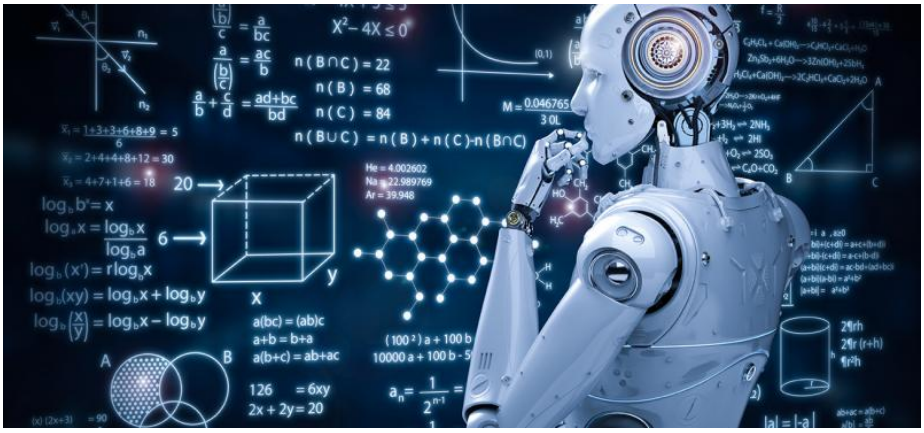
Machine Learning

mohammadamin Milantash

December 2020

1 Introduction

Machine learning (ML) is the study of computer algorithms that improve automatically through experience.
A subset of machine learning is closely related to computational statistics, which focuses on making predictions using computers; but not all machine learning is statistical learning. The study of mathematical optimization delivers methods, theory and application domains to the field of machine learning. Data mining is a related field of study, focusing on exploratory data analysis through unsupervised learning.[4][5] In its application across business problems, machine learning is also referred to as predictive analytics

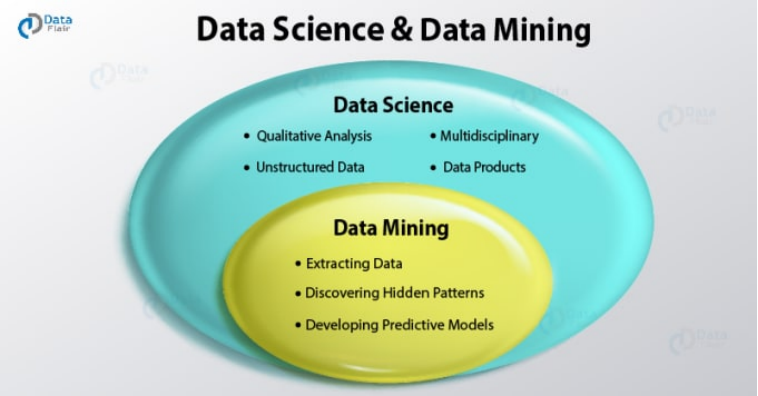


2 Data Mining

Machine learning and data mining often employ the same methods and overlap significantly, but while machine learning focuses on prediction, based on known properties learned from the training data, data mining focuses on the discovery of (previously) unknown properties in the data (this is the analysis step of knowledge discovery in databases).

3 Data Mining vs Data science

Data science is a broad field that includes the processes of capturing of data, analyzing, and deriving insights from it. On the other hand, data mining is mainly about finding useful information in a dataset and utilizing that information to uncover hidden patterns.



4 Main Formulas

Linear Regression: $f(x) = \Sigma_{i=1}^{n} m_i x_i + b$

K Nearest Neghibour : $D(x, y) = \sqrt{(\Sigma_{i=1}^{n}(x_i - y_i)^2)}$

5 Data Mining Task

Data Mining Task	Alogorythm and Technique
Classification	Neural Network, Decision Trees , Rule induction
clustering	K-Means
regression and predictions	Decision Trees,Support Vector Machine,Rule induction
Association	Association Rule Mining
summarization	Multivariable visual

6 Code Example with python,Program to Display Calendar

In the program below, we import the calendar module. The built-in function month() inside the module takes in the year and the month and displays the calendar for that month of the year.

```
# Program to display calendar of the given month and year

# importing calendar module
import calendar

yy = 2014  # year
mm = 11    # month

# To take month and year input from the user
# yy = int(input("Enter year: "))
# mm = int(input("Enter month: "))

# display the calendar
print(calendar.month(yy, mm))
```