



“MACHINE LEARNING BASED CAR DAMAGE IDENTIFICATION”

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1. ABSTRACT

In this paper, we have designed and used a car injury severance pipeline, which can be used by insurance companies to automate car insurance claims. Recent developments in Computer vision are largely due to the adoption of fast, scalable, and end-to-end training networks of Convolutional Neural Networks (CNNs) making it technically possible to detect motor vehicle damage through deep transforming networks. We collected and commented on various online sources using a web browser containing various types of vehicle damage. Due to the small size of our database, we have used pre-trained large models and various data sets to avoid overcrowding and to learn common features. Using pre-trained CNN models ImageNet data set and advanced processing techniques to improve our system's performance, we obtained 96.39% accuracy, which is much better than the results obtained in the past in the same test set. In addition to locating the damage site, we used the YOLO modern scanner and obtained a high score of 77.78% on the captured test set, indicating that the model was able to successfully detect various vehicle damage. In addition, we have also developed a solid pipeline for identifying damage to vehicles by integrating segmentation and acquisition activities. All in all these results paved the way for further research on this problem area and we believe that the collection of various databases will be sufficient to use the automated vehicle diagnostic system soon.

2. INTRODUCTION

Many cars rental services around the world rent the car orient of the count of hours or days. However, after using the car may have been damaged. Even though there are many automatic car damage detection systems, human intervention is also required, and also the accuracy is very less when compared with recent development in the

field of data science. So there is an urgent requirement to develop a system with improved accuracy which eliminates human intervention. Research on damage detection has been conducted in various areas been actively conducted. In this paper, we use the Convolutional Neural Network (CNN) method to classify the types of motor vehicle injuries. In particular, we consider the most common types of damage such as bump bumps, door bills, broken glass, broken headlamps, broken tail lamps, scratching, and cracking. To the best of our knowledge, no public data is available for the classification of vehicle damage. So, we created our database by collecting images on the web and interpreting them in person. The task of differentiation is challenging due to factors such as high segment, and apparent damage. We tried many techniques such as direct CNN training, pre-training CNN using an automated configuration followed by fine editing, transfer learning from major CNNs trained in ImageNet, and building an integrated classifier over the previous set. -sprained dividers. We see that transfer combined learning and integrated learning work much better. We also include localization of some kind of damage. Test results confirm the effectiveness of the proposed solution.

3. LITERATURE SURVEY

Machine Learning Techniques for Detecting Insurance Claims Fraud [1]. Written by Riya Roy, Thomas George K. Identify and collect data with necessary attributes. Perform necessary data cleansing Segregate data into a training set and testing set Select algorithm like a decision tree and random forest Execute algorithm with training data Evaluate algorithm with testing data Use classified for the new dataset. Form a confusion matrix that provides information on the false positive, false negative, true positive, and true negative. The decision tree and Random Forest algorithm have better performance than naïve Bayes and calculate the accuracy, precision, and recall. Limitation- use only a large dataset the number of samples used in this paper is small. The explanatory variables involved in the sample are fewer, which reduced the prediction accuracy of the model to a certain extent. Research and Application of Random Forest Model in Mining Automobile Insurance Fraud [2]. Yaqi Li, Chun Yan, Wei Liu, Maozhen Li. Random Forest was used for the classification and prediction. The data used was the automobile insurance data of a vehicle insurance company in 2011. The sample contains 1000 data. choose the following 10 indexes from the customer's basic insurance information. A tool used- R software The 10 indicators include insurance maturity (V1), vehicle property (V2), automated underwriting (V3), car-testing (V4), site report (V5), driver gender (V6), survey type (V7), repair-shop type (V8), number of damage photos (V9) and historical times (not including this time) (V10). Automatic License Plate Detection System Based on the Point Weighting and Template Matching [3]. Hossein Vahid Dastjerdi, Vahid Rostami, and Farid Kheiri Pre-processing Obtaining the center of the weight for the pixels of the boundary. Through the use of line templates, a plane's existing lines can be obtained. Finding a required template for locating the license plate. Comparing the proposed model with other techniques being used currently in the industry, the proposed model is capable of recognizing license plates in the fixed distance range faster. Besides the 93% accuracy rate of this method, it can work in environments with strong noise. Through the use of line templates, a plane's existing lines can be obtained. Finding a required template for locating the license plate. Comparing the proposed model with other techniques being used currently in the

industry, the proposed model is capable of recognizing license plates in the fixed distance range faster. Also, the role of ML and ESPs [11-69] are becoming important in recent applications, recognition, and control.

4. PROPOSED BLOCK DIAGRAM

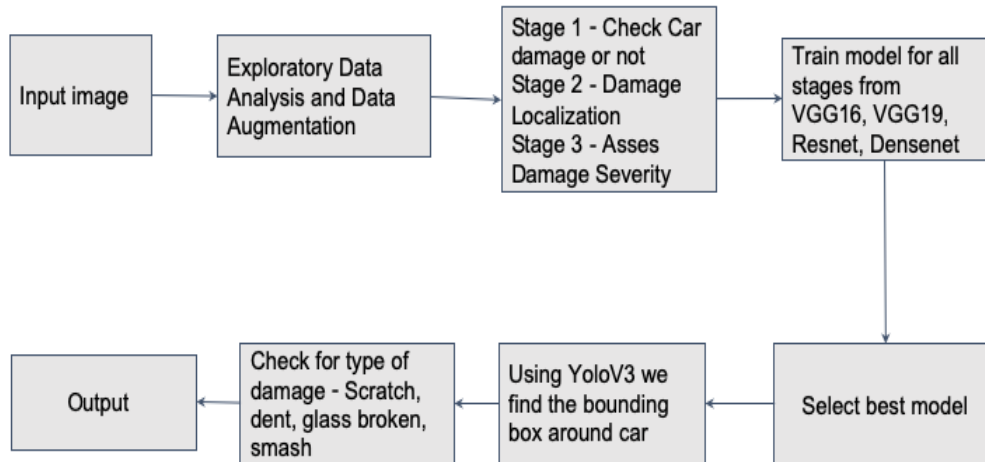


Fig 1. Block Diagram

In image analysis, CNNs are mostly used to recognize images, detect objects, and segment them.

- 1) Convolutional Layer
- 2) Pooling Layer
- 3) Fully-Connected layer

The architecture of our proposed technique is to give out a car damage assessment method. First, the user will give an input image and our model will detect if the image is of a car or not then it detects whether the car in the image is damaged or not then it detects the location of the damage i.e., front, rear, side and finally it detects the severity of the damage. Then finally it passes the parameters to another model which predicts the probability of the insurance that the user can claim.

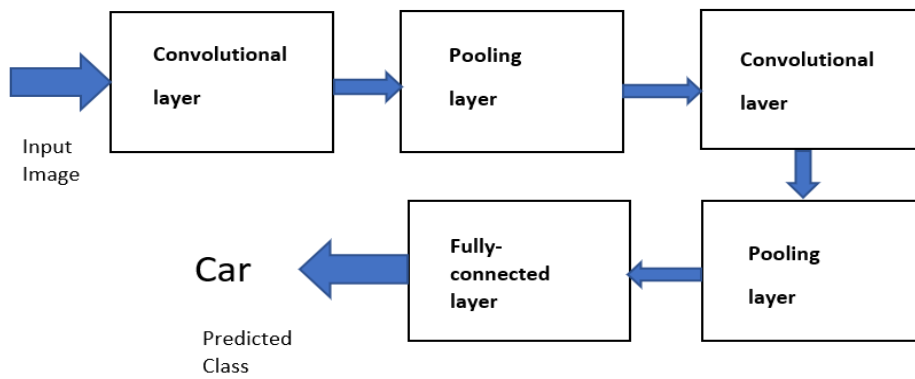


Fig 2. CNN Architecture and Class Prediction

Class1: Damage Detected, Glass Broken and Dent,

Class2: Damage Detected, Scratch Only,

Class3: Damage Detected, Scratch and Dent,

Class4: Damage Detected, None,

5. CONCLUSION

After renting a car from a car rental service in case the car is damaged, then by using the Car Damage Assessment website successful detection is possible by uploading an image by the user of whether it is damaged or not, and if it is damaged then what is its damage type? Accuracy could be improved further; it could be trained for another dataset of two-wheelers or trucks. An expanded dataset would improve the results and make this system more effective in real-life situations.

6. FUTURE SCOPE

1. We could get more data by downloading images so that the training accuracy improves.
2. Using Cloud services to deploy the web app

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