

AI & MACHINE LEARNING DISRUPTION TIMELINE CONFERENCE

Timothy Aeppl

The biggest question is not whether AI will disrupt business and society, but when?

How fast?

Of all the questions hanging over artificial intelligence (AI) and machine learning, perhaps the biggest is how fast these technologies will disrupt business and society.

Will advances come in waves, separated by spells of relative stability as new devices and machine capabilities are integrated and adapted—or are we on the cusp of breakthroughs that will come one after another in rapid succession?

“We think we’re at the early stages of an even bigger inflection point” than the development of steam engines—which was the opening salvo of the industrial revolution—said MIT Sloan Professor and IDE Director, [Erik Brynjolfsson](#). He addressed 300 researchers, entrepreneurs, and business leaders at the [MIT AI & Machine Learning Disruption Timeline Conference](#) earlier this month. This time it’s not muscles augmented by machines, “but our minds” and white-collar work that’s being augmented, he said.

Mapping a timeline for how this will unfold is crucial, even if it gets redrawn again and again by surprise advances and setbacks. That’s how innovation works. But Brynjolfsson noted there’s an urgent need for a roadmap: How fast changes will wash over society influences everything from what kind of labor and social policies we need, to how businesses should train and retrain its workers.

The future “won’t be a world without work,” he said, but one in which more jobs are fused with AI and machine enhancements. It was a theme repeated by many others at the conference where various versions of the future were offered.

HUMANS + MACHINES FOR THE NEAR-TERM?

[Elliot Turner](#), the Director of Offering Management at [IBM’s Watson](#) division, agreed that new AI-based machines and cognitive systems will augment—not replace—humans. AI has perfect memory, he said, but there is a long period ahead in which humans will be the only ones that can understand the emotion and nuance required for many business and consumer tasks. Both machines and humans will be needed for optimal performance of the new systems.

But questions abound over what kind of jobs will be created or replaced, and whether the disruptions hit some social groups harder than others. Take rapid advances in self-driving vehicle technology. So-called “mobility services” will continue to spawn new kinds of jobs, but could also endanger paychecks for truckers and taxi drivers, two fields often staffed by workers with minimal formal education. Many at the conference expressed concern that the rise of autonomous vehicles could definitely lead to inequality.

Yet, an informal survey of 140 attendees at the conference showed that nearly 80% expect wage disparities to improve as AI is introduced in the next 25 years. (See Chart 1).

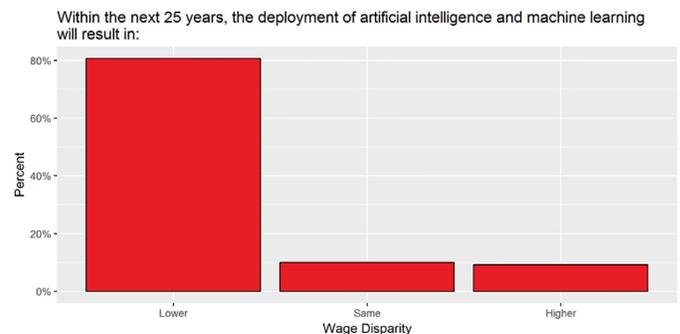


Chart 1



AI & MACHINE LEARNING DISRUPTION TIMELINE CONFERENCE

Timothy Appel

Coming up with a timeline for driverless technology is a good example of how difficult it can be to map the future—even for experts in the field. [Gill Pratt](#), head of the [Toyota Research Institute](#), told attendees that he “wasn’t going to guess” how soon driverless cars will achieve what’s known as Level 5—the capability to operate safely on crowded city streets alongside cars driven by humans.

That level of capability requires a machine that can anticipate and respond to often unpredictable and even irrational human behavior. Still, there’s optimism that breakthroughs are on the horizon. The IDE survey of conference attendees showed over half expected that 50% of highway miles will be driven by self-driving vehicles within about 15 years. Another 30% said it would come even sooner (See Chart 2).

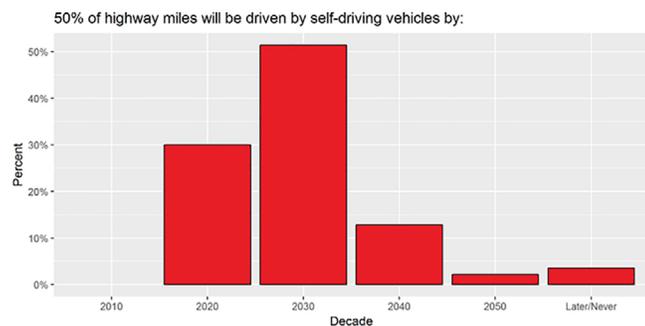


Chart 2

In his view, MIT Professor [Tomaso Poggio](#) said there could be autonomous cars in cities today, but only if no human drivers were allowed to share the road.

Tomaso illustrated the advances made over recent years by showing a 20-year-old video in which sensors on a car driving on a European street misidentified many items, including a lamppost mistaken for a pedestrian. The same street view done more recently shows huge refinement, including no lamppost mix-ups. But Tomaso said advancements in driverless technology are nearing a “plateau,” because we’re getting closer to human-level

capabilities. He predicted Level 5 self-driving cars will be a reality in “20 years plus.”

Pratt, from Toyota, said factors other than technology will guide how fast AI and machine learning generally are adopted, including the national character of the country involved. As a result, some applications might move ahead more rapidly than others: For example, Toyota is using research on mobility to develop robots that could be used to aid elderly people in their homes.

What Americans want won’t be the same as the Japanese, Pratt said, which will influence the timeline for adoption as well as what those machines will do. Housekeeping, for instance, is considered a “noble art” in Japan, something the elderly want to keep doing well into advanced years, whereas, robotic housekeeping is one of the first things Toyota thinks elderly Americans will embrace.

BUSINESS OPTIMISM

Despite geographic differences, businesses are driving their own AI timelines—often focused on what they can do for customers right now using existing technology. [Nicola Morini Bianzino](#), head of the Global AI Practice at Accenture, sees businesses like his rushing full speed—as evidenced by where they’re putting their money. “I expect that 20% of every dollar spent on tech in five years will be for AI,” he said.

MIT IDE Co-Director, [Andrew McAfee](#), pushed business leaders on a panel he led at the conference to consider the potential “bad” consequences of AI—including the possibility of heavy job losses.

[Colin Parris](#), VP for Software Research at the General Electric Global Research Center, said some jobs will be displaced, but often in the service of creating a safer and more effective work environment. He gave the example of helicopter pilots who fly over oil rigs, looking for corrosion or other flaws in the structures. It’s dangerous work. GE is now developing a system using teams of low-cost drones which do that job without endangering pilots.

AI & MACHINE LEARNING DISRUPTION TIMELINE CONFERENCE

Timothy Aepfel



IDE Co-Director, Andrew McAfee (left), listens to GE's Colin Parris, at the conference. Elliot Turner of IBM looks on. (Photo: Dave White)

"If I lose one" of the four or five drones flying over a rig, he said, "it's not a big deal," a helicopter crash is a disaster.

Another example is a device GE is developing for neonatal intensive care units to correct a major design flaw where the alarms on cribs sound constantly—80% of them with false warnings. GE is using AI to connect devices that can analyze alarms to determine if there is a real danger, said Parris. That technology will improve the efficiency of nurses and also the well-being of tiny patients.

PREPARATION LACKING

One glaring problem highlighted during the conference was the lack of adequate preparation—by governments, schools, and other institutions that need to respond to the coming AI revolution. MIT Professor and economist [David Autor](#), who moderated a panel on skills and labor, said even jobs that don't disappear could be negatively impacted by the new technology.

For instance, he noted that skilled electricians have traditionally developed their own relationships with customers, which helped them control and set prices for their services. Now, however, Autor said you can buy

a light switch on Amazon and pay on the site to have someone install it.

"So those jobs are becoming embedded in the technology," he said. "They're no longer personal—they're commodified."

Most agreed that the U.S. government needs to step up its game with more training targeted at preparing workers for what comes next, and aiding those who are likely to be harmed. But no one is ignoring how difficult that will be at a time when Washington appears poised to cut back on spending for many kinds of training and workplace safety nets.

In fact, on Mar. 24, Treasury Secretary Steven Mnuchin [startled many in the technology community](#)—and beyond—by saying he didn't think there was any urgency to develop policies in anticipation of AI and machine learning. Speaking at a conference [organized by Axios](#), he said he was "not at all" worried about job displacement and that the timeline for such disruption is in the distant future—50 or 100 years away.

The solution isn't to slow AI development, but rather to use advancements to boost economic growth and wealth creation, said [Jason Furman](#), a former top economic adviser to President Barack Obama, and now a senior fellow with the Peterson Institute for International Economics.



Jason Furman speaks at the IDE conference. (Photo: Dave White)

AI & MACHINE LEARNING DISRUPTION TIMELINE CONFERENCE

Timothy Aepfel

Getting to that point, however, is the grand challenge that economists, business leaders, and technologists are trying to address.

Timothy Aepfel is a reporter for Reuters and a Research Affiliate with the MIT IDE.

MIT INITIATIVE ON THE DIGITAL ECONOMY

The MIT IDE is solely focused on the digital economy. We conduct groundbreaking research, convene the brightest minds, promote dialogue, expand knowledge and awareness, and implement solutions that provide critical, actionable insight for people, businesses, and government. We are solving the most pressing issues of the second machine age, such as defining the future of work in this time of unprecedented disruptive digital transformation.

SUPPORT THE MIT IDE

The generous support of individuals, foundations, and corporations are critical to the success of the IDE. Their contributions fuel cutting-edge research by MIT faculty and graduate students, and enables new faculty hiring, curriculum development, events, and fellowships. Contact Christie Ko (cko@mit.edu) to learn how you or your organization can support the IDE.

TO LEARN MORE ABOUT THE IDE, INCLUDING UPCOMING EVENTS, [VISIT IDE.MIT.EDU](http://IDE.MIT.EDU)