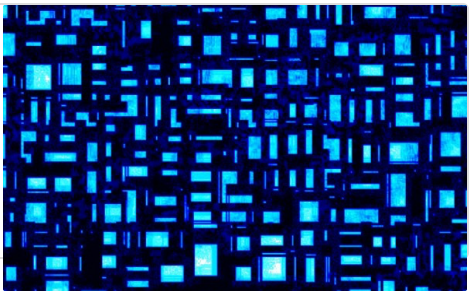
Objective:

You have been provided with a dataset containing car images. Your task is to train a classification model that can accurately predict the angle of the car in the image.

Car Angle Classification Dataset

Kaggle is the world's largest data science community with powerful tools and resources to help you achieve your data science goals.

https://www.kaggle.com/datasets/amarcodes/car-angle-classification-dataset



Tasks:

1. **Data Analysis & Preprocessing:**
    - Conduct an initial analysis of the dataset to understand its structure and characteristics.
    - Apply data preprocessing techniques and augmentations to enhance the dataset and improve model performance.
2. **Model Training:**
    - Train a classification model on the dataset, experimenting with different architectures and hyperparameters to optimize performance.
3. **API Development:**
    - Develop an API using FastAPI or Flask that accepts an image as input and returns the predicted angle of the car along with a confidence score in the response.

Submission Requirements:

- Submission link - https://docs.google.com/forms/d/1GLhYtcgzuSHgnmWXgIRGW-dCCteNVSbEt3XRC5Sh08o/edit?ts=6704ea5c
- Well-documented code, including comments explaining key steps and decisions.
- A final report summarizing your approach, challenges faced, and the results obtained.

- For Project 2, include instructions for running the API locally.
