

The Competitive Landscape for Machine Intelligence

by Shivon Zilis and James Cham

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Three years ago, our venture capital firm began studying startups in artificial intelligence. AI felt misunderstood, burdened by expectations from science fiction, and so for the last two years we've tried to capture the most-important startups in the space in a one-page landscape. (We prefer the more neutral term "machine intelligence" over "AI.")

In past years, we heard mostly from startup founders and academics – people who pay attention to early, far-reaching trends in technology. But this year was different. This year we’ve heard more from Fortune 500 executives with questions about machine intelligence than from startup founders.

The State of Machine Intelligence, 2016

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These executives are asking themselves what to do. Over the past year, machine intelligence has exploded, with \$5 billion in venture investment, a few big acquisitions, and hundreds of thousands of people reading our earlier research. As with the internet in the 1990s, executives are realizing that this new technology could change everything, but nobody knows exactly how or when.

If this year’s landscape shows anything, it’s that the impact of machine intelligence is already here. Almost every industry is already being affected, from agriculture to transportation. Every employee can use machine intelligence to become more productive with tools that exist today. Companies have at their disposal, for the first time, the full set of building blocks to begin embedding machine intelligence in their

businesses.

And unlike with the internet, where latecomers often bested those who were first to market, the companies that get started immediately with machine intelligence could enjoy a lasting advantage.

So what should the Fortune 500 and other companies be doing to get started?

Make Talent More Productive

Enterprise Functions

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One way to immediately begin getting the value of machine intelligence is to support your talent with readily available machine intelligence productivity tools. Some of the earliest wins have been productivity tools tuned to specific areas of knowledge work – what we call “Enterprise Functions” in our landscape. With these tools, every employee can get some of the powers previously available only to CEOs.

These tools can aid with monitoring and predicting (e.g., companies like Clari forecasting client-by-client sales to help prioritize deals) and with coaching and training (Textio’s* predictive text-editing platform to help employees write more-effective documents).

Find Entirely New Sources of Data

The next step is to use machine intelligence to realize value from new sources of data, which we highlight in the “Enterprise Intelligence” section of the landscape. These new sources are now accessible because machine intelligence software can rapidly review enormous amounts of data in a way that would have been too difficult and expensive for people to do.

Imagine if you could afford to have someone listen to every audio recording of your salespeople and predict their performance, or have a team look at every satellite image taken from space and

determine what macroeconomic indicators could be gleaned from them. These data sources might

already be owned by your company (e.g., transcripts of customer service conversations or sensor data predicting outages and required maintenance), or they might be newly available in the outside world (data on the open web providing competitive information).

Rethink How You Build Software

Let's say you've tried some new productivity tools and started to mine new sources of data for insight. The next frontier in capturing machine intelligence's value is building a lasting competitive advantage based on this new kind of software.

But machine intelligence is not just about better software; it requires entirely new processes and a different mindset. Machine intelligence is a new discipline for managers to learn, one that demands a new class of software talent and a new organizational structure.

Most IT groups think in terms of applications and data. New machine intelligence IT groups will think about applications, data, and models. Think of software as the combination of code, data, and a model. "Model" here means business rules, like rules for approving loans or adjusting power consumption in data centers. In traditional software, programmers created these rules by hand. Today machine intelligence can use data and new algorithms to generate a model too complex for any human programmer to write.

With traditional software, the model changes only when programmers explicitly rewrite it. With machine intelligence, companies can create models that evolve much more regularly, allowing you to build a lasting advantage that strengthens over time as the model "learns."

Think of these models as narrowly focused employees with great memories and not-so-great social skills – idiot savants. They can predict how best to grow the business, make customers happier, or cut costs. But they'll often fail miserably if you try to apply them to something new, or, worse, they may degrade invisibly as your business and data change.

Enterprise Intelligence

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All of this means that the discipline of creating machine intelligence software differs from traditional software, and companies need to staff accordingly. Luckily, though finding the right talent may be hard, the tools that developers need to build this software is readily available.

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For the first time, there is a maturing “Stack” (see our landscape) of building blocks that companies can use to practice the new discipline of machine intelligence. Many of these tools are available as free, open-source libraries from technology companies such as Google (TensorFlow), Microsoft (CNTK), or Amazon (DSSTNE). Others make it easier for data scientists to collaborate (see “Data Science”) and manage machine intelligence models (“Machine Learning”).

If your CEO is struggling to answer the question of how machine intelligence will change your industry, take a look at the range of markets in our landscape. The startups in these sections give a sense of how different industries may be altered. Machine intelligence’s first useful applications in an industry

tend to use data that previously had lain dormant. Health care is a prime example: We’re seeing

predictive models that run on patient data and computer vision that diagnoses disease from medical images and gleans lifesaving insights from genomic data. Next up will be finance, transportation, and agriculture because of the volume of data available and their sheer economic value.

Your company will still need to decide how much to trust these models and how much power to grant them in making business decisions. In some cases the risk of an error will be too great to justify the speed and new capabilities. Your company will also need to decide how often and with how much oversight to revise your models. But the companies that decide to invest in the right models and successfully embed machine intelligence in their organization will improve by default as their models learn from experience.

Economists have long wondered why the so-called computing revolution has failed to deliver productivity gains. Machine intelligence will finally realize computing's promise. The C-suites and boardrooms that recognize that fact first – and transform their ways of working accordingly – will outrun and outlast their competitors.

**The authors' fund has invested in this company.*

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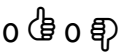
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