INTELLIGENT VEHICLE DAMAGE ASSESSMENT AND COST ESTIMATOR FOR INSURANCE COMPANIES

ABSTRACT:

Nowadays, a lot of money is wasted on car insurance due to leakage claims. Claims leakage Underwriting leakage is characterized as the discrepancy between the actual payment of claims made and the sum that should have been paid if all of the industry's leading practices were applied. Visual examination and testing have been used to may these results. However, they impose delays in the processing of claims. This project aims to build a VGG16 model that can detect the area of damage on a car. The rationale for such a model is that it can be used by insurance companies for faster processing of claims if users can upload pics and the model can assess damage(be it dent scratch and estimates the cost of damage. This model can also be used by lenders if they are underwriting a car loan, especially for a used car.

Recognition of Car Manufacturers using Faster R-CNN and Perspective Transformation - Israfil Ansari et. Al.

They proposed a method to detect car logos from CCTV footage. The approach involved performing a perspective transformation on CCTV footage to get a clear view of the logos and then detecting and localizing the car logos through faster RCNN.

Automatic Car Damage Assessment through videos- Wei Zhang et. Al.

They proposed a method to detect and analyze car damage through user-input videos. The approach involved 2 modules Damage recognition and localization and component recognition to segment the damage and components at the pixel level to get accurate results. The model required high-quality videos as input to generate accurate results.

Auto Insurance Claim Using CNN Model - Li Ying & Dorai Chita

the CNN Model for the auto insurance claims process, improvements in the First Notice of Loss, and rapidity in the investigation and evaluation of claims could drive significant values by reducing loss adjustment expense. This paper proposed a novel application where advanced technologies in image analysis and pattern recognition are applied to automatically identify and characterize automobile damage. Success in this will allow some cases to proceed without human adjusters, while others to proceed more efficiently, thus ultimately shortening the time between the first Notice of Loss and the final pay-out.

To investigate its feasibility. they built a prototype system that automatically identifies the damaged area(s) based on the comparison of ages. Performance of the before- and after-accident automobile in the prototype system has been evaluated on images taken from forty scaled model cars under

reasonably controlled environments, and encouraging results were obtained. It is a belief that, with the advancement of image analysis and pattern recognition technologies, their proposed idea could evolve into a very promising application area where the auto insurance industry could significantly benefit. The main drawback of this model was that the automobile damage can be analyzed only by having white background otherwise it will be not able to give the desired results the study also indicates that there may be an error in the result, so it may not give that accurate result like 85-90% effective.

Damage Analysis of AI based Machine Learning - Phyu Mar Kyu et. Al.

They presented that artificial intelligence can be used for damage analysis and detection. To prove this, they developed a CNN model and trained it using the ImageNet dataset and fine-tuning. Two different approaches are developed, VGG19 and VGG16. The performance of these models is as follows: Damage detection: VGG19- 95% & VGG16- 94% Damage localization: VGG19- 76% & VGG16- 74% Damage severity: VGG19- 58% & VGG16- 54% This shows that VGG19 performs better than VGG16. The only drawback of this model is that, since the vehicle damage is a very specific domain, no real dataset is available to be worked with.

Car Damage Assessment using CNN

The dataset used in training the model was obtained through web scraping. Developing and training a CNN model with 10 convolutional layers and 3 pooling layers with RELU. As the activation function at each layer and the final layer is a Fully Connected Layer. The model performed well on high-quality images but gave inaccurate results on blurred images.

Image Based Vehicle insurance - U. Waqas et. Al.

They showed that vehicle insurance processing and loan management has the scope to become fully automated. The classification of these images can be achieved by developing a deep learning-based mobile net model. Based on these classifications the damage is classified as full, partial, or zero damage. The problem of fake images, screenshots, and images from unsuitable angles can be countered by using a hybrid approach to provide authentic images. The image classification has 95% accuracy and the damage detection has 99% accuracy.

Vehicle Type classification With Deep Learning

The paper researches various algorithms to classify the car body type from images such as SUVs, sedans, and pick-up trucks. Dataset used was the Stanford dataset with 224 images and achieved an accuracy of 76 percent when the arithmetic mean computation was on a hierarchical tree on ResNet 34 architecture [6].

Damage Detection at Deep learning based Architecture

Najmeddine Dhieb, Hakim Ghazzai, Hichem Besbes, and Yehia Massoud presented automated and efficient deep learning-based architectures for vehicle: damage detection and localization. The proposed solution combines deep learning, instance segmentation, and transfer learning techniques for feature extraction and damage identification. Its objective is to automatically detect damages in vehicles, locate them, classify their severity levels, and visualize them by contouring their exact locations. Numerical results reveal that our transfer learning proposed solution, based on Inception-Resnet V2 pre-trained model followed by a fully connected neural network, achieves higher performances in features extraction and damage detection/localization than another pre-trained model, i.c.. VGG16. The transfer learning could significantly reduce the training times when it uses the weights of pre-trained VGG models. Furthermore, it demonstrated significant progress on how to solve classification problems when the small dataset was not enough to train a CNN model. The classes of the pre-trained VGG models are the source tasks, and the detected damaged parts of their locations, and their damaged levels are the target tasks in our system. The main drawback of this model was A reduction of model training time is also the most challenging. Typically, a traditional CNN model can be very time-consuming to perform image classification tasks and identify the correct weights for the network by multiple forward and backward iterations. This process may take days or even weeks to complete it using GPUs.

Mask R-CNN

Mask RCNN is a deep neural network aimed to solve instance segmentation problems in machine learning or computer vision. In other words, it can separate different objects in an image or a video. You give it an image, it gives you the object bounding boxes, classes, and masks. There are two stages of Mask RCNN. First, it generates proposals about the regions where there might be an object based on the input image. Second, it predicts the class of the object, refines the bounding box, and generates a mask at the pixel level of the object based on the first stage proposal. Both stages are connected to the backbone structure