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Vehicle Damage Level Estimator For Claiming Insurance 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. Following a car accident, an insurance company must assess the level of damage to each vehicle to decide on the compensation paid to the insurance customer. This assessment is usually performed by manual inspection, which is costly and time-consuming. Automatic car damage assessment using image data is an under-addressed problem highly relevant to the insurance industry. There are many ways to claim insurance for the damaged vehicle but it may not be accurate all the time and it also takes long time for processing and providing insurance and detect the cost for the only given dataset. The claiming process will take long time. Only able to predict the cost for the damage. Based on the demand of automobile insurance claims and intelligent transportation, combined with abundant basic data and advanced machine vision algorithm, an intelligent damage determination system of 'Artificial Intelligence + Vehicle Insurance' is constructed. This system is used for detecting the exact cost for the damage occurred in an accident so it is helpful to avoid loss of cost for the insurance companies. Gathering data from the user and predicting the exact damage that have occurred . We solve this problem using Convolutional Neural Network (CNN) algorithm using Open Source Computer Vision Library (Open CV) and deep learning which are mainly used for image processing, video capture and analysis with Python Flask framework. This project first introduces the functions of the intelligent damage assessment system. Secondly, it discusses the realization path of each functional module in detail, and finally puts forward the vision for the future.

***Index Terms*– Damage Detection, Artificial Intelligence, Deep Learning, Convolutional Neural Network, Prediction**

INTRODUCTION

In today's world, Vehicles are increasing heavily. Because of increasing of accidents are very common because the peoples are driving a car very fastly on the road. Every day, thousands of claimants send media content to their insurance companies in order to have the company assess their damaged vehicles online. The people claim the money for repair the car through vehicle insurance when the accident happens. Because of incorrect claims, the company behaves badly and doesn't make payments currently. The process of assessing damage severity is handled by experienced adjusters and can be time-

consuming. A lot of money is being wasted in the car insurance business due to leakage claims. Claims leakage, the claims leakage refers to the difference between the amounts secured by the company to the amount that company should have secured based on the claims.

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. To overcome this, Differentiate the proposed system that is maybe speed up the car damage that can be check in process. Just by sending the image containing a damaged car and can system Performs car damage detection in a minute rather than hours if it is inspected visually, our aim is to create a VGG16 model that can detect the area of damage on a car. The process of assessing damage severity is handled by experienced adjusters and can be time-consuming. 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. This model can also be used by lenders if they are underwriting a car loan, especially for a used car.

TECHNICAL FOUNDATION

1.1 Artificial Intelligence

Artificial intelligence (AI), the ability of a digital computer or computer controlled robot to perform tasks commonly associated with intelligent beings. A set of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand and translate spoken and written language, analyze data, make recommendations, and more. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience.

1.2 Machine Learning

Machine learning is an application of AI that enables systems to learn and improve from experience without being explicitly programmed. a branch of artificial intelligence (AI) and computer science that focuses on developing methods for computers to learn and improve their performance. It focuses on developing computer programs that can access data and use it to learn for themselves. It aims to replicate human learning processes, leading to gradual improvements in accuracy for specific tasks.

1.3 Deep Learning

Deep learning is a machine learning technique that enables computers to learn from experience and understand the world in terms of a hierarchy of concepts. The key aspect of deep learning is that these layers of concepts enable the machine to learn complicated concepts by building them out of simpler ones. If we draw a graph showing how these concepts are built on top of each other, the graph is deep with many layers. Hence, the 'deep' in deep learning.

1.4 Convolutional Neural Network

Convolutional neural networks are used in computer vision tasks, which employ convolutional layers to extract features from input data. In deep learning (neural nets), convolutional neural networks (CNN)s, also known as ConvNets are specialized artificial neural networks that can “see” the world as humans perceive it. Convolutional neural networks (CNNs) are a class of deep neural networks commonly used in computer vision tasks such as image and video recognition, object detection and image segmentation. These algorithms take an input image, then assign importance to various objects within that image to differentiate one object from the other. Not is a part of the field of computer vision, which is the study of how computers use artificial intelligence (AI) to achieve a higher understanding of digital imagery or video.

EXISTING WORK

There are numerous ways to file an insurance claim for a damaged car, but they may not always be accurate, and processing, giving insurance, and determining the cost for a single report can take a while. It will take a while to complete the claim process. Additionally, there are regional variations in the estimation, which misleads clients. Furthermore, the existing

technologies for assessing vehicle damage only provide the percentage of the damage level. Insurance companies could file erroneous claims for the car. This leads to a great deal of trauma and discontent between clients and businesses. Therefore, a standard, fixed system that displays the true outcome and cost would be preferable.

PROBLEM IDENTIFICATION

It helps to prevent financial loss for the insurance companies because it is used to determine the precise cost of the damage sustained in an accident. There are numerous methods for filing an insurance claim for a damaged car, but it might not be reliable at all times, but it also requires a lot of time to process, provide insurance, and determine the cost for a single dataset.

PROPOSED WORK

To create an insurance companies' intelligent vehicle damage and cost estimator. It estimates the expense of accident-related damage and provides a simple method for filing an insurance claim. It has multiple categories. To find the damage. determining the location of the damage based on the precise cost of the damage. In order to estimate the cost, it locates the precise damaged area. Its goal is to detect, locate, and categorize car damage mechanically, as well as to shape the exact areas of the damage to provide a visual representation of it.

Simple to estimate the precise cost of the damage Everyone receives the precise information they need to prove damaging collusion. The algorithms identify the shattered period of an car and determine its location and severity. AI has shown its effectiveness in detecting fraud in cases when there may have been collaboration.AI can accurately identify damaged areas and estimate insurance costs. Using the Open Source Computer Vision Library (Open CV), which is primarily used for image processing, video capture, and analysis with the Python Flask framework, we tackle this problem using the Convolutional Neural Network (CNN) algorithm. The system's workflow is displayed below.

FLOW CHART

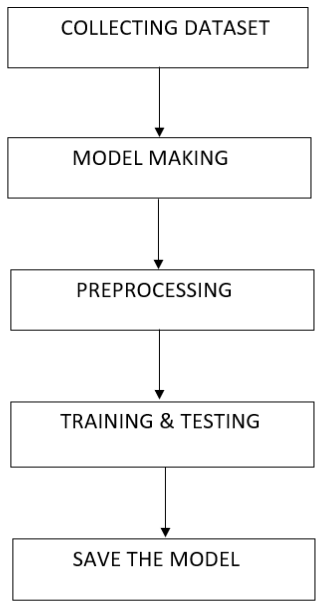

Fig.1 Flow chart of the proposed Work

SOFTWARE REQUIREMENTS

1.Operating System: Windows 7 & above

2.Technology: Deep Learning, CNN

3.Language: Python

4.Platform used: Google Collab- Environment, Flask framework

LANGUAGE AND PLATFORM DISCRIPTION

2.1 Python

Python is a modular language with a rich library that supports various programming paradigms, including functional and object programming. Python promotes code reuse and modularity. The majority of syntax Since Python is written in C, it is developed from C. On the other hand, Python uses indents to organize code blocks. Python is a language interpreter that can translate text entered in up to twelve different languages understood by your computer's processor. Python is a simple language to learn and use. The language is opensource. Python is a scripting language that is frequently used for online applications and interactive content, much like Ruby and Perl. Python can be used to create a wide range of applications, including software, Web apps, and Graphical User Interface apps. Games and 3D apps, network design, physics and math apps, development apps, and other business apps. Debugging can be done most quickly by adding a few print commands to the code. The rapid edit-test-debug loop is one such straightforward method. If the exception cannot be discovered, the interpreter may print the pile trace. Python works on many platforms. Programs compilation is not required because this is PERL-like. Additionally, PHP Python fosters teamwork. To write the programs to the interpreter, a Python prompt.

2.2 Flash Framework

Python's Flask is a lightweight web framework. It offers the user tools, libraries, and modules to assist in creating web applications like wikis and blogs. Unlike Django, Flask is independent of other libraries and is hence referred to as a microstructure. Compared to the Django web framework, Flask is thought to be more Pythonic because the equivalent Flask web application is typically more explicit. When it comes to customization, Flask offers the most options. Due to the lack of boilerplate code needed to launch a basic application, Flask is also straightforward for beginners to start using. Since Flask was created some years after Django, it also benefited from the Responses from the Python community as the framework changed. The Flask application doesn't accomplish anything noteworthy. Persisting user data is an interesting feature of a web application, but it requires a database connection to function. A true "do it yourself" web framework is Flask.

WORKING PRINCIPLE

STEP 1

- Register on the website using your email address.
- To access the website, log in with the credentials you have registered
- The dataset is gathered for the necessary procedure.
- A new user can browse the website to register, and once registered, they can log in at any moment.

STEP 2

- Tasks like “Give Personal information to check my insurance details” are included.
- Speak with specialist to select my insurance plan.

STEP 3

- It includes duties like, Provide the specifics of my car for clarification.
- To obtain the prediction result and insurance claims, upload age.

STEP 4

- This sprint includes activities like, Obtain the estimated cost based on the damage to the car.
- After the procedure is finished, the user can log off of the website.
- The alert is set off when the person exhibits unusual movements, aiding in the identification of drowning. The user has the option to log off of the website once the process is finished.

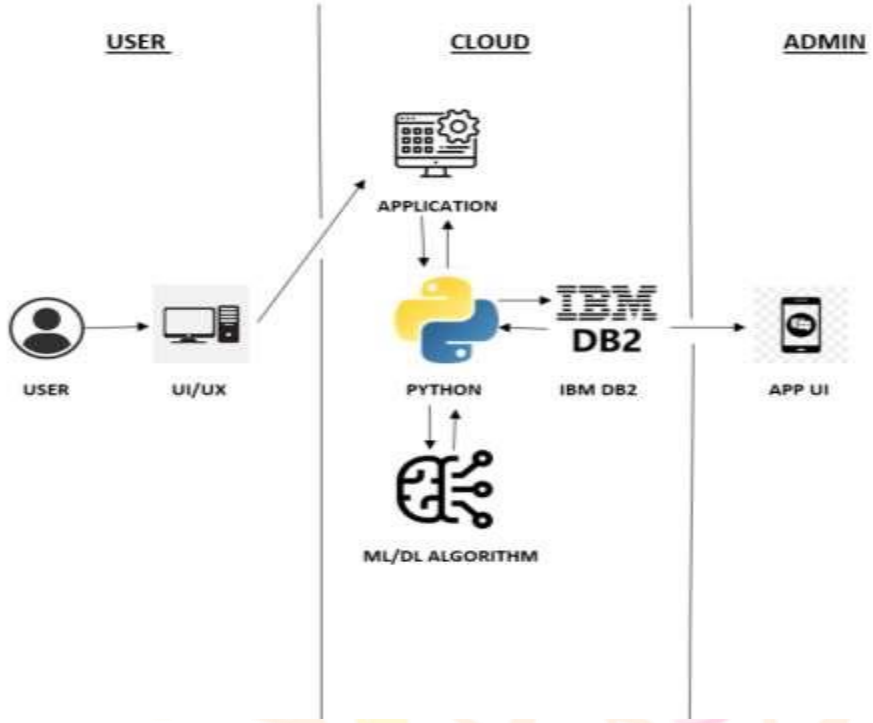

Fig.2 Working of the Module

SYSTEM DESIGN AND ARCHITECTURE

The image data that is employed is the foundation of the suggested system. To gain insight into the images' characteristics, they are visualized. The photos are then divided into training and testing sets, patched together, and fed inside the framework. It is a neural network that is built on the work flow and CNNs. It contains some modules they are the following,

1.Extraction of Data

2.Data Enrichment

3.Model Development and Instruction

4.Classification

The process of measuring and obtaining data, or any variables, in a systematic and predetermined way is known as data collecting. It gives the collector the ability to assess the results of the gathering and respond to or test hypotheses.

MODULE

1. Collection of data

2. Preprocessing the data

3. Building the module

4. Application Building

APPLICATION BUILDING

We create the user interface for our Flask application, which will run in our local browser. Flask is a tiny, light-weight Python web framework with features and helpful tools that make building web Python apps are simpler to use. It is a more approachable framework for novice developers and offers developers versatility because it allows you to quickly create a web application with just one Python file.

SYSTEM IMPLEMENTATION

The crucial project stage known as "system implementation" is when the theoretical design is put into practice. System implementation ought to be carried out following appropriate testing and validation. System deployment incorporates all of the processes involved in switching from an outdated system to a modern one. There may be changes to the new system. One significant change to an old system could be replacing a manual or automated one. The first step in putting our suggested method into practice is to create a Jupyter notebook, which imports certain essential libraries like Tensorflow and Keras. Because the pretrained model has previously been trained on a huge collection of images, it will achieve higher accuracy. Data collection, analysis, preprocessing, model construction, training, and testing are all included in the six-execution step. Training and test speed are increased by employing VGG16 pre-trained model with CNN max-pooling. In order for an implementation phase to be effective, numerous tasks across multiple departments must be completed. Once every package has been imported, several machine learning techniques are used to find an algorithm that performs well. The algorithm with the highest accuracy is integrated with a graphical user interface (GUI)backend interface) for database connections.

CONCLUSION

In this research, we investigate the insurance industry's cutting edge in "AI + Vehicle Insurance." We have access to the intelligent damage determination system's power. On the one hand, the proprietor can snap pictures using one. Click to obtain quick compensation, price estimation, and loss assessment. Conversely, it helps insurance companies to obtain accurate and timely pricing when adjusting claims and losses. Lastly, by combining the quick payment of damaged cars to reduce traffic, to prevent more significant losses to property and people brought on by subsequent collisions.

FUTURE ENHANCEMENT

Artificial intelligence (AI) and its allied technologies will profoundly alter every facet of the insurance business, including distribution, underwriting, pricing, and claims. Data and advanced technology are already having an impact on distribution and underwriting, wherein policies are almost instantly priced, bought, and bound. A detailed analysis of insurance in 2030 reveals significant shifts throughout the insurance value chain. Buying insurance is a quicker process that requires less interaction from both the buyer and the insurer. With AI algorithms generating risk profiles and sufficient data about individual behavior, the cycle times for completing the purchase of an auto, commercial, or life policy will be slashed from 28 days to minutes or even seconds. Instant estimates have been available from auto and house companies for a while, but they will keep improving their capacity to provide coverage to more clients right away as telematics and in-home Internet of Things (IoT) devices increase in number and pricing models develop. While several life insurers are experimenting with simplified issue products, the majority of them charge more than a comparable fully underwritten product and are only available to the healthiest applicants. A new generation of mass-market quick issue products will emerge when AI penetrates life underwriting and carriers are able to assess risk in a much more detailed and sophisticated manner.

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