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Machine Learning

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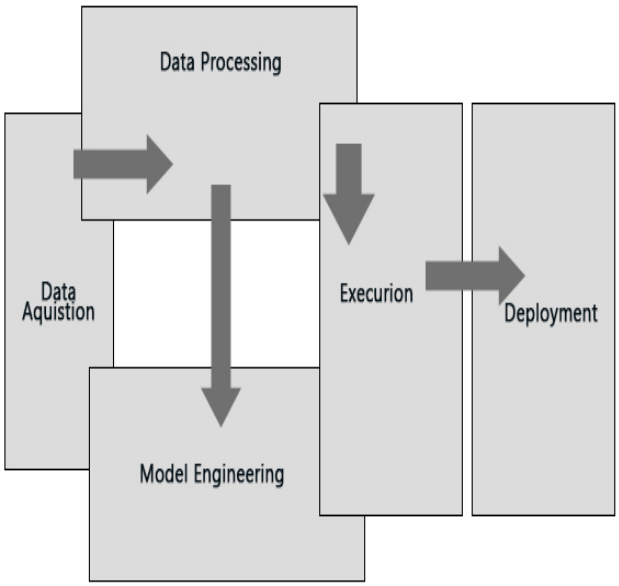
Abstract. Machine Learning (ML) is a modern innovation that has enhanced many industrial and professional processes as well as our daily lives. It's a subset of artificial intelligence(AI), which focuses on using statistical techniques to build intelligent computer systems to learn from available databases.ML enables computer systems to learn from past experiences and improve accordingly without the direct intervention of the programmer. ML enables machines to behave very similarly to human beings. ML can be applied in various fields such as intrusion detection, bioinformatics, health care, marketing, game playing, and so on. It enables the computers or the machines to make data-driven decisions rather than being explicitly programmed for carrying out a certain task. We propose a solution by integrating Machine Learning with the view of helping to understand and identify the hidden patterns of a diverse set of data and moreover encourage automation in analysis in place of humans. Besides, ML is helping industries to avail of the opportunities and make it profitable in future endeavors.

1. Introduction

The machine learning field, has exhibited an impressive development recently with the help of the rapid increase in the storage capacity and processing power of computers. Together with many other disciplines, machine learning methods have been widely employed in bioinformatics. The difficulties and cost of biological analyses have led to the development of sophisticated machine learning approaches for this application area. In this chapter, we first review the fundamental concepts of assessment, unsupervised versus supervised learning and types of classification. Then, we point out the main issues of designing machine learning experiments and their performance evaluation. Finally, we introduce some supervised learning methods.

2. Architecture

Architecting the machine learning process is as follows



3. Process Flow

Data Acquisition: As machine learning is based on available data for the system to make a decision hence the first step defined in the architecture is data acquisition. This involves data collection, preparing and segregating the case scenarios based on certain features involved with the decision making cycle and forwarding the data to the processing unit for carrying

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out further categorization. The data model expects reliable, fast and elastic data which may be discrete or continuous in nature. The data is then passed into stream processing systems (for continuous data) and stored in batch data warehouses (for discrete data) before being passed on to data modeling or processing stages.

Data Processing: The received data in the data acquisition layer is then sent forward to the data processing layer where it is subjected to advanced integration and processing and involves normalization of the data, data cleaning, transformation, and encoding. The data processing is also dependent on the type of learning being used. For e.g., if supervised learning is being used the data shall be needed to be segregated into multiple steps of sample data required for training of the system and the data thus created is called training sample data or simply training data. The data processing is dependent upon the kind of processing required and may involve choices ranging from action upon continuous data which will involve the use of specific function-based architecture, for example, lambda architecture.

Data Modeling: This layer of the architecture involves the selection of different algorithms that might adapt the system to address the problem for which the learning is being devised, These algorithms are being evolved or being inherited from a set of libraries. The algorithms are used to model the data accordingly this makes the system ready for the execution step.

Execution: This stage in machine learning is where the experimentation is done, testing is involved and tunings are performed. The general goal behind being to optimize the algorithm in order to extract the required machine outcome and maximize the system performance. The output of the step is a refined solution capable of providing the required data for the machine to make decisions.

Deployment: Like any other software output, ML outputs need to be operationalized or be forwarded for further exploratory processing. The output can be considered as a non-deterministic query which needs to be further deployed into the decision-making system.

4. Application

Machine learning is a buzzword for today's technology, and it is growing very rapidly day by day. We are using machine learning in our daily life even without knowing it such as Google Maps, Google assistant, Alexa, etc. Below are some most trending real-world applications of Machine Learning:

- Image recognition - It is a well-known and widespread example of machine learning in the real world.
- Speech recognition - Machine learning can translate speech into text.
- Medical diagnosis - Many physicians use chatbots with speech recognition capabilities to discern patterns in symptoms.
- Statistical arbitrage - Arbitrage is an automated trading strategy that's used in finance to manage a large volume of securities. The strategy uses a trading algorithm to analyse a set of securities using economic variables and correlations.
- Predictive analytics - Machine learning can classify available data into groups, which are then defined by rules set by analysts. When the classification is complete, the analysts can calculate the probability of a fault.
- Extraction - Machine learning can extract structured information from unstructured data. Organisations amass huge volumes of data from customers. A machine learning algorithm automates the process of annotating datasets for predictive analytics tools.

5. Future of Machine

Learning: Machine learning is a remarkable technology in the field of artificial intelligence. Even in its earliest uses, machine learning has already improved our daily lives and the future. Machine Learning is not only offering tremendous growth opportunities but also disrupting long-standing industries. Machine Learning is easily one of humanity's best allies by enabling businesses to make more informed decisions, helping developers look at problems in innovative ways, and offering insights round the clock with inhuman speeds and accuracy. In a survey conducted by PWC in 2021, 86% of individuals said that Machine Learning and Artificial Intelligence are now a mainstream part of their company. Over 50% of them reported acceleration of adoption plans for this technology after the impact of the COVID-19 pandemic on businesses worldwide.

6. Conclusion

Machine learning approaches applied in systematic reviews of complex research fields such as quality improvement may assist in the title and abstract inclusion screening process. Machine learning approaches are of particular interest considering steadily increasing search outputs and accessibility of the existing evidence is a particular challenge of the research field quality improvement. Increased reviewer agreement appeared to be associated with improved predictive performance.

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