Lab sheet 1 Machine Learning

UEC713

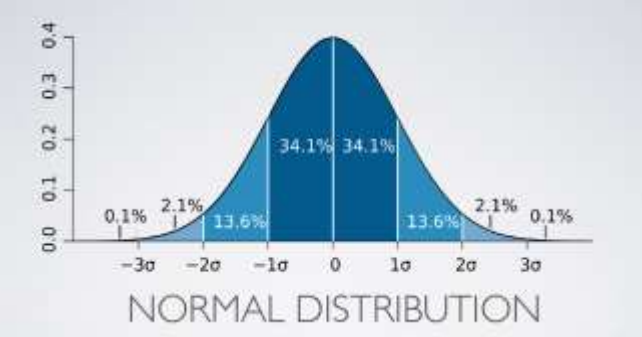
Q1.

LAW OF LARGE NUMBERS

Homework Exercise

$$\bar{X}_n \longrightarrow E(X) \quad when \quad n \longrightarrow \infty$$

LLN



NORMAL DISTRIBUTION

PROJECT STATEMENT

Test the Law Of Large Numbers for N random normally distributed numbers with mean = 0, stdev = 1:

Create a Python script that will count how many of these numbers fall between -1 and 1 and divide by the total quantity of N

You know that E(X) = 68.2%

Check that Mean(X_N) -> E(X) as you rerun your script while increasing N

Q.2

FINANCIAL STATEMENT ANALYSIS

Scenario:-

You are a data scientist working for a consulting firm. One of your colleagues from auditing department has asks you to help them assess the financial statement of organization X. You have been supplied with two lists of data- Monthly revenue and Monthly expenses for the financial year in question. Your task is to calculate the following financial metrics:

1) Profit for each month
2) Profit after tax for each month (the tax rate is 30% to revenue)
3) Profit Margin for each month - equals to profit after tax dividend
4) Good Months – Where the profit after tax was greater than the mean of the year
5) Bad Months – Where the profit after tax was less than mean of the year
6) The Worst Month – Where the profit after tax was minimum for the year
7) The Best Month – Where the profit after tax was maximum for the year

All results are to be presented as vectors.

Results for dollar values need to be calculated with $ 0.01 precision, but need to be presented in units of 1000$ with no decimal points.

Results for the profit margin ratio need to be presented in units of % with no decimal points.

NOTE:- Your colleague has warned you that it is okay for any month to be negative (in accounting terms, negative translates into a deferred tax asset).

Q3.

Basket Ball Insights

Use the Basket Ball database and myplot function to analyse and plot the following observations:

1. myplot(Salary) ---- How much each player get paid annually irrespective of the number of games?
2. myplot(Salary/Games) ---- How much each player get paid per game on average?
3. myplot(Salary/FieldGoals) ---- How the salary varies with the number of goals scored?
4. myplot(Points/MinutesPlayed)
5. myplot(FieldGoals/Games)
6. myplot(FieldGoals/FieldGoalAttempts)
7. myplot(Points/Games)
8. myplotMinutesPlayed/Games)
9. myplot(FieldGoals/MinutesPlayed)
10. myplot(Points/FieldGoals)--- Player style that whether he likes to score 3 pointer or otherwise.

You are required to copy the graphs from Jupyter Notebook. Place the graphs in MS doc page and write few lines for each figure for the inference drawn from each graph.