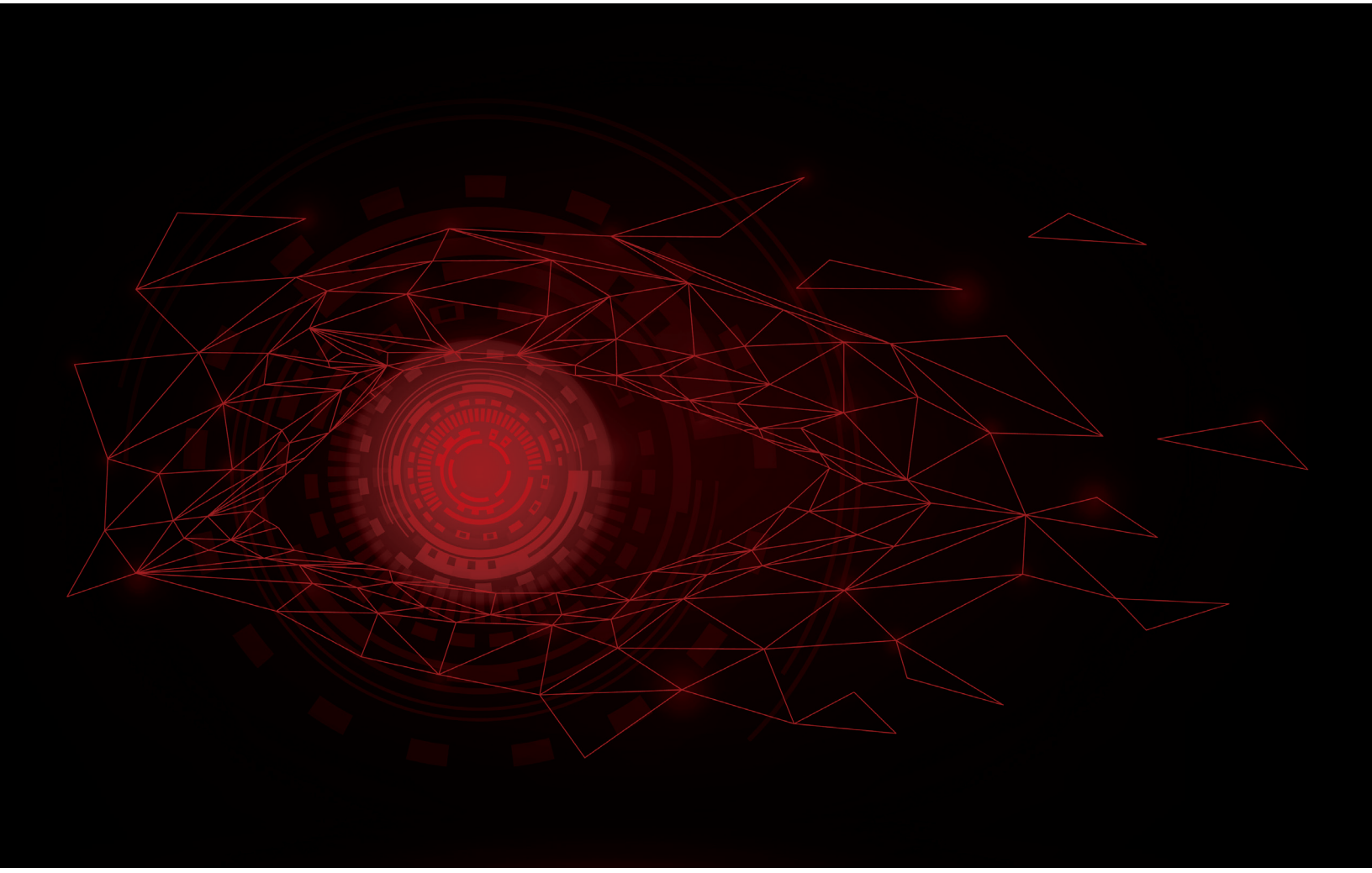
THREE WAYS COMPUTER VISION IS CHANGING P&C INSURANCE



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INTRODUCTION

Human vision initially consists of two parts: identification and categorization. We then analyze what we are seeing and, if appropriate, make decisions based on this analysis. For example, when we look at a vehicle, we first identify its characteristics such as color, make and model. Then we sometimes categorize it by its condition, i.e. "That's a beautiful 1967 Volkswagen Beetle." This process of identification and categorization is innately human, and we take it for granted, but it's exceptionally complex.

Over the past decade, we have helped computers develop the ability to see; a realm of computer science referred to as computer vision – a process in which a computer obtains images or videos, identifies aspects of the image, and then categorizes them and makes decisions based on this analysis.

Computer vision is a field of deep learning within machine learning, which in turn is a field of artificial intelligence (AI). AI can mean many things, but at its core, it is about simulating human intelligence. Traditionally, computers have only been able to perform tasks they have explicitly been programmed to do. With some forms of AI computers demonstrate intelligence through learning and problem-solving.

Computers learn to see through exposure to new objects and feedback on previously identified objects. For computer vision to be successful, a computer must be exposed to many images and videos. Computers must also, after analyzing images, receive feedback on their analysis.

Computer vision is exceptionally complex, and a computer must be capable of interpreting and analyzing billions of variables.[1] For example, for a computer to determine a vehicle's make, model, and level of damage, it must be familiar with all the makes and models of all vehicles on the road. The computer must also be familiar with the almost infinite number of different ways that a vehicle can be damaged.

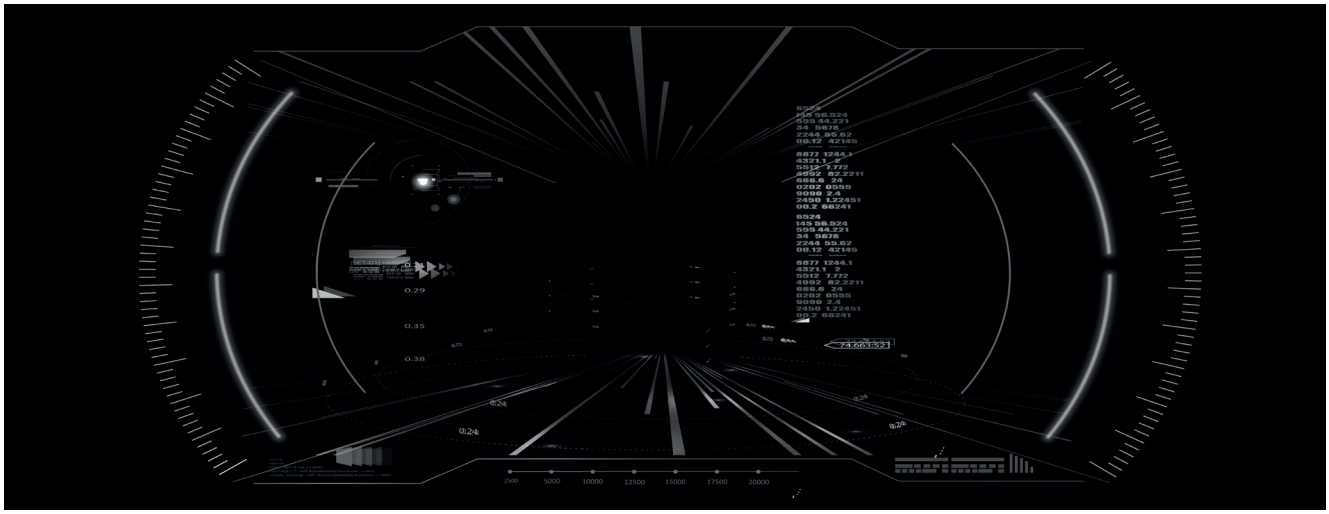
Computer Vision's Application to Insurance

The application of computer vision has the potential to transform the property and casualty insurance (P&C) industry. At a high level, computer vision can, and is starting to, improve safety and accuracy throughout the insurance lifecycle.

It has the potential to help individuals and insurance companies throughout virtually all the stages of the underwriting and claims lifecycles. Overall, computer vision can augment the humans to engage in more precise

underwriting, reduce the need for adjusters to physically inspect properties, reduce risks through better risk management, reduce human error and fraud, and significantly speed up the application and claims processes.

The following use cases highlight how computer vision can enhance safety, accuracy and efficiency throughout the insurance process:



Scenario 1:

Drones Using Computer Vision to Assess Roof Damage

Traditionally, after a policyholder files a claim with their insurance company for roof damage, a property adjuster must climb a ladder to assess the damaged roof which is dangerous. According to the United States Department of Labor, property adjusters experience an average of 78 injuries per million site working hours, which is almost four times the injury rate of average construction worker.[2] Drones using computer vision technology help assist property adjusters by assessing roof damage in a faster, safer, and more efficient manner.

Kespry, an industrials drone manufacturer, produces drones that can fit into a suitcase-size carrying case. The adjuster still travels to the insured's property and programs the coordinates of the property on an iPad, creating a polygon around the property. After the adjuster selects an area to inspect and a flight pattern, the Kespry drone autonomously takes flight. Kespry drones have self-flying capabilities, but adjusters must still monitor them when they are in flight. (It's also worth noting that all other Federal Aviation Administration (FAA) drone rules still apply – such as no-fly zones near airports.)

As the drone does its 'inspection,' it transmits data and imagery to the adjuster. When a drone inspects properties, it uses photogrammetric imaging, which involves taking many pictures and using them to develop either a 2D or 3D model of the site. The drone can measure the dimensions of a roof with great precision, enabling it to determine roof damage more accurately and safely than previously possible.

Some drones also possess additional, sophisticated capabilities. Kespry drones can use artificially intelligent algorithms to identify anomalies on roofs caused by hail strikes and wind and then directly input their findings into claim management software. Arch Aerial drones, which use global positioning technology to set precise flight parameters, are programmed with obstacle-avoidance technology that minimizes their potential for crashing.

After Hurricane Harvey struck Southeast Texas in September 2017, both Allstate and Farmers Insurance used drones to assess subsequent roof damage. The CEO of Farmers claimed that, through using drones, the company reduced the time it took to assess hurricane-damage claims from three homes per day to three homes per hour.[2]

Drones can also be used to inspect a wide variety of property damage. After Hurricane Harvey, local, state and federal agencies used drones to inspect roadways, railroad tracks, water plants, oil refineries and power lines in Houston and its surrounding areas. Moreover, the drones improved accessibility by getting to areas humans could not. Drones not only helped in damage assessments but assisted in finding stranded people and pets.

In 2016, the FAA lessoned restrictions on professional drone use, leading to an increase in the number of insurers that use drones. In 2018, 17 percent of commercial drones were used by insurance agencies, and Goldman Sachs estimates that business and civil governments will spend $13 billion on drones between 2016 and 2020.[3] Drones can benefit the insurance industry through a combination of improved efficiency and productivity, improved employee safety and reductions in fraud. Drones that possess computer vision technology continue to assist property adjusters, reducing their risks of injury and allowing them to perform their jobs with greater accuracy and efficiency.

Scenario 2:

Photo Claim Service for Damaged Vehicles

Today, large insurance companies like Allstate, MetLife and Esurance offer photo claim services that allow drivers to submit photos of their vehicle's damage through their mobile phone after which a human does the damage assessment. Since 2013, Allstate has offered a QuickFoto Claim feature on their Allstate® Mobile App. When an Allstate customer sustains minor damage in an accident, they can open the Allstate app on their mobile device and upload photos of both the damage and their entire vehicle. Then, an Allstate claims adjuster receives the photos and uses them to assess the vehicle's damage to determine the payout. This service makes the claims process faster and easier.

The U.K.-based company Tractable was founded in 2014 and uses artificial intelligence and computer vision to assess images of vehicle damage and estimate repair costs. Tractable's artificially intelligent photo estimating system is trained through what Tractable Chief Commercial Officer Adrien Cohen refers to as 'supervised learning.'[4] This type of machine learning (with human teaching) is especially common for computer vision because of the sheer number of samples required.

The system was initially fed hundreds of millions of images of damaged parts, their corresponding repair estimates and information about what was done to fix damages. This method of supervised learning enables Tractable's system to excel at image classification, and the system can accurately identify and classify a significant number of individual exterior auto parts. The system can then determine each exterior level of damage and indicate if each part should be repaired, replaced or left alone. Because Tractable's system has seen millions of claims, it can often predict when minor exterior damage is likely concealing hidden damage. In addition, the program's accuracy only improves over time. Tractable's founders believe their system can assess 70 percent of auto collision claims.[5]

In October of 2017, Tractable partnered with Mitchell, a collision repair and claims management solution provider, to launch Mitchell WorkCenter Assisted Review. Mitchell WorkCenter Assisted Review is the first artificially intelligent claims review solution for the P&C industry. WorkCenter Assisted Review analyzes photos of vehicle damage and compares them to claims adjusters' assessments. The program then identifies estimates and recommended repairs (such as repairing or replacing specific parts) made by claims adjusters that are likely inaccurate. This technology serves as an additional layer of protection to double check assessments made by claims adjusters. Mitchell claims this solution allows insurance carriers "to more easily maintain estimate quality and consistency, be more selective about sending appraisers into the field, and improve cycle times and productivity."[5]

CCC Information Services Inc., a company that provides software and technology for automotive collision repairers and P&C insurance carriers, launched Smart Estimates in December 2018. This technology is like WorkCenter Assisted Review in that it analyzes images of car damage and pre-populates estimated repairs. After Smart Estimates pre-populates estimates, claims adjusters can then review, edit or advance these estimates. Overall, photo claims services that use computer vision enable claims adjusters to assess damage and determine payouts with greater speed and accuracy.

Scenario 3:

Computer Vision for Risk Management and Employee Safety

Businesses that engage in comprehensive risk management solutions face lower levels of risk and reduced cost of coverage. Computer vision is helping companies reduce the probability of claims occurring in the first place which gives insurers greater confidence in underwriting.

Mobileye, the makers of an advanced driver assistance system, offer collision avoidance technology using computer vision. Mobileye places cameras on the front of vehicles, and its system monitors the inputs from these cameras. The system alerts drivers when it detects threats, such as when drivers veer out of their lanes or when they speed. This system also contains automated braking technology. Mobileye technology is highly effective, and after Dish Network installed this technology in their fleet of vehicles, they experienced an 88 percent reduction in collisions.[6] Businesses and individuals can adopt this technology to reduce automobile accidents and lower insurance costs.

Smartvid.io was founded in 2015 and uses artificial intelligence to improve safety in the architecture, engineering and construction (AEC) industry. Smartvid.io's collection of artificially intelligent engines, which the company has collectively named VINNIE, use computer vision technology to enhance safety on industrial sites. VINNIE can rapidly analyze, tag and flag photos and videos that contain potential safety risks. For example, VINNIE can assess if workers are wearing hard hats and safety vests. VINNIE can also identify potentially risky environments or practices, like workers standing on scaffolding.

During a recent test, VINNIE was able to sort through 1,080 images of construction sites, correctly detect 446 images containing people, and flag 32 images of workers missing hard hats and 106 images of workers missing safety-colored clothing in under ten minutes. When a human attempted the same task, it took four and a half hours while only identifying 414 images containing people.[7] Today, VINNIE can only recognize a few categories of safety issues, but Smartvid.io is adding new categories to enable to system to recognize additional potential safety risks.

Computer Vision is Here, Now

Computer vision technology is and will continue to enable businesses and adjusters to perform their jobs faster, more accurately, more efficiently and with greater safety than ever before. Computer vision technology, businesses, and insurance companies can better determine damages, estimate necessary repairs, and identify and control for risks.

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