Take-Home Assignment for ADAS Intern Role

Backup Camera Simulation with Object Classification

Overview:
In this take-home assignment, you will simulate a back-up camera with dynamic trajectory of rear wheels using a 10-second clip from your phone. You will be required to make assumptions regarding steering geometry and vehicle dimensions and overlay the trajectory of the rear wheels on the video recorded earlier. The objective is to test your ability to apply your knowledge of ADAS software development and vehicle dynamics to create a functional simulation, and basic object classification..

Instructions:

- Record or choose a 10-second clip from your phone, simulating a backup camera's view.
- Assume realistic vehicle dimensions and steering geometry. You can pick any car model for this exercise.
- Overlay the trajectory of the rear wheels on the video using a graphical interface. Make sure that the trajectory is accurate and realistic.
- Once you have completed the simulation, submit a link to your repository with the overlaid video. Include a brief write-up explaining your assumptions and the tools and techniques you used to create the simulation. Please attach a readme and add clear instructions on how to run your simulation.
- Use any programming language or software tools you prefer.

Bonus Task: Vehicle Image Classification

Overview:
Classify objects that appear in the backup camera video, such as other vehicles, pedestrians, or obstacles, feel free to create your own labels and make sure to document them. You are allowed to use pre-trained machine learning models for object classification.

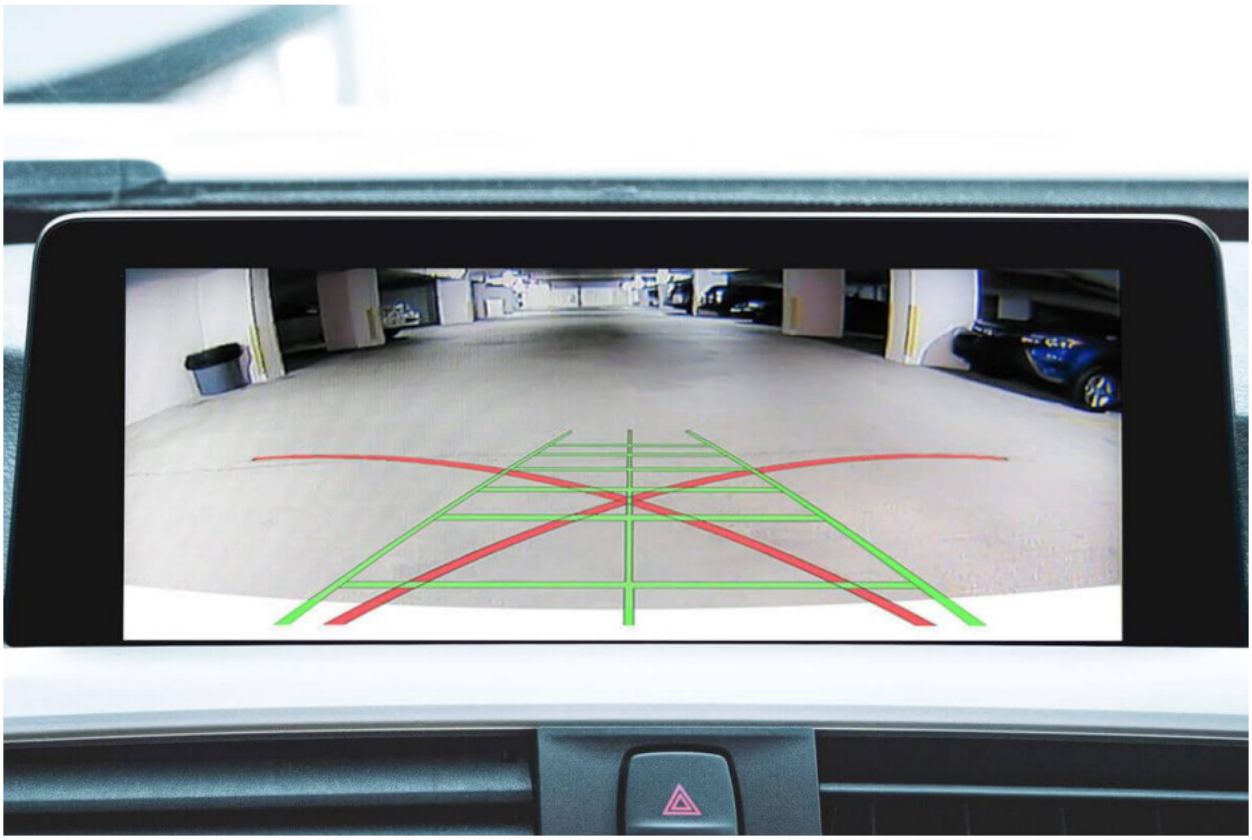
Instructions:

- Use the provided Vehicles-OpenImages Object Detection Dataset to classify different vehicle types.
- You may use any pre-trained machine learning model and adapt it to classify the vehicles in the dataset into their respective categories.
- Use any machine learning frameworks you are comfortable with.
- Include a write-up on your approach, the pre-trained model used, and any significant modifications or decisions made.
- Please submit your model along with the accompanying documentation in the same repository used for the main task. Ensure that clear instructions on how to execute your program are included.

Dataset URL: Vehicles-OpenImages [Vehicles-OpenImages Dataset (roboflow.com)].

Assessment Criteria:

- Accuracy of the simulation in replicating a backup camera view.
- Realism in the assumed vehicle properties.
- Code quality, organization, and documentation.
- Creativity in applying and adapting pre-trained models for the task.



Example of what the backup camera feature would look like.