Concept - Machine Learning

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***Abstract*: There is large amount of data is available everywhere. Therefore, it is much important to analyze this data in order to extract some useful information and to develop an algorithm based on this analysis. This can be achieved through machine learning and data mining.**

INTRODUCTION

- Machine learning is a subfield and also part of artificial intelligence. It is a field within computer science, it differs from traditional computational approaches**.**
- The goal of machine learning generally is to understand the structure of data and fit that data into models that can be understood and utilized by people.
- The ability of AI systems to learn by extracting patterns from data is known as Machine Learning.
- Machine learning algorithms instead allows for computers to train on different data inputs and use statistical analysis in order to output values that fall within a specific range of values. Because of this, machine learning facilitates computers in building models from sample data in order to automate making decision process based on data inputs.
- Machine Learning is an idea to learn from examples, history data and experience, without being explicitly programmed. Instead of writing code, you feed data to the generic algorithm, and it builds logic based on the data given.
- Finding patterns in data on planet earth is possible one and only for human brains. The data being very massive, the time taken to compute is increased, and this is where Machine Learning comes into action, to help people with large data in minimum time.
- The techniques we use for data mining have been around for many years, but they were not effective as they did not have the enough power to run the algorithms. If you run deep learning with access to better data, the output we get will lead to dramatic breakthroughs which is ML.

APPLICATION OF MACHIN LEARNING

1. Virtual Personal Assistants

Siri, Google Now, Alexa are some of the popular examples of virtual personal assistants (PA).They assist in finding information, when we asked over voice. All we need to do is activate them and ask "What about my today's schedule? ", "What are the flights from Mumbai to Delhi", or similar questions. For answering, your personal assistant (PA) looks out for the info, recalls your related queries, and send a command to other resources (like phone) to collect info. You can even say assistants for certain tasks like "Set an alarm for 4 AM next evening", "Remind me to visit collage day after tomorrow".

2. Predictions while Commuting

2. A) Traffic Predictions: We all have been using GPS navigation services nowadays. While we do that, our current locations are being saved at a central server for managing traffic. This data is then used to build a map of current traffic and velocities. This help in preventing the traffic and does congestion analysis, the underlying problem is that there are less number of vehicles that are equip with GPS.ML in such scenarios are helps to estimate the regions where congestion can be found on the basis of daily experience.

2. B) Online Transportation Networks: When we book a cab, the app estimates the price of the ride. When sharing these services, how do they minimize the departure? The engineering lead at Uber reveals in an interview that they use ML to define price surge hours by predicting the rider demand. In all this cycle of the services, ML is playing a major role.

3. Videos Surveillance

The video surveillance system in todays are powered by Artificial intelligence that makes it possible to detect crime before they happen. They can track unusual behavior of people like standing motionless for a long time or napping on benches etc. The system can thus give an alert to human attendants, which can ultimately help to avoid accident. And when such activities are reported and counted to be true, they help to improve the surveillance services. This happens with ML doing their job at the backend.

4. Email Spam and Malware Filtering

Spam filters are continuously updated based on current technologies; they are powered by machine learning. When rule-based spam filtering is done, it fails to track the latest tricks which is adopted by spammers. Multi-Layer Perceptron, C4.5 Decision Tree Induction are some of the spam filtering techniques that are powered by ML.

5. Search Engine Result Refining
Google, Firefox, safari and other search engines use machine learning to improve the search results. Every time you execute a search, the algorithms runs at the backend keep a watch at how you respond to the results.

6. Online Fraud Detection
Machine learning is proving its potential to make a secure place and tracking monetary frauds online is one of its examples. For example: Paytm is using ML for protection against money laundering. The company uses a set of tools that helps them to compare millions of transactions taking place and distinguish between legal or illegal transactions taking place between the buyers and sellers.

Advantages of Machine learning

1. Easily identifies trends and patterns

Machine Learning can review large amount of data and discover specific trends and patterns that would not be apparent to humans. For an e-commerce website like Amazon, it serves to understand the browsing behaviors and purchase histories of its users to help cater to the right products, deals, and reminders relevant to them. It uses the results to reveal relevant advertisements to all of them.

2. Handling multi-dimensional and multi-variety data

Machine Learning algorithms are good at handling data that are multi- dimensional and multi-variety, and they can do this in dynamic or uncertain environments.

3. Continuous Improvement

As ML algorithms gain experience, they keep improving in accuracy and efficiency. This lets them make better decisions. Say you need to make a weather forecast model. As the amount of data you have keeps growing, your algorithms learn to make more accurate predictions faster.

4. No human intervention needed (automation)

With ML, you don't need to babysit your project every step of the way.It means giving machines the ability to learn, it lets them make predictions and also improve the algorithms on their own basis. A common example of this is anti-virus software's; they learn to filter new threats as they are recognized. ML is also good at recognizing spam.

5. Wide Applications

You could be an e-trailer or a healthcare provider and make ML work for you. It holds the capability to help deliver a much more personal experience to customers while also to the right customers.

Future Scope of Machine Learning

1. Machine Learning in Digital Marketing

This is where machine learning can help significantly. Machine learning allows a more relevant personalization. Thus, companies can engage with the customer. Sophisticated segmentation focusing on the appropriate customer at the right time. Also, with the right message.

2. Machine Learning in Health Care

This application seems to remain a hot topic for the last three years. Several promising start-ups of this industry as they are gearing up their effort with a focus on healthcare.

3. Machine learning in Search Engine

Search engines rely on machine learning to improve their services is having no secret today. Implementing these Google has introduced some amazing services. As voice recognition, image search and many more.

4. Machine Learning in Education

Teachers can use machine learning to check how much of lessons students are able to consume, how they are coping with the lessons taught and whether they are finding it too much to consume. Of course, this allows the teachers to help their students grasp the lessons.

CONCLUSION

Machine learning is quickly growing field in computer science. It has applications in nearly every other field of study and is already being implemented commercially because machine learning can solve problems too difficult or time consuming for humans to solve.

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