

## AI and the Future of Work Meeting, MIT Nov 1 2017, Opening Remarks

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Welcome, everyone, to MIT! I'm so glad that you can join us for these important conversations on artificial intelligence and the future of work.

I'd like to extend a special welcome and thank you to the President of MIT, Rafael Reif, whose support has helped make this event and so much of what we do possible. President Reif is here to kick off our meeting. Please join me in welcoming him.

I'd also like to welcome all the speakers and panelists who will be sharing their thoughts and experiences with us, including today's keynote speakers, Yann LeCun of NYU and Facebook, and Eric Schmidt from Alphabet.

Over the next two days, this symposium will cover a broad range of topics related to the future of work, from technology to business, from law to economics, ethics, sociology, and everything in between. This blending of perspectives has never been more important, as we seek to understand how our world will change, and how we can work together to make sure that change is one that benefits us all.

That there are changes won't come as news to anyone in this room. Today, telepresence enables students to meet with tutors and teachers, and doctors to treat patients thousands of miles away. Robots help with packing on factory floors. Networked sensors enable monitoring of facilities, and 3D printing creates customized goods.

We're surrounded by a world of possibilities— possibilities that will only get larger as we start to imagine what we can do with advances in artificial intelligence and robotics.

Picture a world where routine tasks are taken off your plate. Fresh produce just shows up on your doorstep, delivered by drones. Garbage bins take themselves out, and smart infrastructure systems support automated pick-up. AI assistants—whether embodied or not—act as our guardian angels, providing advice to ensure that we maximize and optimize our lives to live well and work effectively. How will we live in the future? How will we learn? How will we work? How will we get to work? How will we get paid? What will we do for leisure? How will we ensure that everybody's life will be better?

Technology has the potential to support us from local challenges—like making riding to work easy and safe—to global issues. As a society, we have a lot of big challenges to solve: inequity, affordable housing, health care, jobs, education, safety, climate change, fake news, and everything in between. Technology in general—and AI in particular—can be an incredible vector for positive change as we work together to figure these things out. It can bring us together. It can give us ways to navigate the truth in a world inundated with alternative facts. It can take care of the routine stuff, and that gives us more time to focus on solving the issues that require creativity, collaboration, and strategy.

I know this sounds optimistic. AI is not going to solve all of our problems any more than it is going to destroy the world. Today AI can crunch numbers, and remember, and make predictions better than people can, but AI can't reason, communicate, nor understand the world like we do. It lacks common sense.

This doesn't mean AI isn't a powerful tool. Only that it isn't humans or machines. Consider instead humans *and* machines. Working *together* with AI systems, humans can augment and amplify many aspects of work and life.

For example, already today, businesses are using AI to understand what customers are saying on social media posts -- in near-real time. Systems can automatically alert business on supply chain issues.<sup>1</sup> Microsoft recently announced that its speech recognition has reduced its error rate to 5.1%, matching the error rate of multiple

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<sup>1</sup> <https://www.forbes.com/sites/tompopomaronis/2017/08/29/11-tech-leaders-share-insights-on-artificial-intelligence-and-what-actually-matters/2/#551fe981c1ff>

human transcribers in a widely recognized accuracy test.<sup>2</sup> Google translate has made it possible to have instantaneous translations.

Imagine the impact of these advances on our ability to communicate easily with each other no matter what our native tongue, through instantaneous translations, and on our ease of giving instructions to everything from robots in factories to our cars.

Speaking of cars... The Credit arm of the Ford Motor Company is testing new software that uses machine learning to help underwriters better assess the loan applications they receive. The makers of this software believe that it will make a huge difference for people without credit histories, who today struggle to get loans.<sup>3</sup>

Machine learning is powering many other services: product recommendations, prevention of money laundering, even energy efficiency. A division of Google's DeepMind team was able to improve the cooling efficiency at Google's own data centers by more than 40%. Data centers consume about 3% of global energy usage each year—so imagine the impact on the environment if we could apply these systems across the world.<sup>4</sup>

As the barriers to entry go down, we're likely to see opportunities for businesses of all kinds to take advantages of what AI can do. In some cases, that may include transforming entire industries. Take the medical field, for example.

CSAIL's Regina Barzilay has teamed with doctors at MGH to use machine learning to improve detection and prevent over treatment in breast cancer. Their method correctly diagnosed 97 percent of the breast cancers as malignant and reduced the number of benign surgeries by more than 30 percent compared to existing approaches.

DeepMind is teaming with doctors to train AI to help plan treatments for cancer. IBM's Watson AI is being trialed by doctors at 55 hospitals around the world because of its success rate at identifying tumors.<sup>5</sup> AI is also enabling the discovery of new treatments. In the past, it took around 12 years to get a new drug to market, with a cost of about \$2.6 billion. But now, machine learning algorithms allow computers to "learn" how to choose what experiments need to be done.<sup>6</sup> Recently, researchers using this technique announced that they'd already seen promising results in delaying the onset of ALS.<sup>7</sup>

AI is not replacing doctors. It can't sit down with patients, discuss their diagnosis, or review treatment plans. But it CAN help doctors make the right diagnoses and recognize all the available treatment options—all while freeing up time to actually spend with their patients.

I like to share this last example because I think it speaks to a big concern that many people have about AI. AI advances show what humans and machines can do when they work together. But this also raises questions about whether AI will put humans out of jobs, and brings fears of losing control and stability in our lives.

This concern is exactly the kind of issue we are here today to address. Because while I don't believe we can stop the advance of technology, I do think we get to decide on some of the consequences.

The workforce will be changing. Just as agriculture was deeply changed by machines in the past, there will be profound changes due to the advancement of AI and robotics. Today we start the conversation to figure out

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<sup>2</sup> <https://www.geekwire.com/2017/microsoft-claims-new-speech-recognition-record-achieving-super-human-5-1-error-rate/>

<sup>3</sup> <https://www.americanbanker.com/news/ford-motor-credit-tests-ais-ability-to-spot-overlooked-borrowers?brief=00000158-07c7-d3f4-a9f9-37df9bc10000>

<sup>4</sup> <http://www.wired.co.uk/article/mustafa-suleyman-deepmind-google-ai>

<sup>5</sup> <http://www.bbc.com/future/story/20170914-spotting-cancer-stopping-shootings-how-ai-protects-us>

<sup>6</sup> <https://techcrunch.com/2017/03/16/advances-in-ai-and-ml-are-reshaping-healthcare/>

<sup>7</sup> <https://www.usnews.com/news/technology/articles/2017-08-10/how-ai-robots-hunt-new-drugs-for-crippling-nerve-disease>

how change could be for the greater good. How can professions be enhanced with machines taking on monotonous of tasks, leaving more time for people to apply their expertise?

We have to think about how to prepare all parts of our society for a future with machines. In a recent open letter to Jeff Bezos published in Boston Globe, it was suggested that every school should have a computer science teacher. This is music to my ears. Education will play an even more crucial role and as we think about the skill set required by the new world, it is important to define literacy for the 21<sup>st</sup> Century. I believe knowing how to make things and how to program them, knowing how to solve problems with computers should be part of our standard K-12 education. But we also need life-long learning programs to help people adapt to working with machines. We need to embrace life-long learning as a way of life.

Some creative organizations are taking steps at retraining—for example, Bit Source, who you will hear from tomorrow is retraining coal miners into data miners to fill today's many open coding jobs. Universities are offering MOOCs, for example, MIT EdX. Companies are also stepping up. Google has recently committed \$1 billion for programs to retrain workers, and Steve Wozniak announced his own online tech education platform.

What life-long learning programs will look like, how to build them and pay for them, and what should be the role of universities and companies, are open questions. It's one of the many discussions on this topic that will need to take place to bridge the gap between technologists, economists, businesses, and policymakers. I hope that's a conversation that we will have today.

I'm so pleased to welcome some of the visionaries that we'll be hearing from over the next two days. Today, we'll hear from our keynote speakers Eric Schmidt, Chair of Google's parent company, Alphabet, and Yann LeCun, the Director of AI Research at Facebook. They will discuss the state of the art and opportunities in AI.

Tomorrow, we will welcome the leaders of BitSource, the Kentucky company who is retraining miners using the insight that the reasoning skills needed to problem-solve in a coal mine could also be put to great use in working with computers.

Throughout our program, you'll be in the capable hands of our moderator, John Markoff, a Pulitzer Prize winning reporter who has covered developments in technology for decades. John has over 2,000 bylines to his name, most for the New York Times, and was one of the earliest writers to cover topics ranging from the first significant computer virus to the emergence of the web browser and the rise of artificial intelligence.<sup>8</sup> I have full faith that in his hands, we'll be able to uncover new insights and find common ground.

These two days are the beginning of many important conversations. They represent an important opportunity for us to challenge ourselves to see technology as something that unites people. When I came to the US in 1982, I left behind an oppressive dictatorship with food shortages, suppressed freedoms, persecutions, and great fears. Today, I live what many people would call the American dream—and I get to be here to discuss important issues with you. What should we do to build a world where the American dream holds true for everybody? To shape a future for our country that holds hope for everybody? One where we attract the best people in the world to work together to build their dreams and a society that supports innovation and entrepreneurship, embraces meritocracy and life-long learning, and enables people to benefit from the prosperity that technology can bring. Where everybody finds meaningful ways to contribute with purpose.

Technology has the potential to give us the tools to build this better world. I'm excited to begin these conversations together today, and I hope you are too.

Thank you.

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<sup>8</sup> <https://www.wired.com/2016/12/i-covered-tech-for-the-times-for-28-years-and-now-my-time-is-over/>