Artificial Intelligence has been in the top news almost every day in the past year, but which achievements can be considered as true breakthroughs? Here is a list of our top 10 picks (in no particular order):

1) Deep Blue

The legendary game against Kasparov that proved intelligence machines were here to stay. It was the first time that something received as much publicity. This also came as a big surprise because in previous games the computer never had a chance. Kasparov won the 1989 match, and although he lost the first game in the 1996 match, he won all the rest. And then, just a year later, the unthinkable happened. Deep Blue, believed to be able only to calculate 5 moves ahead, seemed to calculate 20 moves ahead (compared to 10-15 for Kasparov) and won the match, leaving a deep scar in Kasparov’s mind. For a captivating interpretation, take a look at [this post](https://fivethirtyeight.com/features/rage-against-the-machines/) by Nate Silver.

2) ELIZA

The first known chatbot, ELIZA can converse on any topic. It was developed by Joseph Weizenbaum from MIT in 1965 with the intention to emulate a psychotherapist. Take a look at [this online implementation](http://www.manifestation.com/neurotoys/eliza.php3), does she seem intelligent enough? If not take a look at the next point.

3) Siri, Cortana, Jarvis, Duplex

Virtual assistants can chat with you or manage your schedule, manage appointments, or even fool around with witty remarks and jokes. Although conversational software existed long before these particular ones, never were they so well-made. Instead of having a million hardcoded responses, these new assistants can decide what that best answer is based on your questions using Machine Learning techniques. Furthermore, they even have their own voices, which is a great feat in itself.

4) Computer vision

In 2012 a Neural Network developed by Google managed to correctly differentiate between cats and dogs by watching YouTube videos. Big deal. Or not? Over the past 5 years the field of Computer Vision has evolved tremendously and made available techniques that can easily classify more than 1000 different objects (see [ImageNet challenge](http://www.image-net.org/challenges/LSVRC/)), using the computing power of the average smartphone.

5) Jeopardy!

In 2011 [IBM’s Watson defeated Jeopardy!’s champions Rutter and Jennings](https://www.youtube.com/watch?v=WFR3lOm_xhE). This means that Watson achieved a great level of understanding of Natural Language, enough to both understand and answer (or should I say ask) questions.

6) Back-propagation & Neural Networks

This is the algorithm that makes Neural Networks work. It was originally developed in the mid-1980s but up to the 2000s they were shunned by the A.I. community as not efficient enough. Advanced in computational power, including the widespread use of computer graphics cards, or GPUs, turned the tables and gave Neural Nets the leading edge.

7) Prolog

A computer programming language that enables logical programming. Suited for solving problems like:   
Condition 1: “If it is raining, take an umbrella”,   
Condition 2: “It is raining”  
Result: “Take an umbrella”

8) Reinforcement learning

A technique that helps a computer program learn by doing. Being a top notch Mario World player ([MarI/O](https://www.youtube.com/watch?v=qv6UVOQ0F44)) or a stickman that learns to walk and run like a human ([DeepMind](https://www.youtube.com/watch?v=gn4nRCC9TwQ)), reinforcement learning can do it all. The biggest moment was perhaps winning the board game of Go (more on that later) and the video game of DotA ([OpenAI wins in DotA 2](https://www.youtube.com/watch?v=jAu1ZsTCA64))

9) Self-driving cars

A car that can drive, and even park, by itself, straight out of a 60s, or 70s fiction movie is now a commonplace occurrence. Using radars, laser light, GPS, cameras for computer vision, it can detect and recognize anything in its path be it a road sign, pedestrian, a pet, or your not-so-friendly neighbor ready to be pulverized! Jokes aside, autonomous cars promise increased safety and security, mobility and reduce crime. Texting, reading a book, watching a movie, or even working will definitely be better uses of lost transportation time.

10) Alpha Go / Zero

AlphaGo is a computer program designed by Google’s DeepMind team for playing the [game of Go](https://en.wikipedia.org/wiki/Go_(game)), and it one-sidedly won the world champion, Lee Sedol, 4-to-1. It is powered by a deep neural network that uses a technique called Monte Carlo tree search. Go is much more complex than chess and brute force search algorithms aren’t enough. AlphaGo’s newer version, AlphaGo Zero achieved better results, faster, and more importantly, without any human data. It learned to play the game by constantly playing against itself. Were it to try chess, it could probably learn to play within less than a day![[1]](#footnote-1) Comparing ratings, Lee Sedol has about 3500 rating, while AlphaGo had 3700, but AlphaGo Zero is estimated at about 5200, going 100-0 against the version that defeated Lee Sedol!!

1. https://arxiv.org/abs/1712.01815 [↑](#footnote-ref-1)