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**WEEK 4**

SUPERVISED LEARNING

Simple Linear Regression

* We have to find the B0 and B1 value and the predict the value of Y and the Error Functions
* Steps 🡪
  + Analyze the Data (**PREPROCESSING**)
  + Make sure we find a pattern by **Training**
  + Check how the model is doing by **Testing**
  + After Training and Testing is done, we use it to **predict** the future values
* slr = **LinearRegression()** is an inbuilt function to create an object of LR
* **slr.fit(x,y)** is used to TRAIN the data
* **slr.predict(x\_predict)** predicts the values
* **slr.coef\_** is used to find the C in Mx + C
* **slr.intercept\_** is used to find the M in Mx + C aka the Slope
* **y(cap)** = B0 + B1x
* **df[‘new\_y’] = slr.intercept\_ + slr.coef\_ \*x** makes the y(cap)
* **plt.scatter(x,y)** plots a scatter plot for the given data
* **plt.plot(x, df.new\_y)** is used to SUPER IMPOSE A LINE ON THE SCATTER PLOT
* metrics.mean\_absolute\_error(x, new\_y) - MAE
* metrics.mean\_squared\_error(x,new\_y) - MSE
* metrics.round(np.sqrt(metrics.mean\_squared\_error(x,new\_y)) - SSR
* **slr.score(x,y)** is used to find the R^2 value and the higher the R^2 the better the model
* To split the dataset into training and testing dataset we use 🡪 **X\_train, X\_test, Y\_train, Y\_test = train\_test\_split( X, Y, test\_size = 0.2)** this says that 20% data is used for Testing and 80% data is used to Training.
* Now we can slr.fit(X\_train, Y\_train) and for MAE, MSE, SSR

FOR Q1 b) we are supposed to make a MARKS(0 – 50) and GRADE(0 – 10) Cols. The value of grade should be in decimal.

Multiple Linear Regression

* We use mlr instead of slr for this, it’s a variable name so it honestly doesent matter.
* Now the slr.fit(x,y) has 2 values for x and y as it’s a MLR
* lin\_model.intercept\_
* lin\_model.coef\_[0]
* lin\_model.coef\_[1]
* lin\_model.coef\_[2]
* lin\_model.coef\_[3]

For Q2 a) there are 3 cols for marks M1, M2, M3 and grade from 0 – 10 which can be decimal.

Use the built in functions and also implement each function form scratch.