SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution
Coimbatore-35

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade (Cycle-III)
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT303-ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

III YEAR/ V SEMESTER

UNIT 2 – SUPERVISED LEARNING

TOPIC – REGRESSION

- Regression analysis is a fundamental concept in the field of **machine learning**.

- It falls under **supervised learning** wherein the algorithm is trained with both input features and output labels.

- It helps in establishing a relationship among the variables by estimating how one variable affects the other.

Regression in Machine Learning

- Regression in machine learning consists of mathematical methods that allow data scientists to predict a continuous outcome (y) based on the value of one or more predictor variables (x).

- Linear regression is probably the most popular form of regression analysis because of its ease-of-use in predicting and forecasting.

Regression in Machine Learning

Example:

Imagine you're car shopping and have decided that gas mileage is a deciding factor in your decision to buy. If you wanted to predict the miles per Liter of some promising rides, how would you do it?
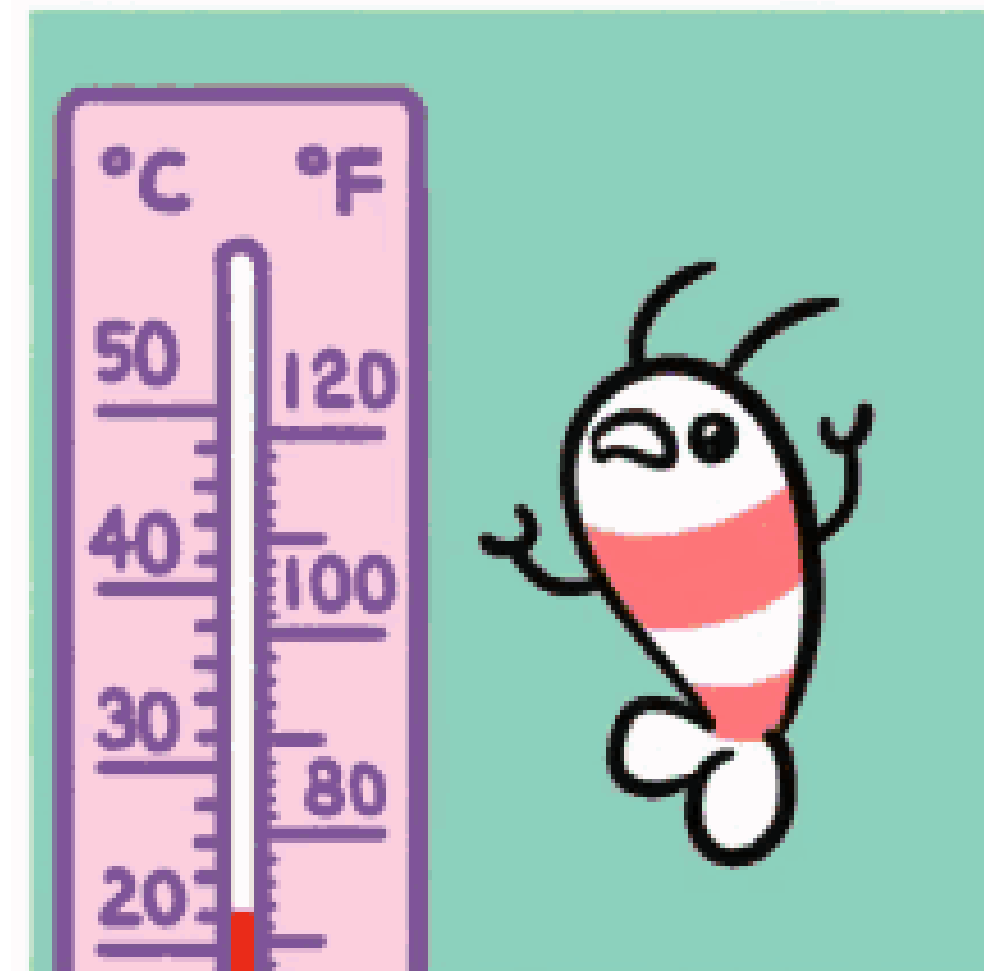
Regression in Machine Learning

Example:

- By plotting the average MPG of each car given its features you can then use regression techniques to find the relationship of the MPG and the input features.

- The regression function here could be represented as $Y = f(X)$, where Y would be the MPG and X would be the input features like the weight, displacement, horsepower, etc.

- The target function is f and this curve helps us predict whether it's beneficial to buy or not buy. This mechanism is called regression.

Let's say you've developed an algorithm which predicts next week's temperature. The temperature to be predicted depends on different properties such as humidity, atmospheric pressure, air temperature and wind speed. But how accurate are your predictions? How good is your algorithm?

Classroom **Activity**

To evaluate your predictions, there are two important metrics to be considered:

- Variance

- Bias

Variance:

Variance is the amount by which the estimate of the target function changes if different

training data were used.

Bias:

- Bias is the algorithm's tendency to consistently learn the wrong thing by not taking into account all the information in the data.

- For the model to be accurate, bias needs to be low. If there are inconsistencies in the dataset like missing values, less number of data tuples or errors in the input data, the bias will be high and the predicted temperature will be wrong.

Evaluate the any Regression model in Machine learning by suitable metrics.

THANK YOU