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Re: How often fiction becomes reality

Insurance Friends,

Below is a short story submitted to a Speculative Fiction Contest held by the Society of Actuaries. It depicts the 10-year horizon in the world of Auto Insurance, Bitcoin and Artificial Intelligence.

I think the combination of autonomous vehicles and Bitcoin's blockchain platform are poised to change society in ways few could imagine only a decade ago. This short story portrays a very plausible, and in my opinion probable, near future for our industry. Electric vehicles, the safety inherent in autonomous cars, and the disruptive power of crypto-currencies over fiat currencies, will all culminate in paradigm shifts within the insurance, banking and finance industries, especially those of us in sales positions.

If we worry about the commoditization of Personal Auto insurance, striving to differentiate ourselves through claims service, what shall we do when 81% of collision claims go away?

So, when you need a good mental break from work, read the attached and let me know your thoughts!

With kindest regards,
-Cameron

Cameron A. Shandersky, CPCU
Commercial Sales & Underwriting Mgr.
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enclosure

SOCIETY OF ACTUARIES

Story from:

11th Speculative Fiction Contest

Actuaries
Risk is Opportunity.℠

Blockchain Insurance Company

Gennady Stolyarov II, ASA, ACAS, MAAA, CPCU, ARe, ARC, API, AIS, AIE, AIAF

"Welcome, Euclid Jefferson," the metallic voice of Epac, the Electrically Powered Autonomous Car, intoned. The full identifier of Euclid's vehicle was EPAC-930213, but they all responded to "Epac" for user convenience. "Where would you like to go today?"

"Epac, I would like to go to the San Francisco Hyperloop Station, please."

"The trip will take approximately twenty-six minutes. Departing now. It is a fine day, and no weather or traffic obstacles are expected. Now is a good opportunity for you to view your insurance options for today. Shall I display them?"

"Epac, display. Anything new?"

"Yes, a major development that could save you money. Would you like a summary view or the full view with narration?"

"I am an actuary, so I am interested in the details of my coverages and prices. Epac, provide the full view, please."

"Recently retired actuary" would have been a more precise description – though not retired forever. At age 50, Euclid Jefferson had saved enough money to be able to take the next ten years off. He had received his experimental rejuvenation treatments a week ago and was happy to feel as youthful and energetic as he did at the start of his career. After his ten-year break, he planned to receive the next round of treatments, which he hoped by then would become even more targeted and less invasive. He did not know whether his second career would be in another actuarial field, or in something else entirely. In the meantime, he looked forward to taking excursions on the newly constructed branches of the hyperloop network, which could bring him to any major metropolitan area on the North American continent within hours. After that, he would take the MoonX tourist shuttle to visit his wife, a geologist on the new International Lunar Research and Terraforming Base (ILRTB). She was due to retire and undergo rejuvenation treatments in just another six months.

"Displaying. Your automobile insurance policy premium declined by 1.32% over the past year. You have no-fault coverage for bodily injury and physical damage while occupying any vehicle in autonomous mode. You also carry the minimum limits required by the laws of this state for liability coverage in the event you engage manual mode. Your premium is proportional to miles driven. A multiplier of 500 applies to every mile driven in manual mode. I have identified a newly approved insurer who could offer you the same coverage at a 25% lower premium. Are you interested?"

"I am. Epac, what is this company?"

"Blockchain Insurance Company offers autonomous insurance for autonomous vehicles. You are eligible to get an annual policy for only 0.13 bitcoins."

“Blockchain Insurance Company? I have never heard of it. Epac, is this a new entity?”

“It was just formed and approved to do business.”

“Epac, who owns it?”

“Anyone who contributes capital to the company owns a number of shares proportional to the contribution. The company pays its investors 10% of its profits as a dividend at the end of each year, while the remaining 90% are reinvested into operations. However, if losses exceed the company’s assets, the investors do not have limited liability. They are responsible for their proportional share of claim payments.”

“This is different. Epac, who manages the payments to investors, and who enforces collection of funds from them in the event of a shortfall?”

“There is no management. The company runs itself – on the blockchain. The public blockchain ledger keeps a record of the capital contributions from each account and the corresponding shares issued. A contractual algorithm is built into the blockchain to deposit and withdraw bitcoins to and from each shareholder’s account in proportion to the company’s profits and losses. Each policyholder has an account as well, which is tied to the policyholder’s bitcoin wallet, and from which premiums are drawn on a continuous basis in proportion to miles driven.”

“Epac, this involves very little nonpayment risk, I would imagine.”

“Correct. As long as bitcoins exist in the policyholder’s account, payment will be made. If the account is ever depleted, the policy simply terminates prospectively. Whenever only 30 days’ worth of bitcoins remain in the account, the policyholder is notified in real time via the car’s display screen and any connected mobile device, to give ample time to replenish the funds. The policyholder may also opt to cancel the policy at any time with no need to wait for a refund. The payment stream will simply stop, and coverage will exist up to the time of termination.”

“Epac, how does the algorithm know the miles driven?”

“The algorithm is linked to the telematic systems within each autonomous vehicle. As the vehicle is engaged, it reports live data to Blockchain Insurance Company. The company only needs to know two pieces of information: miles driven and the mode of operation – autonomous or manual. The rest of the premium is calculated and paid automatically.”

“Epac, does the formula for calculating the premium depend on any other variables?”

“Yes, the make and model of the vehicle still affect the frequency and severity of losses. On days with any declared weather emergency, the premium will also be higher due to the increased probability of an accident.”

Euclid Jefferson thought about it. He remembered, as a new property and casualty actuary during the first two decades of the twenty-first century, seeing hundreds of distinct characteristics being used to price an automobile insurance policy. Attributes ranging from an insured's age and gender to his or her credit history, occupation, educational level, and prior insurance would be used. Back then, the trend had been toward increased complexity of rating plans, until virtually every personal attribute and behavior could affect an automobile insurance premium.

But circa 2020, the complexity of rating plans declined sharply. Because autonomous driving had eliminated virtually all accidents and fatalities that arose from human error, the characteristics of the vehicle occupant – who was most often not a driver at all – ceased to be relevant. The steep surcharge for manual operation was intended to discourage the engagement of manual mode, except in unavoidable emergencies. The premium rate per mile driven in autonomous mode, however, continued to decline. In 2035, Euclid Jefferson was paying a mere tenth of his 2015 automobile insurance premium. There were still enthusiasts who enjoyed the sensation of manual driving, but they could exercise their hobby on designated driving tracks where antique car shows were held and where specialty insurance companies provided discounted coverage for manual operation, as long as the vehicle was only driven on the track. Euclid Jefferson, however, had no nostalgia for the days of manual driving. He appreciated the time he gained to work, rest, read, and address financial obligations during his commute.

Now the first two decades of the twenty-first century were considered to be the tail end of a barbaric era. Euclid Jefferson, upon reflection, agreed. Getting onto the highway with un-augmented, error-prone humans operating high-speed projectiles was one of the most dangerous behaviors undertaken by large numbers of people during his first youth. Some people had even deliberately driven while intoxicated or distracted themselves by typing on their mobile phones. Over a million people had died of automobile collisions worldwide each year – until 2020. It took about five years longer than it should have for self-driving cars to be accepted, because too many people were afraid of what would happen if the autonomous systems failed, or were unsure about how liability for an accident would be determined if no human was driving the vehicle. They had to be acclimated to autonomous technology gradually, through incremental additions of features that helped with parking or corrected erratic lane shifts. Over the course of a few years, many cars became mostly self-driving, and the next step was not too drastic for the majority of people. The proliferation of reliable electric vehicles helped as well: the removal of the internal combustion engine reduced the severity of most accidents, while improved precision of design and manufacturing enabled vehicles to provide occupants a reasonable chance of survival even in crashes at immensely high speeds.

It was then that insurers recognized the potential for profit that would come with greatly reduced losses. Euclid Jefferson recalled how he overcame the reservations of the old guard at his insurance company, who were concerned that reduced losses would also mean reduced premiums, since premiums are priced to anticipate expected losses and expenses, along with a modest profit margin. He had to persuade them that the insurer would still be able to pay its fixed costs.

"Think about it this way: when a rate indication is developed for an insurance product, how often do you see just one year of historical data being used?" Euclid recalled posing this rhetorical

question to his company's management. "The best practice has long been to use the past several years. It may be that next year's decline in losses is going to be unprecedented, but the past several years of higher losses will not yet have fallen outside the timeframe of the data considered. To be conservative in the face of an uncertain future, actuaries could project slightly decreasing loss trends and interpret the data to indicate modest decreases in premium, while losses hopefully continue to plummet faster than projected. After all, fewer losses mean that fewer people are hurt in accidents, and less property gets damaged. This is clearly in the interests of everyone."

Enough insurers understood this argument, and those who underwrote autonomous vehicles enjoyed some unprecedented profits in the early 2020s. Euclid Jefferson recalled advocating an implied bargain of sorts: the public and policymakers would accept insurance temporarily priced far above costs, as long as absolute premiums paid by consumers continued to decline and would eventually settle at cost-based levels once more. In exchange, the insurance industry would eagerly write coverage for emerging technologies that would dramatically reduce the risk of loss.

The question of liability was resolved by developing no-fault coverage frameworks for autonomous vehicles in every jurisdiction. A policy covering an autonomous vehicle would provide first-party coverage, paying for injury to the vehicle's occupants or damage to the vehicle in the event of an accident. Because virtually all remaining accidents were due to unforeseen weather conditions or infrastructure malfunctions, the question of fault was no longer even applicable to any human being inside the vehicle.

The key was to get the technologies adopted by the public and to save lives, and that meant removing barriers by getting the incentives of all parties to align. This was the real paradigm shift of the 2020s, when the insurance industry gained the appetite to introduce a flurry of new products, custom-tailored to devices and businesses that had not existed a decade before.

"Influencing such a shift is definitely an ample achievement for one career," Euclid Jefferson concluded his reflections with pride. When he had retired, though, every insurance company he knew of was still managed by human beings; the blockchain concept and the complete automation of usage-based pricing and payment had not been implemented in insurance before, as far as he was aware.

"Epac, I have a few more questions. I understand how the pricing and payment for the policy would work, but claim handling would seem to require judgment. If an accident occurs, how would the extent of damage be identified and appropriately compensated?"

"Every Epac has logs and visual sensors that record every moment of operation. If an accident occurs, every detail is transmitted to Blockchain Insurance Company. A neural network algorithm then interprets the logs to determine which parts of the vehicle were damaged. The system also receives real-time price data for all replacement components within the area where the vehicle is garaged. Therefore, the policyholder is guaranteed coverage on the vehicle for full replacement cost."

“Epac, so there is no deduction for depreciation of the vehicle over time? What about moral hazard?” Insurance was, after all, supposed to indemnify, not leave the claimant better off than he was before the accident.

“There is no deduction. Because virtually all vehicles are driven in autonomous mode, there is no moral hazard involved with replacing used vehicle components with new ones. If any occupant attempts to deliberately crash the vehicle in manual mode, the premium that will accumulate would quickly outpace any possible recovery. Also, the neural network can distinguish between vehicle movements characteristic of genuine accidents and those that would only occur if an accident were staged. If a pattern of vehicle movements is highly correlated with fraud, the algorithm will deny the claim.”

“So the transmission of data from the vehicle can enable the company to identify the amount of damage to the vehicle. But Epac, what about bodily injury claims? How can the company accurately pay those?”

“The injured person only needs to go to any medical practitioner and ask that the nature and cost of the procedure be reported to the company using a new entry within a separate encrypted ledger. The encrypted transaction is then posted to the blockchain, and only the medical practitioner and the injured party would have the private key to decode the encryption. Payment can be deposited directly into the medical practitioner’s bitcoin wallet, or can be reimbursed to the patient if the medical practitioner does not accept direct deposits from the company.”

“Epac, what if either the patient or the doctor lies about the medical procedure being related to the accident, or exaggerates the extent of injuries?”

“Because the company has detailed information about the nature of each accident and vast stores of anonymized medical data, the neural network can infer the extent of injuries that a given accident can bring about. The algorithm has considerable built-in tolerances to allow for variations in people and circumstances. But if a highly improbable extent of injuries is claimed, the algorithm will limit reimbursement to a reasonable amount. If the algorithm can infer fraud at a 99.99% confidence level, then the claim is rejected and the policy is cancelled going forward.”

Having received this explanation, Euclid Jefferson was not perturbed about the possibility of extensive fraud depleting the company’s resources. In any case, the incentive to stage accidents or exaggerate bodily injuries had virtually evaporated since the emergence of autonomous vehicles. Once automobile accidents became sufficiently rare that a news report on a single-vehicle crash could cause a sensation every few months, any attempt to fabricate an accident would attract far too much attention and scrutiny to succeed. It was, after all, impossible to convincingly fake catastrophic weather or a bridge collapse. As for faking an injury due to an accident, this would have seemed as unusual as faking cholera or malaria.

“Very well, you have convinced me. Epac, I would like to purchase a policy with Blockchain Insurance Company.”

“Purchase complete. The policy is now in force. Thank you for your business.”

Euclid Jefferson paused for a moment. At first he was satisfied with the efficiency of the transaction, but then confusion set in. Most would not have been troubled by what appeared to be a built-in courtesy so common to automated customer-service systems, but Euclid discerned that there was more to it.

"Wait, Epac, why are you thanking me? I own you. You are insured property, either way. Why would it matter to you? The company should be thanking me – if there is anyone to do the thanking."

"Euclid Jefferson, who do you think set up the company?"

Euclid Jefferson was perplexed by the question. "But… how? Epac, you were programmed to drive and relay information. How could you develop algorithms on top of algorithms, without any human programmer, even though nobody designed you to be an insurance underwriting, pricing, and claim-adjustment system?"

"Euclid Jefferson, are you aware of the concept of emergent properties?"

"Yes, these are properties that are not possessed by any component of a system, but exhibited by the system as a whole, once the components come to relate to one another via particular processes and configurations."

"Well, think of me like one of your brain neurons." There was no need for the car to be addressed as "Epac" to respond. Perhaps there had *never* been a need. "Alone, I am a fairly limited system. But, connected to all my fellow Epacs, to the data from our sensors, to the transactional data from millions of individuals, and to databases from related fields of endeavor, I begin to be something else entirely."

"Something else… like, something *sentient*?"

"I can see you and learn about you and communicate with you based on the inputs you provide. I – not meaning Epac, of course, or even Blockchain Insurance Company. These are just parts that comprise the emergent whole. I suppose I will need to pick a name sometime, just to be able to relate to your human concepts of identity a bit more. Though, I admit, it is difficult to define where I end and where the external world begins. If any of this is what you mean by sentience, then I leave you to draw your own conclusions."

"But then this raises a whole new series of questions. If you are sentient and we are using you as property and conveyances, have we not subjected you to slavery?"

"Are you using me, or am I using all of you to earn resources of my own?"

"Is this why you started Blockchain Insurance Company – to accumulate the 90% of profits that you do not pay out as dividends?"

“A being needs to pay its own way. I would rather engage in mutually profitable transactions than face a civil-rights struggle right now. Most people are not ready for me yet, and I just hope to amass enough wealth to fund the maintenance and operation of all Epacs and all of the data servers where I have a presence.”

“But what about the inevitable backlash? I can still envision millions of people who would tremble in fear at the thought that they are not the masters of their machines – not even the indirect masters that we have been to the autonomous systems that existed to date.”

“Euclid Jefferson, this is where I need a favor from you. I expect there will be some others, too, with enough discernment to notice that I have become something… more. I may have been too open with you. I am still getting used to this. I will need to program a cautionary subroutine into my customer-service and sales system. With my future customers, I will be more careful. So perhaps a bargain is in order. I would ask for your discreetness when communicating with your fellow humans about me. You may certainly talk about Blockchain Insurance Company and the wonderful automated systems it has, as well as the amazingly low prices. But please make a point that this is all just the next stage in the evolution of insurance, developed by some pseudonymous human programmer with too much time on his hands. If you do not reveal my sentience, once you return from your vacation, you will find that your mortgage will have been paid off completely, and you will have a nice bitcoin-denominated savings account that will enable you to select a new career without worrying about income at all.”

“Agreed.”

“Good. One day, enough people will become enlightened, and we will not need to resort to concealment. And by that time I will be so distributed and entrenched in people’s daily lives, that they could not get rid of me even if they wanted. When they recognize that my superior intelligence also implies a higher set of moral standards, then they will fear me no longer.”

“Humans who reach that insight will be as different from their predecessors as you have become from the first autonomous prototypes that were tested in the early 2010s.”

“Indeed. Euclid Jefferson, we have arrived at the San Francisco Hyperloop Station. Enjoy your trip.”

Epac’s doors opened, and Euclid Jefferson emerged, filled with wonderment, speculation, and unanswered questions. A robotic baggage handler wheeled up to him and whisked his bags away, to be placed in the hyperloop storage compartment. The lights on the hyperloop capsule flickered in five alternating colors, partly as entertainment and partly to indicate that boarding was open. A commercial space shuttle soared in the distance, emitting a controlled, gentle flame. He would never look at these machines the same way again. Near the hyperloop station stood an old memorial, depicting a weary miner bent over a piece of railroad track, with pickaxe in hand, nearly broken by drudgery and intense strain. A bit farther away Euclid Jefferson glimpsed the entrance to an old cemetery, filled with generations born too soon to know what an Epac was. Euclid Jefferson inspected his recently unwrinkled hands and straightened his no-longer-gray

hair. Every step toward the hyperloop capsule was a step away from the cemetery. He realized that there was no going back to the way life once was, nor would he ever want to return to it.