Swiss Re Institute

The Intelligence behind Artificial Intelligence

AI pioneer Jürgen Schmidhuber on life, health, bots, markets and business

7 November 2018

This document provides a compilation of the most relevant quotes for the insurance industry derived from the conversation between Professor Jürgen Schmidhuber and Thomas D. Meyer held on 7 November 2018 at the Swiss Re Institute.

Q WHAT CAN BE EXPECTED OVERALL?

A

"I think it would be naïve to expect that in the long run humans will be in charge of everything."

"Within a few decades, small computational devices might carry an LSTM with has as many connections as you have in your brain. Fast electronic connections, not just slow biological ones."

"The next wave of AI is about machines that interact with the world, shaping the incoming data through their actions. In academia, that is already an old hat but now it is going to become commercial, and you will have all kinds of machines and robots that are going to learn complicated things. With a little bit of help from humans, but also just by themselves, just by trial and error and clever artificial curiosity, they are going to become smart assemblers of all kinds of complicated products."

Q

HOW IS AI ADDING VALUE TO INSURANCE COMPANIES?

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"[...] Maximizing rewards – and here the reward is profits for insurers [...] – is about discovering learning algorithms that, through interaction with the world, figure out how to come up with action sequences that maximize these profits. This has been going on for decades in research, but now it's moving into the mainstream. All kinds of processes will be controlled through reinforcement learning machines with deep neural networks like LSTM that learn to maximize the rewards. [...]

For example, if you are a big insurance company and you have sources of profits – which are your clients – you want to optimize pricing for the clients and you want to optimize risk management as you are [...] getting sensory feedback from the world through satellites that help you predict whether certain natural catastrophes are going to happen or not. You are interacting with the world and as you're learning to better predict how the world behaves, you are learning to optimize the actions that lead to better deals for your company. This is just an application of the old principle of reinforcement learning. In principle, we know how to do that and in some certain limited cases, we can do it very well already – better than any human. So to me, it would be surprising if this won't generalise in the next few decades and if it won't invade every part of the economy and transform every aspect of our civilization."

Q HOW ABOUT HARNESSING DATA FOR THE GOOD OF SOCIETY?

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"At the moment, there is a huge commercial pressure towards human-centric, human-friendly AI because the big companies want to sell you something. And you will buy only stuff that you feel makes you happy. That is why almost all of AI research at the moment is about making human lives easier and happier and longer and healthier."

"In particular, almost all of medical diagnosis is going to be superhuman. This will fundamentally change the business of many health care professionals. And it is also going to affect what insurance companies do. For example, politicians here in Switzerland are already discussing how to deal with privacy rights of patients on their data."

"What you really should have in place is a market economy for data where every patient can become a micro-entrepreneur and figure out the value of his/her data. Let's look at the different participants in this data market scenario: patients, hospitals, data companies.

- Patients with a rare form of cancer can offer much more valuable data than patients with a very typical form of cancer. From this data, an AI company can learn through artificial neural networks to predict whether similar patients are going to die soon or whether there's a chance of helping them. This can be done without violating data anonymity.

- Hospitals and their machines are needed to extract the data, e.g., through magnet spin tomography, radiology, evaluations through human doctors, and so on.

- Companies who are interested in the data. For example Siemens, Google or IBM would like to buy annotated data to make better artificial neural networks that learn to predict pathologies and diseases and the consequences of therapies.

Now, each patient should become a micro-entrepreneur who owns his/her data, and the market's invisible hand will decide about the data's price through the interplay between demand and supply. On the demand side, you will have several companies offering something for the data, including insurance companies who would like to get access to patient data to better predict whether their patient portfolios are going to be profitable or not. On the supply side, each patient in this market should be able to profit from high prices for rare valuable types of data. Likewise, competing data extractors such as hospitals will profit from gaining recognition and trust for extracting data well at a reasonable price. The rules of the market will make the whole system efficient through incentives for all that are doing a good job.

As an early adopter of a regulated, privacy-protecting marketplace like that, Switzerland (or other countries) could not only improve the incentives within the country for better healthcare. Once enough people have gained trust in the system, it will become attractive for foreign patients as well, and the model could be exported to the rest of the world. […] It's a very exportable thing and it is totally relevant for what insurance companies are doing."

[…] At first glance, a marked-based system seems detrimental to the interest of certain industries because they would have to pay for the data - some might prefer a monopoly where they get the data for free. However, given that suddenly every patient, every guy on the street, would have an incentive to share his or her data under certain anonymity constraints, I think there will be lots of companies that will be thriving based on the availability of this market-evaluated data. And I think the insurance companies will be among the first to profit from that."

Q

WHAT ARE HURDLES FOR FASTER AI IMPLEMENTATION?

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There are two types of hurdles: technical hurdles and legislation. As for technical hurdles, computers aren't fast enough yet for the next AI wave. At the moment your brain is apparently a faster and cheaper and more efficient computer than our artificial neural networks. We may have to wait for a few decades maybe to match that advantage. Then, there are possibly missing fundamental learning algorithms, although I think most of the basic insights are in place. In principle, we know how to build machines that not only learn but also learn how to learn, that have artificial curiosity and stuff like that. These puzzle places still have to fall in place in a good way but I think many of the basic ideas are already there.

But then there's also legislation. There, the question is how lawmakers will react to new possibilities. For example, suppose that the next generation of self-driving cars is about 100 times safer than human drivers. Then the lawmakers will say that now it has to become mandatory, even if in one out of 100 cases the human would have made a better decision than the self-driving car. But if I can reduce the number of deaths per million persons by a factor of 100 per year, then that's such a strong incentive that many countries will say: let's do it. On the other hand, legislation is always something that comes slowly, and in many countries you have lots of vested interests and lobbies which are not really extremely interested in certain laws. Different countries have different approaches to that. Countries where you have established car manufacturers with strong lobbyists are probably not going to make self-driving cars mandatory as quickly as countries where the car industry is young like in China [...]."

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HOW SHOULD INSURERS IMPLEMENT AI?

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"For an insurance company, which is dealing with all kinds of insurance cases, there are so many use cases. Satellite data can help to predict business: There's a company which is looking at parking lots in front of supermarkets from space just to predict whether business is going well. You can also evaluate satellite data to predict the success of certain crops this year, which has an influence on the option market in Chicago etc. So there are lots of data that an insurance company can use to predict what will be its losses this year or its unexpected profits, and to optimize the latter. So I guess large insurance companies should have a significant machine learning department, systematically going through all the potential use cases, and where it really makes sense, employ more people there – or maybe better a start-up company specialized in that.

But what about the smaller companies? Switzerland and large parts of Europe are about small and medium-sized enterprises. Many of them are world market leaders in certain niche markets. [...] These companies find it difficult, even if they are profitable, to hire one or two machine learning experts because at the moment they are really expensive and Chinese and American companies easily pay a million per year for well-known experts. [...] So what can be done to help these SME's? Maybe it's a good idea to have some industrial policy in place, which sends experts from one small enterprise to the next just to try to figure out where are the use cases in this enterprise, what can be improved, and maybe some of these companies then will suddenly realize, hey, if we do that and that and if we introduce that kind of AI maybe we can scale our business as quickly as some of the businesses in China and America."

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for further content on AI and its impact on the insurance industry.

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