# Chapter 18

# Case Studies in Big Data Analysis:
## A Novel Computer Vision Application to Detect Insurance Fraud

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## ABSTRACT

*Computer vision technology can be used for instant car damage recognition by analyzing images of damaged vehicles to detect and identify the location and severity of any damages. Technology can accurately classify damage into categories such as small, medium, or high severity. This can help insurance companies and other relevant stakeholders quickly process claims, reduce fraudulent claims, and improve the overall claims process efficiency. The conventional car damage assessment process is time-consuming, labor-intensive, and prone to errors. Computer vision models offer a new solution to detect car insurance fraud by identifying the damage severity and streamlining the claims process. AI can automate the process by analyzing images of damaged cars and generating a breakdown of the damage. The authors propose a unique computer vision process that can help identify small, medium, and high severity of damages and validate investigators' recommendations to detect anomalies in real-time.*

## 1. INTRODUCTION

Insurance fraud is a serious threat that threatens the insurance industry in several ways. It can affect client satisfaction by delaying payouts or conducting lengthy investigations during an already hectic timeframe and reduce profitability through incorrect payouts. An effective method of detecting insurance fraud is

through machine learning, which allows insurers to identify suspicious patterns in customer behavior that might indicate fraudulent claims. Deep learning algorithms have the capability of quickly comparing millions of pieces of data in milliseconds. Computer vision technology provides another means of detecting auto insurance fraud, allowing insurers to accurately assess damage. This approach helps prevent fraudulent repair claims with false invoices submitted to collect more from insurers.

Computer vision technology can also be used to inspect damaged cars. By analyzing 360-degree videos, it can analyze images to detect causes of damage such as minor spot damages or isolated injuries and quickly assess repair needs. This system can also be integrated with car rental and repair services to inspect vehicles prior to their repair, detecting the type of damage detected as well as providing a report detailing estimated repair costs. Instead of saving photos or videos locally on systems, this AI solution transmits camera feed directly to a backend platform - eliminating potential customer and middleman agent manipulation of camera feed data Car owners also avoid inflating their claim amounts by misrepresenting past damage in their claim by concealing it entirely, for instance by adding stickers over damaged areas or by covering it with new damage altogether.

AI and data analytics can assist insurers in detecting fraud as it happens and connecting previously disjointed data sets to enhance the process. This provides greater control over fraud prevention while offering customers a seamless customer experience.

Artificial intelligence can also help to prevent fraud. In the past, people have hidden damages on their cars during video inspections to increase the value of their cars. These hidden damages are usually covered with stickers, which make it hard for the tool to detect the true extent of the damage. The latest AI-based solutions offer an automated inspection process that can eliminate manual processes. Using the machine learning model on the image of damaged car, an insurance company can predict the extent of a claim before it is even filed. Machine learning-based workflows analyze the damages, estimating the costs of repair and identifying damaged components.

One of the benefits of this approach is the user-based system, which allows for more personalization in the claims process. It also relies on user behavioral patterns to identify potential problems. our AI-based auto damage inspection approach uses smart accidental damage pattern analysis to separate new or old damages. It can be used by car rental services, car repair services and motor vehicle insurers to streamline the claim process and increase customer satisfaction.

The advent of machine learning in the car insurance industry has transformed the way policies are priced and claimed. These advancements in AI have helped insurers to better price their policies, identify suspicious patterns, and prevent fraud. As more insurers use machine learning for claim processing, they are also improving their customer service. AI can help insurers reduce the number of complaints they receive and make the claims process faster and easier. It can also suggest car insurance add-ons to customers. A machine learning model can analyze a large amount of data to generate a fraud suspicion score. The score is measured by the accuracy of a model's predictions. Compared to rules-based systems, models with higher precision can identify more frauds. Car insurance companies can use these algorithms to develop and implement customized policies to best serve their customers. It can also be used to spot fraudulent claims and flag them for further investigation.

Machine learning is a data-driven, automated approach that helps us identify fraud and reduce human error. With AI, we can process claims quickly and efficiently, reducing our risk of false claims. The auto insurance industry is a huge profit center. It is estimated that fraudulent insurance claims cost US insurers approximately $40 billion[1] each year. By incorporating AI into claims processing, we can reduce the costs of investigating fraudulent claims, and speed up claim settlements. As per insurance

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