A NOVEL APPROACH TO INTELLIGENT DAMAGE DETERMINATION SYSTEM USING AI

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ABSTRACT -At present, under the guidance of the new generation of information technology, the rapid accumulation of data, the continuous improvement of computing power, the continuous optimization of algorithm models, and the rapid rise of multi-scene applications have made profound changes in the development environment of artificial intelligence. In this paper, based on the demand of automobile insurance claims and intelligent transportations, combined with abundant basic data and advanced machine vision algorithm, an intelligent damage determination system of "Artificial Intelligence + Vehicle Insurance" is constructed. This paper first introduces the functions of the intelligent damage module in detail, and finally puts forward the vision for the future.

1. INTRODUCTION

Intelligent vehicle damage assessment and cost estimation is a revolutionary technology that allows insurance companies to accurately and quickly assess the extent of damage caused to a vehicle and estimate the cost of repairs. This technology is based on computer vision and machine learning algorithms that allow for rapid and accurate analysis of the vehicle. Using this technology, insurance companies can quickly and accurately assess the extent of damage and estimate the cost of repairs, providing customers with a more efficient and cost-effective service..

A.1METHODOLOGY

The aim of this project is 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 from and estimates the cost of damage especially for a used car and bikes.

A.2 DATA COLLECTION

Data Gathering collect a diverse dataset of vehicle images containing various types and severities of damage. And Annotation manually label these images with bounding boxes or segmentation tasks to indicate the locations and type of damage present.

A.3 DATA PREPROCESSING

present. Data preprocessing is a image preprocessing standardize image sizes, color, spaces, and orientations for consistency and data augmentation augment the dataset using techniques like rotation, flipping, scaling and adding noise to increase model robustness.

A.4 MODEL SELECTION

Choose a model for select a suitable pre_trained deep learning model for object detection or semantic segmentations, such as Faster R-CNN,YOLO(you only look once) or Mask R-CNN. Adaptation fine_tune the chosen model on the annotated vehicle damage dataset to specialize it for damage detection.

A.5 EVALUATION

Validation assess the model's performance on the validation set using metrics such as precision, recall, F1-score and mean average precision. And fine-tuning adjust model architecture or training parameters based on validation results to improve performance.

2. PROPOSED MODEL

CONVOLUTIONAL NEURAL NETWORK

Convolutional Neural Network (CNN) is a type of deep learning algorithm designed specifically for processing structured grid-like data such as images or audio. CNNs are structured in a hierarchical way, mimicking how the human brain processes visual information.

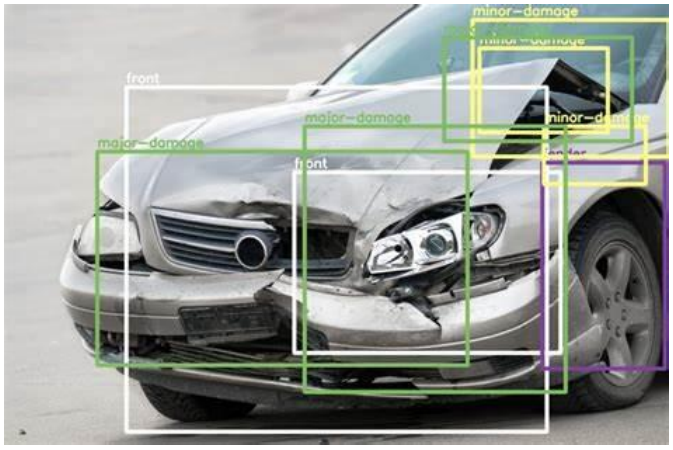
CNNs leverage parameter sharing and spatial hierarchies, allowing them to efficiently learn complex patterns and hierarchies within data. The training process involving forward propogation, calculating loss, and backpropogation.

CNNs have revolutionized tasks such as image classification, object detection, and segmentation due to their ability to automatically learn hierarchical representations directly from raw data, leading to state -of-the-art performance in various computer vision applications.

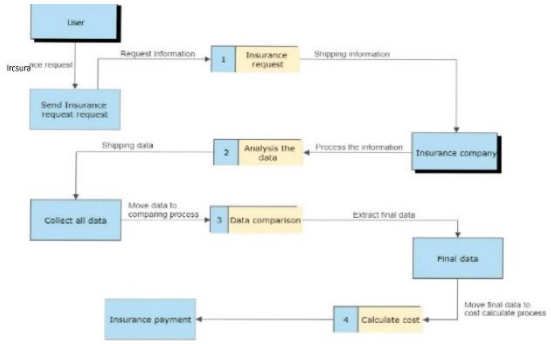
VGG16

The Vgg-16 architecture is a deep convolutional neural network renowned for its effectiveness in image classification tasks. Developed by the Visual Geometry Group at the University of Oxford, VGG-16 consists of 16 layers, predominantly comprising convolutional layers followed by maxpooling layers.

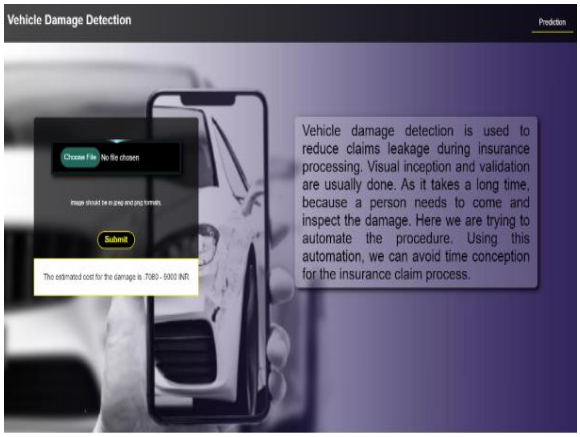
At its core, VGG-16 processes an input image through a series of convolutional operations. Each convolutional layer applies learnable filters to extract hierarchical features, capturing details ranging from simple edges and damages in earlier layers to more complex patters and object parts in deeper layers.



5. MODELLING AND ANALYSIS



6. RESULTS



7. CONCLUSION AND FUTURE ENHANCEMENT

Response In our project, we explore the innovation of insurance technology of "AI+ Vehicle Insurance". We can use the power of intelligent damage determination system. On the one hand, the owner can take photos by one click to achieve rapid loss determination, price estimation and immediate compensation.

AI and its related technologies will have a seismic impact on all aspects of the insurance industry, from distribution to underwriting and pricing to claims. Advanced technologies and date are already affecting distribution and underwriting, with policies being priced, purchased, and bound in near real time.

8. REFERENCES:

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