



IoT Analytics

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Overview of Presentation

- Introduction
- Advantages of ML
- Challenges in ML
- Types of ML



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Introduction

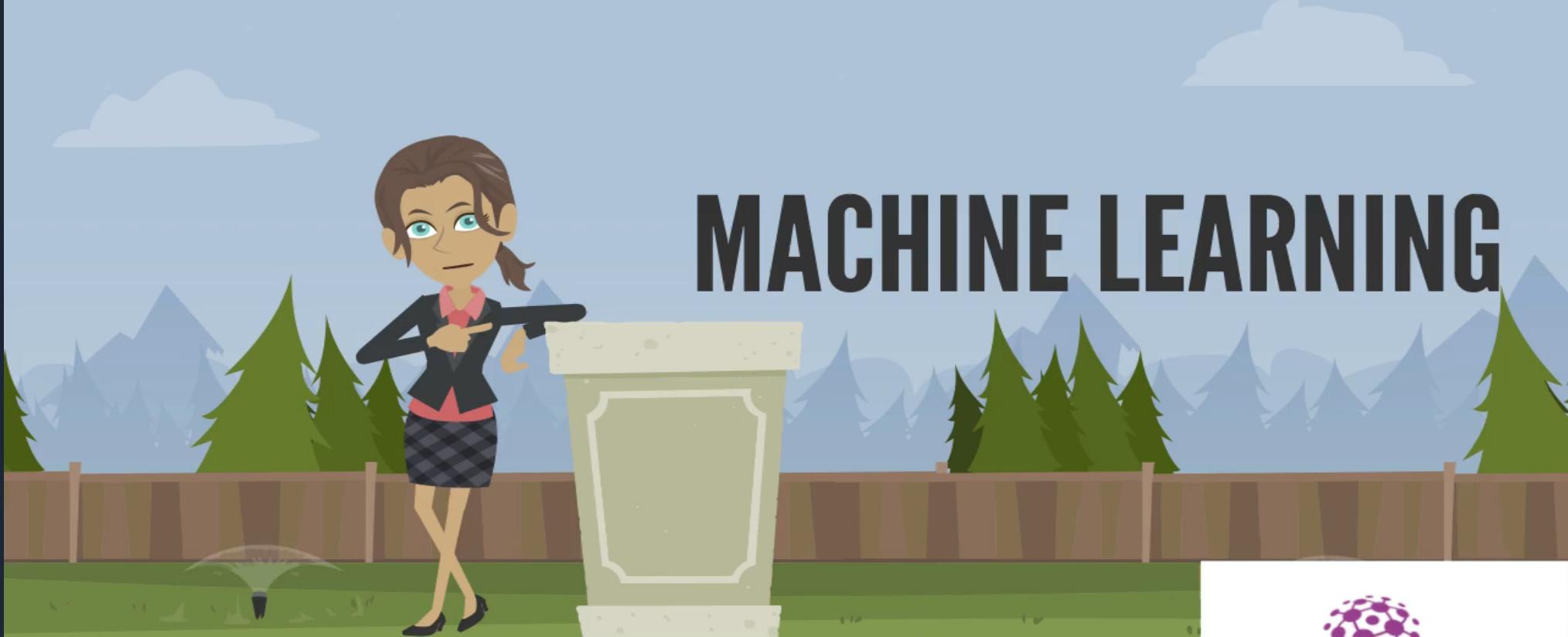
- The term “machine learning” was coined by an American scientist *Arthur Lee Samuel* , in 1959 .
- He defined machine learning as a “field of study that gives computers the ability to learn without being explicitly programmed”.
- ML is a powerful tool that allows a computer to learn from past experiences and its mistakes and improve itself without user intervention.
- Different ML models play a crucial role in designing the intelligent systems in IoT by leveraging the massive amount of generated data and increasing the accuracy in their operations.
- The main components of ML are **statistics, mathematics, and computer science** for drawing inferences, constructing ML models, and implementation, respectively.



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ADVANTAGES OF MACHINE LEARNING



MACHINE LEARNING

GoAnimate



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Data Wrangler



ADVANTAGES OF MACHINE LEARNING

Self-learner



Minimum human intervention

Time-efficient



Diverse data

Self-guided



Diverse application



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SELF-LEARNER:

- An ML-empowered system is capable of learning from its prior and run-time experiences, which helps in improving its performance continuously.
- An example – an ML-assisted weather monitoring system predicts the weather report of the next seven days with high accuracy from data collected in the last six months.
- The system offers even better accuracy when it analyzes weather data that extends back to three more months.



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TIME-EFFICIENT

- Time-efficient: ML tools are capable of producing faster results as compared to human interpretation.
- An example – the weather monitoring system generates a weather prediction report for the next seven days, using data that goes back to 6–9 months.
- A manual analysis of such sizeable data for predicting the weather is difficult and time-consuming. Moreover, the manual process of data analysis also affects accuracy.
- In such a situation, ML is beneficial in predicting the weather with less delay and accuracy as compared to humans.



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SELF-GUIDED:

- An ML tool uses a huge amount of data for producing its results.
- These tools have the capability of analyzing the huge amount of data for identifying trends autonomously.
- An example – when we search for a particular item on an online e-commerce website, an ML tool analyzes our searching trend.
- As a result, it shows a range of products similar to the original item that we searched for initially.



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MINIMUM HUMAN INTERACTION REQUIRED:

- In an ML algorithm, the human does not need to participate in every step of its execution.
- The ML algorithm trains itself automatically, based on the available data inputs.
- An example – let us consider a healthcare system that predicts diseases.
- In the traditional system, humans need to determine the diseases by analyzing different symptoms using standard “if–else” observations.
- The ML algorithm determines the same disease, based on the health data available in the system and matching the same with the symptoms of the patient.



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DIVERSE DATA HANDLING:

- Typically, IoT systems consist of different sensors and produce diverse and multi-dimensional data, which are easily analyzed by ML algorithms.
- An example – consider the profit of an industry in a financial year.
- Profits in such industries depend on the attendance of laborers, consumption of raw materials, and performance of heavy machineries.
- The attendance of laborers is associated with an RFID(radio frequency identification)-based system.
- On the other hand, industrial sensors help in the detection of failure of the machinery, and a scanner helps in tracking the consumption of raw materials.
- ML algorithms use these diverse and multi-dimensional data to determine the profit of an industry in the financial year.



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DIVERSE APPLICATIONS:

- ML is flexible and can be applied in different application domains such as healthcare, industry, smart traffic, smart home, and many others.
- Two similar ML algorithms may serve two different applications.



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CHALLENGES IN ML

- Data Description: The data acquired from different sensors are required to be informative and meaningful. Description of data is a challenging part of ML.
- Amount of Data: In order to provide an accurate output, a model must have a sufficient amount of data. The availability of a huge amount of data is a challenge in ML.
- Erroneous Data: The learning of a model is heavily dependent on the quality of data. Since erroneous data misleads the ML model, its identification is imperative.
- Selection of Model: Multiple models may be suitable for serving a particular purpose. The proper selection of the model is pertinent for ML.
- Quality of Model: After the selection of a model, it is difficult to determine the quality of the selected model. The quality of the model is essential in an ML-based system.



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WHAT IS MACHINE LEARNING?



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TYPES OF MACHINE LEARNING



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Thank You!



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