20CS713 PROJECT PHASE 1-C9

Damaged Car Detection using Multiple Convolutional neural networks with Flask Web app

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ABSTRACT:

Vehicles get damaged due to various reasons such as accidents, collisions, natural disasters, and wear and tear. The issue affects many businesses, including automakers, insurance companies, car rental companies, and individual vehicle owners. For insurance companies to file a compensation claim, they must quickly and accurately detect the damage to the vehicles involved in the accident. This project is designed to create an application to diagnose car damage using multiple CNNs and Flask Web. This project uses advanced image processing tools and machine learning algorithms to quickly analyze images and highlight damaged areas. The system uses the power of CNNs to accurately identify and describe various vehicle damages such as dents, scratches, and deformations from input images. Adding to the importance of CNN-based damage to pipelines, we created a web application using Flask that allows users to easily upload images and receive instant damage assessments. The system is divided into two parts: training the model and submitting the model to the website. Using this technology has the potential to improve the insurance process, improve the vehicle's performance, and increase customer satisfaction through speed. Speed up and streamline the process.

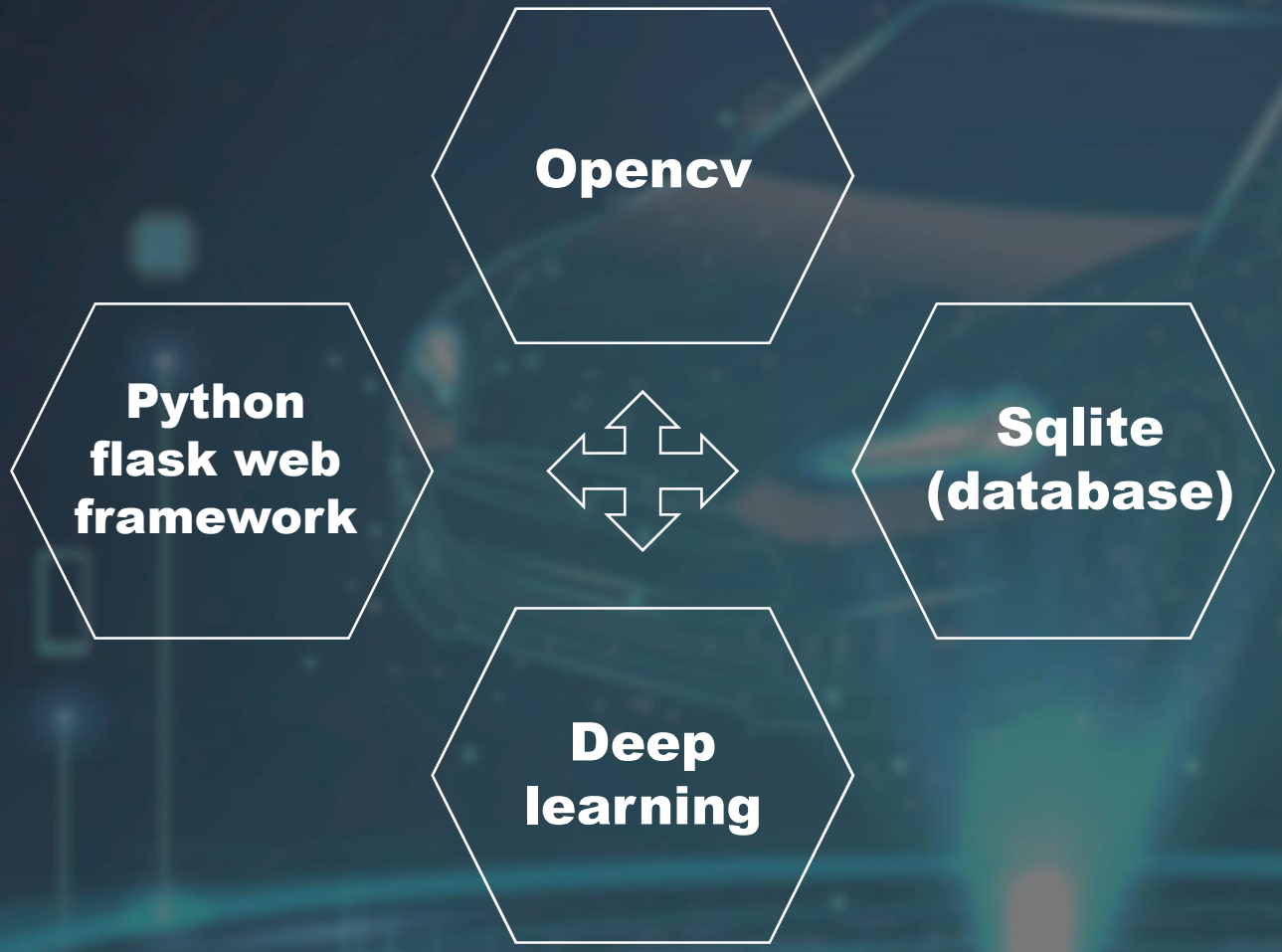
PROBLEM STATEMENT:

Car damage detection is an important task in many applications, such as insurance claims processing and vehicle inspection. However, it can be a difficult task, especially when the damage is minor or difficult to see. The problem is significant, as inaccurate or delayed damage assessments can lead to increased costs for insurers, longer processing times for claims, and customer dissatisfaction.

PROBLEM OBJECTIVES:

To develop a system that can accurately and reliably detect damaged cars using multiple Convolutional Neural Networks (CNNs). CNNs are a type of machine learning algorithm that are well-suited for image classification tasks. CNNs have been used to successfully detect damaged cars in a variety of settings. The goal of this project is to develop a system that can accurately and reliably detect damaged cars using multiple CNNs. The system should be able to detect damage of all types and severities, even in challenging conditions such as poor lighting or occlusion.

TECHNOLOGY STACK:



LITERATURE SURVEY:

[1] Vehicle-Damage-Detection Segmentation Algorithm Based on Improved Mask RCNN

The main result is a methodology to estimate quickly and easily repair costs of vehicles involved in road accidents. Real-world accidents analyzed in this paper are Crashworthiness Data System (NASS CDS Database)- field research teams located across a country study about 5000 crashes a year; Audaplus estimation system which used data about costs of the vehicle parts and the time necessary to replace it based on manufacturer's information. This study has developed a retrospective methodology to estimate easily repair costs of vehicles involved in road accidents with the front zone involved. Using residual deformation measurements based on Tumbas and Smith's protocol, it is viable to estimate deltaV and absorbed energy for the vehicle involved in an accident.

LITERATURE SURVEY:

[2] Automated Detection of Multi-class Vehicle Exterior Damages using Deep Learning

Maleika Heenaye has deployed an application in this paper for the automatic detection and classification of vehicle damages, which can be used by insurance companies to process claims or by the police department to record accidents. Manually identifying the types and severity of vehicle damage after an accident can be time-consuming. An automated damage detection application can help with insurance claims. Convolutional Neural Networks (CNN) have had great success in object classification. However, CNN has not been thoroughly investigated or applied for multiclass classifications of vehicle damages. In this paper, pre-trained CNN models, MobileNet, and VGG19 are adapted and used in transfer learning on the large-built dataset. This application achieved a MobileNet accuracy of 70% and a VGG19 accuracy of 50%.

LITERATURE SURVEY:

[3] A Very Deep Transfer Learning Model for Vehicle Damage Detection and Localization

Najmeddine Dhieb proposes efficient and streamlined deep learning-based architectures for vehicle damage identification and localization in this paper. For feature extraction and damage identification, the proposed solution incorporates deep learning, instance segmentation, and transfer learning techniques. Its goal is to automatically detect vehicle damage, locate it, classify its severity levels, and visualise it by contouring its exact location. Numerical results show that our proposed transfer learning solution, which is based on an Inception-ResnetV2 pre-trained model followed by a fully linked neural network, outperforms another pre-trained model, VGG16, in feature extraction and damage detection/localization.

LITERATURE SURVEY:

[4] Vehicle Damage Classification and Fraudulent Image Detection Including Moiré Effect Using Deep Learning

Umer Waqas considers the problem of car damage classification in this paper, where classifications include medium damage, huge damage, and no damage. For classification, the MobileNet model is proposed using deep learning techniques and transfer learning. Furthermore, moving toward automation comes with a variety of challenges; users can upload bogus images such as screenshots or take screenshots of computer screens, for example. To address this issue, a hybrid approach is proposed in which only authentic images are provided as input to an algorithm for damage classification. To detect fraudulent images, moiré effect detection and metadata analysis are used. Damage classification accuracy is 95%, and moiré effect detection accuracy is 99%.

LITERATURE SURVEY:

[5] Car Damage Detection and Assessment Using CNN

If the vehicle is insured, an insurance agent will go to the customer's home to investigate and prepare a report. Book review is a time-consuming process. However, thanks to significant advances in deep learning algorithms, it can be used to solve these problems in the insurance industry. Two CNN models are used in the proposed solution. VGG16 is used to diagnose damage to the vehicle as well as the location and severity of the damage. Mask RCNN is used to isolate damaged areas. Both models provide reasonable estimates of vehicle damage, allowing insurance companies to submit insurance claims without wasting resources and time on manual checks.

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Thank
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