**## 1. \*\*Logistic Regression\*\*:**

In machine learning, we use various statistical methodologies to create models that can in simple terms, perform pattern recognition. The models a trained to perform either regression analysis or classification. However, The primary goal of both forms is to estimate the relationship between a dependent variable and one or more independent variables.

One of the most common methods forms of regression analysis is linear regression. It just so happens that within the Sci-Kit Learn Python API, we have a library for performing the linear regression analysis, smartly named, Linear Regression.

Why is this important to us, well at its core in linear regression, we are attempting to predict or forecast a possible value, such as the price of a house, stock price, births per month, etc. We do this by fitting a straight line to our data through various mathematical methods. Once a line has been fit as closely as possible to the data’s center, we are able to utilize it to predict and forecast new data points.

However, in the case of classification, we must use a module within the linear regression library called Logistic Regression. Logistic regression is essentially the classification version of linear regression. Through the use of some clever mathematical principles, we are able to transform our linear combinations outputs into a binary output. Our data is then fitted to a S-formed curve, the sigmoid function, where we are able to determine if the value falls between the fixed ranged, 0 and 1. Thus, we are able to assign the data with a label, effectively categorizing or classifying the data.

Logistic Regression is considered to be one of the easier models to utilize for machine learning. This is largely because the model is build around less complex mathematics, making it much easier to grasp and implement. Due to its simplicity in nature, it is also has extremely fast performance. This makes the model quite flexible in its usability, ranging from use cases for spotting fraud in the banking and credit industries to disease prediction in the medical field to even providing in-game micro transaction prompts to video game players at key moments.

Logistic Regression is not without its faults though. The same simplicity that allows for its speedy performance also limits its ability to handle complex data structures or large datasets. This means that non-linear problems and complex relationships cannot be solved with this model.

Resources:

<https://en.wikipedia.org/wiki/Logistic_regression>

<https://en.wikipedia.org/wiki/Statistical_model>

<https://en.wikipedia.org/wiki/Regression_analysis>

<https://www.spiceworks.com/tech/artificial-intelligence/articles/what-is-logistic-regression/#:~:text=Logistic%20regression%20is%20a%20supervised%20machine%20learning%20algorithm%20that%20accomplishes,1%2C%20or%20true%2Ffalse>.

<https://www.geeksforgeeks.org/understanding-logistic-regression/>

<https://www.spiceworks.com/tech/artificial-intelligence/articles/linear-regression-vs-logistic-regression/>

<https://www.geeksforgeeks.org/ml-linear-regression-vs-logistic-regression/>

<https://medium.com/@matthewjacobholliday/an-introduction-to-log-odds-86d364fa6630>

<https://en.wikipedia.org/wiki/Statistical_classification>

<https://www.geeksforgeeks.org/advantages-and-disadvantages-of-logistic-regression/>