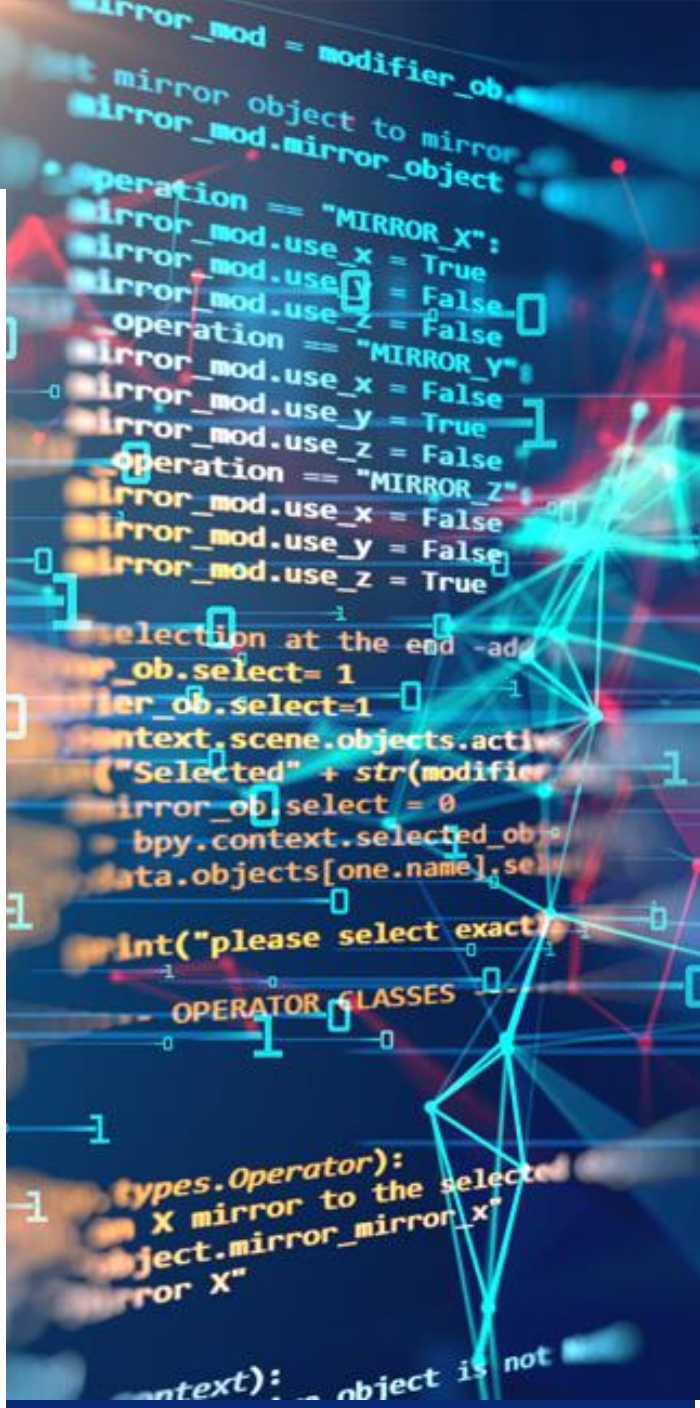
Machine Learning



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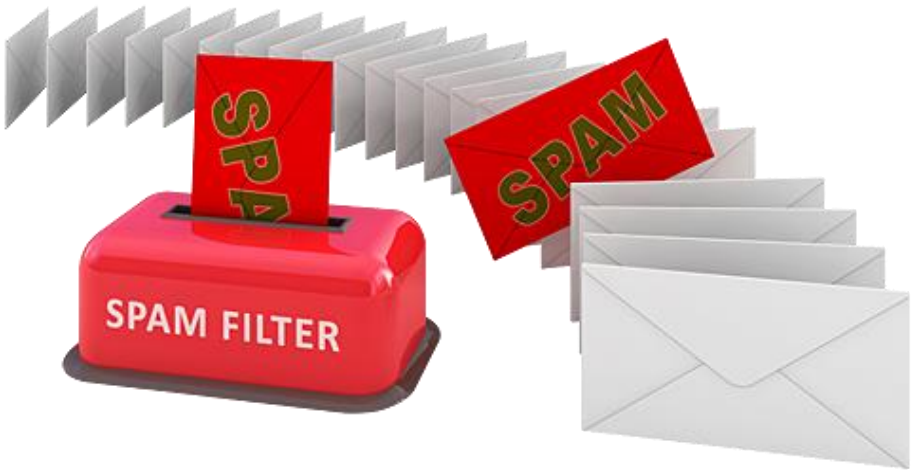
What Is Machine Learning?

Machine Learning is a split from artificial intelligence (AI) that is focused on creating applications and projects that learn from previous and current data and improve their accuracy over a set or indefinite time period without being directly programmed to do so.

Algorithms are trained to find patterns and feature massive amounts of data and computing in order to make choices based on the current data being created. The more advanced and the longer an algorithm runs the more accurate and thoughtful the decisions come to be, as more data is being used to process the machine learning AI becomes more stable.

There is machine learning in many things all around us, some examples include Digital Assistants, Such as Google Home and Amazon Echo's. These use machine learning in voices to do simple commands such as setting a timer or playing music but also to search the web and answer strange questions the participant may have.
Robot Vacuums also use machine learning to gradually get better at navigating a room, so you will not have to deal with constant banging into walls. Even things like spam detectors for emails are machine learned, as it would be impossible for actual people to sit and look at every email to see if it is considered spam or not.



How does Machine Learning work?

There are typically 4 steps behind creating a success machine learning project.

Step 1:

The first step is to pick and prepare a set of training data, training data is a data set hat the machine learning model will take its ideas from to solve the problem that is meant to be solved.

. Training data needs to be properly prepared, whether that is randomized, or checked for flaws, imperfections and biases that could hinder the training.

Step 2:

Step two is choosing the algorithm in which the training data set will run. Some different algorithms commonly used include but are not limited to the following:

- **Regression algorithms**

  Linear regression is used to presume the value of a variable based on the value of an independent variable (

- **Decision trees**

  A decision tree uses classified data to make recommendations based on a set of preprogrammed decisions and rules.

- **Instance-based algorithms**

  Uses classifications to estimate how likely a data point is to be a member of one group, or another based on proximity

- **Clustering algorithms**

  Focuses on groups of similar records according to the group in which they belong to.

- **Neural networks**

  An algorithm that defines a layered network where different calculations are performed and make different conclusions.

Step 3:

The next step is to train the algorithm to create the model. This is a iterative process in which variables run through the algorithm comparing the output with the results. Adjusting itself to produce a more accurate and complete result

by running itself over and over in different generations.

Step 4:

The last step is to use the model with new and improved data, and it will hopefully improve in accuracy and productivity over the time in which it is ran. Where the data will come from depends on the application and the problem.

Machine Learnings Impact

Machine Learning has a mostly positive impact on the future, with it advancing many technologies such as:

Self-Driving Cars:

With the use of Machine Learning self-driving cars can be trained with an algorithm to drive more safely and know where and when to break, accelerate and to get itself out of harms way. This technology is still in its infancy, so it still has flaws.

Video Game AI:

Machine Learning in video games can be used to keep the AI on par with the player, progressively getting harder as the player gets better to keep a balanced game. In a racing game for example an AI will train itself around a circuit to improve.

An example of Machine Learning in a modern game is Hello Neighbor's AI system for the antagonist. "**The horror game's main antagonist, 'The Neighbor,' is programmed with machine learning AI that doesn't just automatically respond based on pre-programmed commands.**

The Neighbor observes the player's actions, learning where they succeed and where they make mistakes on any given level, and he reacts to that information. This means that the more one plays, the smarter and harder Hello Neighbor's main villain becomes." – Joey Harr, Trendhunter.com

Social Media Algorithms:

With the current technology set in place, a personalized social media makes it so that ads consider your searches and what you are likely to purchase or look at. This also makes finding accounts you would like to follow easier.

The algorithm is aware of accounts you follow and will in turn recommend others you may like. This all could be a serious issue to someone who's privacy is important to them.

Machine Learning Methods

Supervised Machine Learning

Supervised machine learning trains itself on a labeled data set. The data in which is labeled with information that the model is being built to determine the way in which the model should classify the data.

Supervised machine learning requires less training data then other methods and makes training easier because the results of the model can be compared to actual labeled results.

Unsupervised Machine Learning

Unsupervised machine learning ingests unlabeled data and uses algorithms to extract important features needed to label, sort, and classify the data in real-time, without human involvement.

Some Examples of Machine Learning

Listed below are some examples of machine learning in practice:

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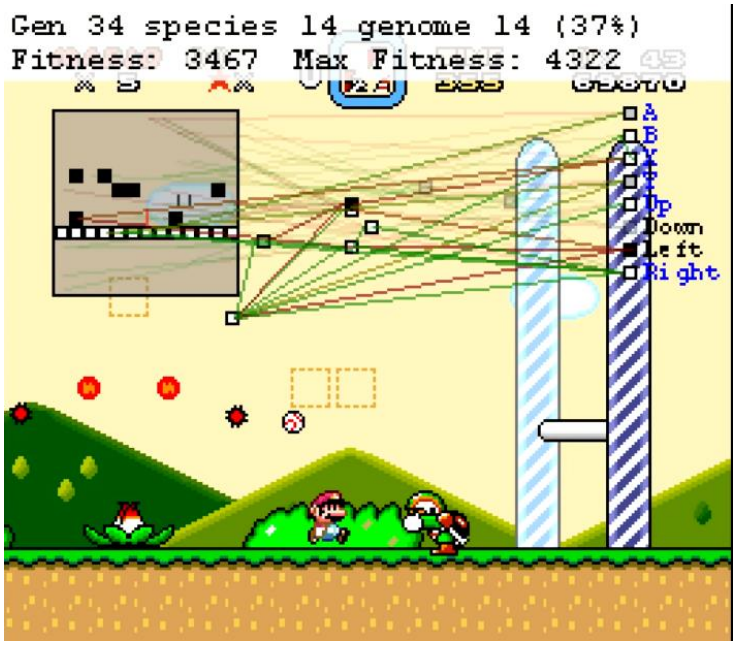
A great example of Machine Learning applied to a popular video game to progressively get it towards the end of the level over multiple generations.

https://www.youtube.com/watch?v=qv6UVOQ0F44



OpenAI Plays Hide and Seek

A machine learning AI which has multiple examples of machine learning in the form of hiders and seekers.

https://www.youtube.com/watch?v=Lu56xVlZ40M&t=93s

Conclusion

In Conclusion machine learning is very important and very useful. Machine learning is everywhere, whether that is in a self-driving car, your phone or a digital assistant. Machine learning will continually get better with technological advances and will be able to perform some tasks quicker than humans ever possibly could. Machine learning still has a long way to go but with how rapid advances are being made it will be able to be on par with the human brain one day.

Machine learning is an amazing field of Information Technology that deserves any attention it is given as that attention could lead to new innovations in the hardware and the software.

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