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The Value of Machine Learning

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There's a lot of hype out there today about Artificial Intelligence (AI). Some people are forecasting various job destroying, doomsday scenarios. The good news is that we are nowhere near the dystopia of Terminator movies that the term sometimes seems to suggest. Just how intelligent is AI, and what can it do? What sorts of problems can these technologies solve in your company? How should you be organizing yourself around tackling these problems?

How intelligent is AI, anyway?

Artificial intelligence is an umbrella term that refers to a number of different approaches and technologies. Recognizing language either written or spoken, recognizing images, and recognizing patterns in various data sets to categorize things or make predictions are types of uses for AI.

Machine Learning or Deep Learning are other terms sometimes used interchangeably with AI, although Machine Learning techniques are a subset of the overall AI landscape. At a high level, machine learning takes a data set, represents it mathematically, and applies some mathematical formulas to it, looking for patterns to emerge. A machine learning model trains on a data set, and then you further use the model to make predictions outside the training data set.

A few words of caution: Just because a pattern exists, it doesn't necessarily mean that the pattern can teach you anything more interesting. Also, it's easy to have various biases exist in your data without realizing they're there.

However, there is a tremendous amount of great work going on right now in the area of interpretation and explanation of AI models. Some extraordinary steps are being made in the usefulness of these outputs. But it is still a computer model that must first be trained to solve specific problems.

What sorts of problems can you solve with AI?

The various cloud vendors (AWS, Microsoft, IBM, Google, etc.) offer some AI-based services out of the box. These capabilities can be leveraged directly on the right types of problems. Two examples of these out of the box capabilities are image recognition and language recognition.

With image recognition, you could tie this into CCTV systems or production cameras to identify patterns or particular events automatically. There is also a lot of drone activity happening in industry right now, and the drones are producing incredible amounts of picture and video data about operations and assets. Plugging this data into a powerful image recognition engine can reap significant benefits.

On the language side, many companies are introducing automated chatbots to route customer interactions in the right direction, either connecting them to a sales representative, or helping them with technical challenges. I personally have had a number of positive interactions with websites that offer a chat option instead of a phone number. Often, it's tough to tell whether you're interacting with a human being or not. Language recognition and speech can be used in the same way on a phone system. You can implement similar internal systems for connecting different departments or providing services to employees. If implemented correctly, these systems can reduce costs and improve the effectiveness of the service.

Beyond these out of the box functionalities, of course, lies the broad realm of machine learning. Any problem with many potential variables and a rich data set can be the fodder for a deep learning model. If the problem only has a few variables and is relatively straight forward to solve in a spreadsheet or database, it's probably overkill to solve it with AI. But there are many scenarios in the sales and marketing world, logistics, operations, and maintenance, where the data gets overwhelming, and the number of potential variables rises significantly. In these

situations, an AI model can tease out patterns and predictions that a spreadsheet never can discern.

What do we need to do to prepare to leverage these capabilities?

Data science is a new and exciting science, focused on gleaning new insights from data, and building up mathematical models that underpin the machine learning models. If you don't have a data science team in your company, you should consider it. They don't replace the traditional technology skillsets around databases and applications and infrastructure. They shouldn't be competing teams. Ultimately, it may make sense for the traditional technology and data teams to sit together. But to get things started, they probably should be separate. You want the data team to be relatively unconstrained in looking for insights and innovations.

What is the current state of your data? There's probably some work to be done to start pulling your data together in such a way that it can be leveraged by a new data science team. You shouldn't need to spend multiple years and many millions of dollars cleansing every bit of data. If your data is in particularly bad shape, however, then you may indeed have some significant work to do here. You don't need to aim for perfection or purity. But a designated effort is enough to start solving a few big problems.

There's an exciting world opening up around AI and machine learning. We're certainly getting closer to being able to interact with a computer in a natural way, and deep learning models can now be trained to solve ever more complex problems that we've always just tackled with intuition and best guesses. Now, we have a computational approach to these types of problems. To remain competitive in this modern landscape, every company should start looking to see what vexing problems they can tackle with ML / AI technology.