

The startling breakthrough in Machine Learning from 2016.

It's here! It's now! The ignored moment that will revolutionize 2017.

Without a doubt, Machine Learning had a watershed year in 2016. Looking back, there were many exciting showcases, releases of new frameworks and victories. The pioneers of Machine learning applied the techniques to new problems and improved its performance on existing applications.



In review of 2016, everyone's mind is drawn to the major victory of [AlphaGo](#). AlphaGo is a computer program developed by Google to play the board game [Go](#). AlphaGo is powered by deep neural networks combined with reinforcement learning. [Its defeat of 9-dan professional Go champion Lee Sedol](#), surpassed even the optimistic expectations of the Artificial Intelligence community. The victory has been suggested as a "tipping point" for the success of Deep Learning.

Go is a notoriously difficult game for AI, with an enormous game search space that was only determined in early 2016 and is over [171 digits in length](#). To put this in perspective, this is more than the estimated number of atoms in the universe! And you thought chess was hard!

As a result, Go is notoriously difficult for computers. Each turn generates more player options (resulting in this huge search space)! Combine this, along with difficulty in being able to clearly assess whom is winning – and you have a perfect storm of combinatorial mathematics making it hard for any algorithm to succeed.

Solving and thriving in this space, requires an entirely different approach than “Deep Blue”, the IBM chess computer that defeated chess champion Garry Kasparov in 1997. Deep Blue had hard-coded rules that were developed to reduce the size of its search space. AlphaGo by contrast, is pure machine learning, meaning that it's learning over time to make the best moves for its given situation.

That's what everyone is talking about. It's significant and substantial and I wouldn't want to ignore this victory. However, there's something that's barely as whisper – and it's more significant than all the other victories and advances combined from 2016.

For in 2016, Machine learning has reached what I'm calling its "Inception point".

For those unfamiliar with the [2010 classic film Inception](#), it's a futurist mind-bending drama where the technology to be in people's dreams has been developed. Without spoiling the plot of this worthwhile film, I'll mention that the idea of "being in a dream, within a dream" plays out. The film bends the mind in these recursive ways, making the viewer wondering what is real, what is a dream, and what is a dream within the dream. But what does this have to do with Machine Learning?



Those familiar with my [Introduction to Machine Learning for Data Science](#) course will know that Machine Learning does just one thing. It gives us a predictive model, that we can feed data (or a scenario) into, and see a suggested outcome. Data is, as I teach [in my course](#) – everywhere! But selecting the right data, applying the right algorithm, and getting meaningful results is the artful domain of the Data Scientist, whom mixes Mathematics, Technical Skills, and Domain Knowledge.

But this is still data. Anyone in the industry, knows, deep in their hearts that there is a moment to which a Machine Learning algorithm, would be applied to the problem of applying a machine learning algorithm itself. Mind-blown? Let me put it another way.

We now have machines that are learning, and now "learning how to learn". It's a mind-bending, and rather "meta". But I think it's the most exciting development in Machine Learning in 2016, and will have substantive impacts in 2017. For the first time, in 2016 – Automated Machine Learning systems (AutoML) were able to compete with human Data Scientists.

It's only a matter of time, before tools like [TPOT](#) (A Python tool that automatically creates and optimizes machine learning pipelines using genetic programming), will meet and exceed the capacity of human experts. An open source project, TPOT is developed by [lead developer Randy Olson](#) and has already started to rank in the 90th percentile on several Kaggle data science competitions.

Archimedes said, "Give me a place to stand, and a lever long enough, and I will move the world. ". We are emerging from an industrial society, where our tools extend our physical reach. In the world of the digital future, digital tools will give us the ability to extend our intellectual reach. Soon, we'll stand on the shoulders of AutoML data scientists, allowing for everyday people to enrich their lives with the outcomes data science can bring.

The only question is – what will you do with it?