The Ciência & Engenharia - Science & Engineering Journal
ISSN: 0103-944X
Volume 10 Issue 1, 2022
pp: 132 - 137

Intelligent Vehicle Damage Assessment and Cost Estimator for Insurance Companies

[1]M.S. Rakha, [2]M.Srujana, [3]M.Sowmya, [4]M.Venkata Prasanna
[1,2,3,4] UG Student, Department of Electronics and Communication Engineering,
Dr K V Subba Reddy College Of Engineering For Women, Kurnool, Andhra Pradesh, India

Abstract
Nowadays, there are a lot of accidents. For example, if someone was in an accident and wants to file a claim with their car insurer, they would likely have to have someone look at the damage to their vehicle at home or at a repair shop, and then they would have to wait for an official estimate and approval before they could start the necessary repairs. While this traditional procedure can take a long time and keep your vehicle off the road for longer than you would like, AI can now speed up the process by taking over the appraiser's duties. During insurance processing, vehicle damage detection is utilized to reduce claim leakage. Most of the time, visual inception and validation are done. because a person needs to come and look at the damage, which takes a long time. In this case, we are attempting to automate the process. We can avoid time conception for the insurance claim procedure with this automation. In this, we are utilizing the VGG16 model to anticipate vehicle damage. The accuracy of VGG16 is 94.56%..

1. Introduction

A common person with little knowledge of this technology will associate it with "robots." They will assert that AI is an autonomous object resembling the Terminator. An AI expert will respond, "it is a set of patterns and algorithms that can generate solutions to everything without being explicitly instructed to do that work," when asked the same question.

Machines serve as an illustration of artificial intelligence. In the modern world, this technology has grown to be extremely well-known. It is the process by which machines acquire intelligence by learning from, comprehending, and imitating human behavior. These machines can learn new things over time and do things that are similar to what a human would do without being explicitly instructed. Artificial intelligence (AI), machine learning (ML), and a great number of other technologies are developing at a very rapid rate and will have a significant impact on our way of life. In fact, everyone wants to be connected to this technology, whether as an end user or as a career in the field.

AI can't be put into a single category because different kinds of AI are made to do different things. That's why they're different. Based on how it works, AI can be divided into two categories. Because it is so extensive and necessitates numerous other factors, artificial intelligence is not just a component of computer science. Intelligence is an intangible part of our brain that is a combination of reasoning, learning, problem-solving perception, language understanding, and so on. In order to create the AI first, we need to understand how intelligence is made. Artificial Intelligence necessitates the following skills in order to achieve the aforementioned outcomes for software or machines: The machine learning

The Ciência & Engenharia - Science & Engineering Journal
ISSN: 0103-944X
Volume 10 Issue 1, 2022
pp: 132 - 137

model's training component includes data analysis and learning. Neurons, Mathematics, Biology, Psychology, Sociology, Computer Science, and Study Statistics The goal of the model's training is to minimize the difference between the actual and predicted values. For instance, when a user is given product recommendations, the goal is to reduce the gap between the user's actual rating and the item's predicted rating from the model. The loss- or objective-function method is used to calculate the difference between the predicted and actual values. Therefore, the core of the ML model is defining the objective/loss function. ML has had a significant impact on every sector in the modern era..

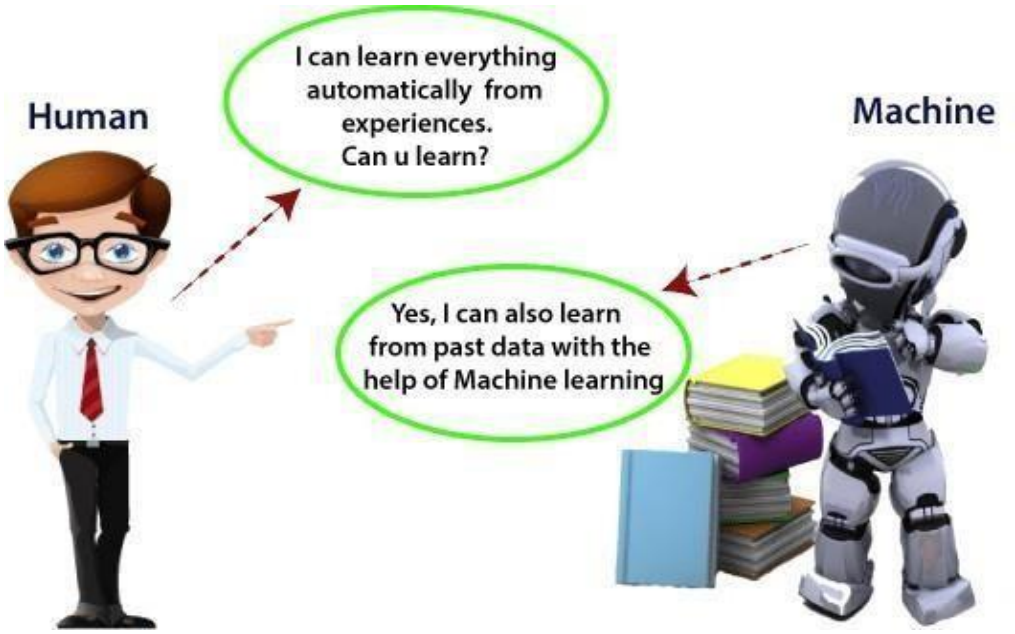

Fig.1 Machine Learning

2. Literature Review

The subfield of artificial intelligence known as machine learning serves as the foundation for deep learning. Deep learning will suffice because neural networks mimic the human brain. Nothing is explicitly programmed in deep learning. In essence, it is a class of machine learning that performs feature extraction and transformation with a large number of nonlinear processing units. Each of the subsequent layers takes as input the output of the layer before it.

The DL model, like the ML model, is considered a subset of ML because it needs a lot of data to learn and make good decisions. The misconception that ML and DL are the same is partly due to this. On the other hand, the DL model is based on artificial neural networks that can solve problems that ML cannot.

DL models are driving the future. Self-driving cars are not possible without DL, Alexa, Siri, Google Voice Assistant, and Google Translation. Visit my Deep Learning in-depth blog to learn more about building DL models.

Neural Networks, which are based on the biological neurons that make up a brain cell, serve as the inspiration for the implementation of deep learning. So, deep learning is basically done with the help of deep networks, which are nothing more than neural networks with multiple hidden layers. In the example above, we feed the first layer of the input layer the raw data for images. After that, these input layers will make the patterns of local contrast, which means

The Ciência & Engenharia - Science & Engineering Journal
ISSN: 0103-944X
Volume 10 Issue 1, 2022
pp: 132 - 137

that it will distinguish based on colors, luminosity, and other characteristics. The first hidden layer will then focus on the eyes, nose, and lips, among other facial features. The face features will then be fixed to the appropriate face template. As can be seen in the image above, it will therefore determine the correct face in the second hidden layer before being sent to the output layer.

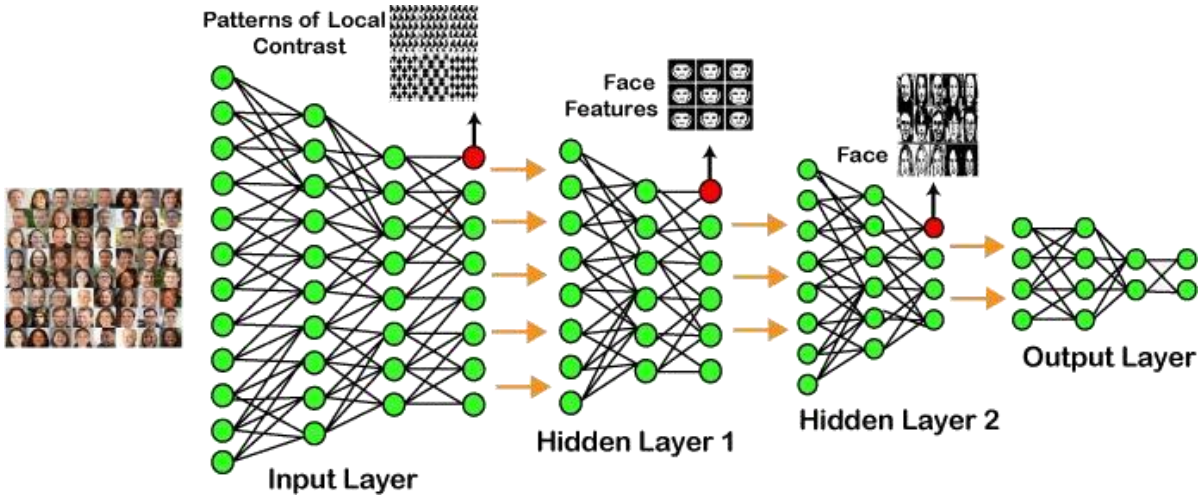

Fig.2 Deep Learning Layers of images

Likewise, more hidden layers can be added to solve more complex problems, for example, if you want to find out a particular kind of face having large or light complexions. So, as and when the hidden layers increase, we are able to solve complex problems

3. Proposed System

The intelligent damage determination system included OCR recognition technology for the uploaded driving license photos (front and side pages), driving license photos (front and side pages), and other documents. The uploaded driving license and driver's license can be intelligently recognized and filled in with the VIN code, license plate number, engine number, driver's name, and other information. The embedded OCR technology currently has a recognition accuracy of 98.5% and can recognize Chinese characters, English upper and lower case letters, numbers, and other information. The incorporation of optical character recognition (OCR) technology addresses the issue of manual input for the majority of fixed-loss products at mobile terminals by effectively avoiding input errors and saving invalidation staff time from entering certificates without basic information, such as the three vehicles.

The benefits of savvy misfortune assurance framework are additionally reflected in its bountiful fundamental data information. The basic database of vehicle and accessory information can be automatically linked using the VIN code to produce the output of specific vehicle information like the brand, vehicle system, vehicle type, and OE code of parts that match the vehicle type. This allows for one-to-one correspondence between vehicles and accessories.

The image-based identification of the kind of damage to the vehicle's exterior is the core of intelligent damage fixing products. The intelligent image damage algorithm has experimented

The Ciência & Engenharia - Science & Engineering Journal
ISSN: 0103-944X
Volume 10 Issue 1, 2022
pp: 132 - 137

with the system numerous times. Last but not least, it divides the issue into three parts: the image-based recognition of appearance parts, the image-based recognition of damage parts, and the relative position relationship-based determination of damage parts.

Fig.3 Damaged Vehicle

The appearance parts where damage occurs are ultimately identified by calculating the intersection relationship between the polygon identified by the algorithm for vehicle appearance components and the rectangular position identified by the algorithm for appearance damage. The comprehensive accuracy of the image damage determination algorithm currently reaches 87.3%, based on the vehicle appearance component recognition algorithm, vehicle appearance damage recognition algorithm, and image position determination algorithm. Using the image loss algorithm, it can determine which component's output has damage. Take, for instance, the original image in Figure 3.

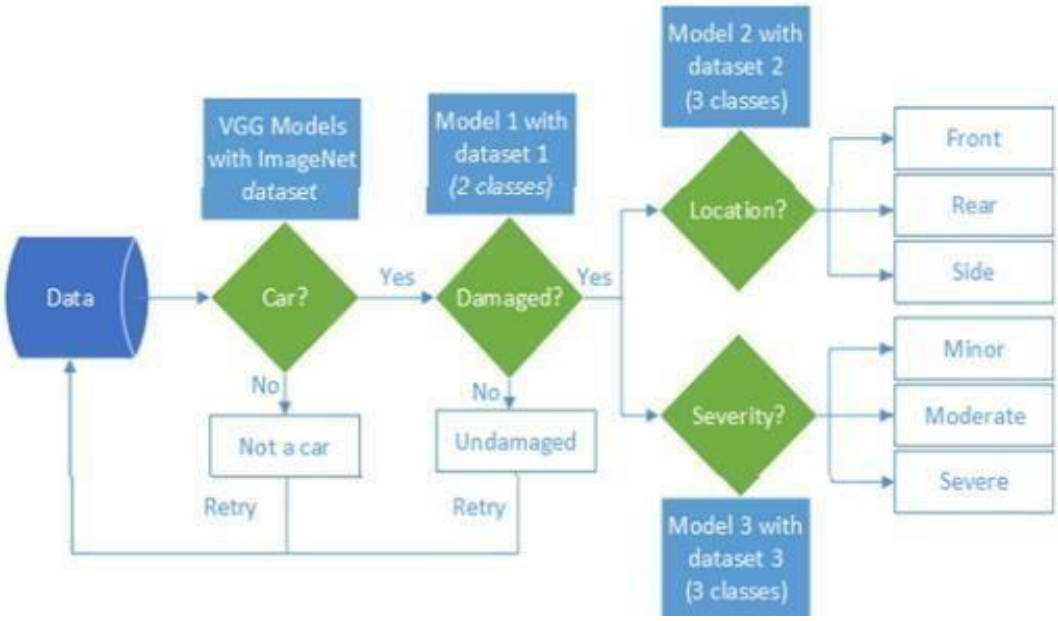

Fig.4 Flow Chart Of The Project

The Ciência & Engenharia - Science & Engineering Journal
ISSN: 0103-944X
Volume 10 Issue 1, 2022
pp: 132 - 137

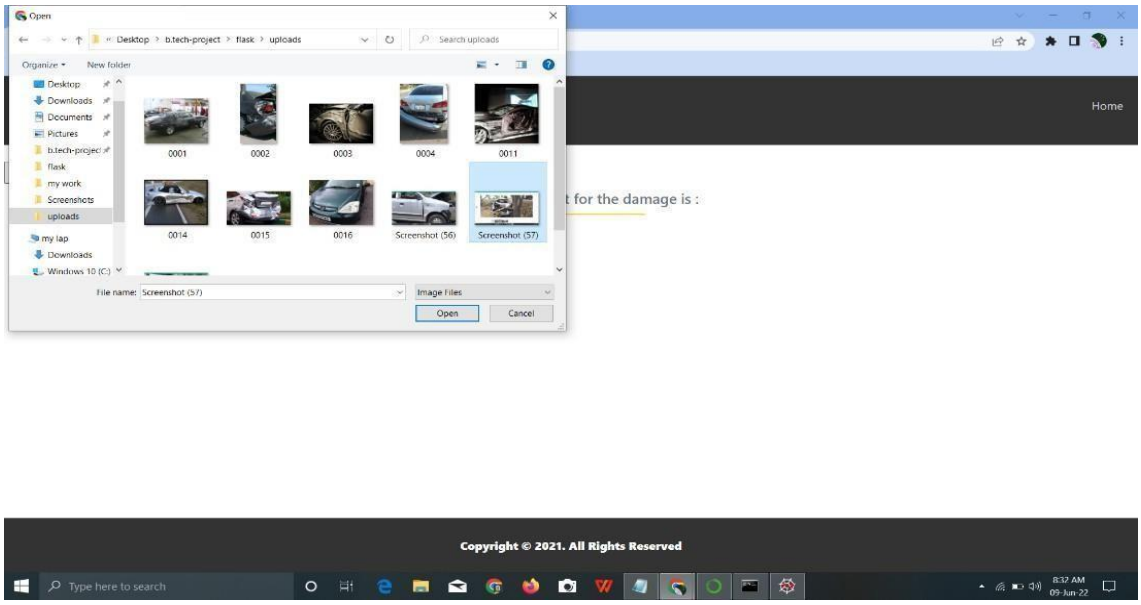

Fig.5 Output Of The Project

5.Conclusion

We will keep looking into the innovative insurance technology known as "AI + Vehicle Insurance" in the future. We anticipate being able to make use of the intelligent damage determination system's potential. On the one hand, the owner can quickly determine the loss, estimate the price, and receive immediate compensation by snapping photos with a single click. On the other hand, it makes it easier for insurance companies to quickly and accurately price losses and claims. Finally, to avoid more serious personal and property losses due to secondary accidents, by combining the prompt compensation of accident vehicles with traffic relief.

References

1. N. Dhieb, H. Ghazzai, H. Besbes, and Y. Massoud, ”Extreme gradient boosting machine learning algorithm for safe auto insurance operations,”in IEEE International Conference on Vehicular Electronics and Safety(ICVES’19), Cairo, Egypt, Sept. 2019.
2. M. Wassel,”Property Casualty: Deterring Claims Leakage in the DigitalAge,” Cognizant Insurance Practice, Tech. Rep., 2018.
3. N. Dhieb, H. Ghazzai, H. Besbes, and Y. Massoud, ”A Very Deep Transfer Learning Model for Vehicle Damage Detection and Localization,”in IEEE International Conference on Vehicular Electronics and Safety(ICVES’19), Cairo, Egypt, Sept. 2019.
4. K. Patil, M. Kulkarni, A. Sri Raman and S. Kerande, ”Deep Learning Based Car Damage Classification,” in IEEE Int. Conf. Machine LearningApp. (ICMLA’17), Cancun, Mexico, Dec. 2017.
5. j. d. Deijin,”Automatic Car Damage Recognition using ConvolutionalNeural Networks,” March 2018

The Ciência & Engenharia - Science & Engineering Journal
ISSN: 0103-944X
Volume 10 Issue 1, 2022
pp: 132 - 137

6. K. Simonyan and A. Zisserman,”Very Deep Convolutional Networks for Large-Scale Image Recognition,” arXiv preprint arXiv: 1409.1556,2014.
7. J. Deng, W. Dong, R. Socher, L. J. Li, K. Li, and L. F. Fei, ”ImageNet: A Large-Scale Hierarchical Image Database,” IEEE, 2019.
8. R. Singh, M. P. Ayyar, and T. V. S. Pavan, S. Gosain, and R. R.Shah,”Automating Car Insurance Claims Using Deep Learning Techniques,” in IEEE fifth International Conference on Multimedia Big Data(BigMM), 2019.
9. P. Li, B. Y. Shen, and W. Dong, ”An Anti-Fraud System for CarInsurance claim Based on Visual Evidence,” arXiv: 1804.11207v1, April,2018.
10. M. Dwivedi, M. H. Shadab, S. Omkar, E. B. Monis, B. Khanna, S.R. S. A. Tiwari, and
11. A. Rathi,”Deep Learning Based Car DamageClassification and Detection,” DOI: 10.13140/ RG.2.2.18702.51525, Sep.2019.