

School of Computing Year 4 Project Proposal Form

Project Title: Car Damage Analysis

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Stream: CASE

Project Supervisor Name: Suzanne Little

Area: Computer Vision, Deep Learning, Automation, Tensorflow, Raspberry pi

Description:

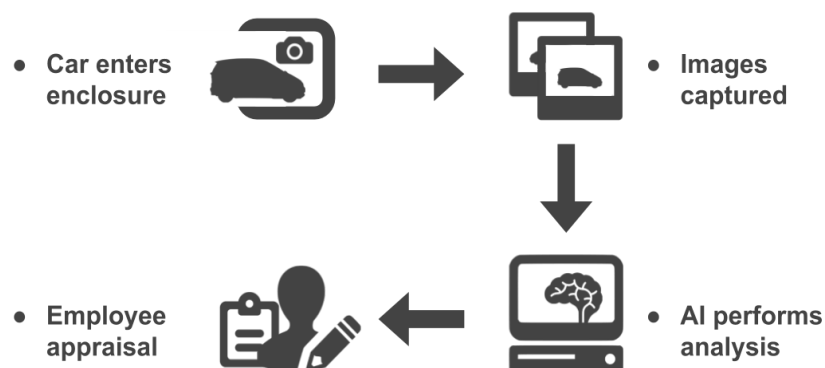
The goal with this system is to automate the process by which cars are returned and inspected for external damages, using the car rental industry as an example but this could be employed by taxi companies, ride sharing, or insurance companies. An automated system would provide companies with a more reliable and cost saving method of vehicle monitoring.

The system will detect when a car has entered the enclosure and take a number of photos of the car from different angles and locations. These photos will be sent to a server by the enclosure where a Machine Learning model will perform inference on the images to detect damage. Ideally then at this point, the server will send report to a desktop application highlighting where on the car it has recognised damage. This report can then be used by a company employee to appraise the damage.

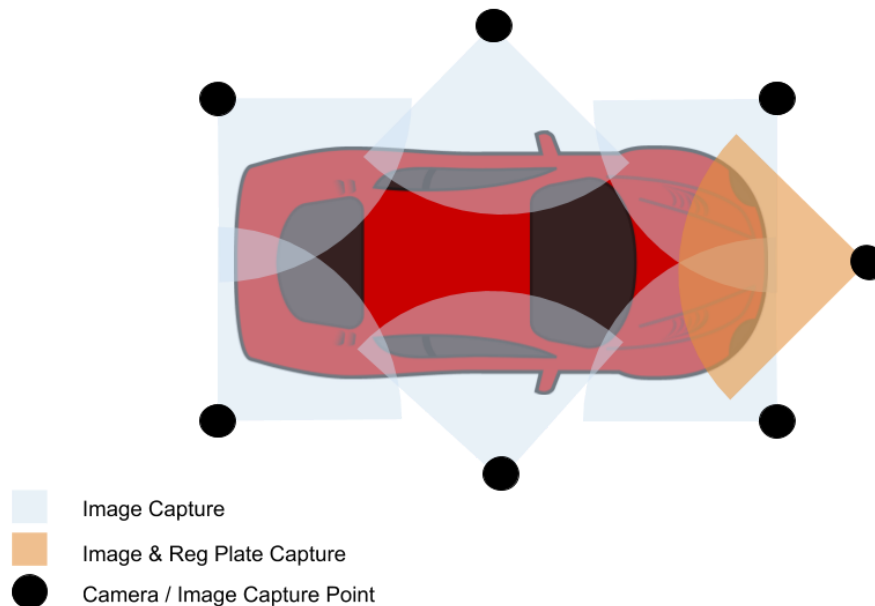
A large dataset of undamaged and different varieties of damaged cars will need to be acquired, either created manually by me or from an online source. I will most likely make use of the Stanford Car dataset which contains 16,000 images of different varieties of cars, which I will clean to ensure a good fit for my project.

This system could be deployed by rental companies around the world to allow for an easier and more automated management of their fleet.

Proposed System Diagram:



Enclosure Diagram:



Programming Languages:

- Python: Machine learning model creation
- Java: application backend
- Bash Script: Image capture using raspberry pi

Programming Tools:

- Server for API and storage of images, database for storage of image location based on reg plate.
- Electron: Used to develop the front-end desktop app
- Docker: Deploy the ML model

Learning Challenges:

- Working with images in code using opencv
- Very small amount of experience with Tensorflow and Neural Networks
- Creation of a dataset
- Use of Cloud Platform for training. (Possibly)

Hardware / Software Platform:

- Development will take place on my personal laptop, running a dual-boot of Windows and Ubuntu.
- A raspberry pi will be used to automatically capture images of the cars

Special Hardware:

- Raspberry pi and cameras used to capture images of cars