

Areej Fatima | Student ID:23018993 | Machine learning and neural networks assignment | Transcript

GitHub Repository: <https://github.com/Reejfatima12/regression>

[ML assignment3.mp4](#)

Transcript

Hello there, this is Areej Fatima. And I'm here to teach the tutorial of machine learning and neural networks. So here we go. We shall study the concepts of regression and explore some types of regression, right? So let's get started. So here we have regression. Regression is basically a supervised learning technique. It is used to predict continuous values. It does not predict any discrete values and we have the best fit plot or line. Which is between the data and also it is a widely used technique, so we have the graph which has scattered points and a straight line which is a linear line. So it is the very simple graph for linear regression. Now we shall discuss about the example of regression so. Suppose there is an ecommerce company which is B. It is investing in campaigns of advertisement in 2015 it has spent \$100 and the sale revenue was. \$1000 in 2016 we have some value as well, but in 2020 it has spending value which is 350. And we don't have any sales revenue. So to find this value of sales revenue, we use linear regression. So that's the example of linear regression, and we shall discuss major types of regression. So the first type is linear regression. It is very simple and easy type of regression. Linear regression shows a linear relationship between independent and dependent variable. Independent variable is on X axis and dependent is on Y axis. And we have. If we have one input variable then it is simple linear regression. If we have more than one then it will be multiple linear regression. So moving on towards the equation which is $Y = aX + b$ where Y is dependent variable, X is independent variable. a and b are linear coefficients and we also have the graph over here which is a linear line. Between salary and experience. So now we have the coding of regression like we will apply regression on a real data set. So here we have the data set of McDonald's financial statements. We are importing library in this slide. And then we will do the coding. We will fit or predict. X and we shall have the plot. Here is the graph for linear regression we

have here X axis and dividend at Y axis and we have a linear line which is in red colour and we have scatter points which are in blue colour. So that's our relation between. Year and dividend, which is told by this graph. So that's it, that's. And now we have the prediction coding of linear regression and we shall see the graph as well. So we have the prediction graph of linear regression it predicts for next five years from 2020 to 2025, which is a green dotted line. So that's it. For linear regression we have got all of these. These two graphs moving on towards the next tie. So, our second type is logistic regression. It is basically a supervised learning technique as it is regression. So obviously it will be supervised. So its main purpose is that it is used for binary classification problems. It works with the categorical variables which are 0 or one, yes or no true or false, spam or not spam etc. And it has equation as well. There we have $F(x)$. And here $F(x)$ is output between zero and one value, as is the input to. Function. Is obviously the base of natural logarithm, and we have the sigmoid function over here in the graph. We can see there is a curve which is of S-shape, so that's the graph of logistic regression. And now we shall apply the logistic regression by Python on saying that on same data set and we have applied the coding. Over here and this will show us the graph. So we have got the graph of logistic regression which is between probability of profit and year. So year is on X axis and probability of profit is obviously on Y axis. So we have got the S-like curve and the points which is logistic regression curve and actual data is. In blue colour cross. So that's the curve of logistic regression graph. Then we have got the prediction of logistic regression coding and. OK it. Be predict for next five years, like from 2020 to 2025 and we have got the graph. So here is the line dotted line which is in green colour. Future prediction from 2020 to 2025. So that's it for

logistic regression. It's a very different from before the linear regression. And the third type is exponential regression, so exponential regression is basically a statistical method used to model data that grows or decays at exponential rate. It fits an equation of the form. $Y = a \cdot e^{bx}$. Y is dependent variable, X is independent. And a the initial value based growth is Euler's which is approximately 2.718 and we have the graph as well which is growing graph. So that's it. We'll move towards the code. Now we are moving. The. Of exponential direction and we have a different variables over here at X&Y axis. So we should see the graph. I know you've. The. Of exponential regression, which is not that much perfect like linear regression. It is basically a curve, not a line, and we have the same variables like linear regression and. The line occur

which is of red colour and it is basically an exponential regression line and we have the point if we will take some other variables then it will may be a perfect line which is passing through all the points. Thanks. We have done the prediction coding as well for exponential regression and we'll get the graph. It will predict for next five years. So here's the graph. And we have the green line which is predicting from 2020 to 2025. For next five years, it's a dotted line. So that's it for exponential regression. We shall discuss about the differences between. Of 3 so. First point is aim. Linear regression has aim to predict continuous values. Exponential has exponential decay and logistic regression has binary classification. And go on to the next we have output. Linear regression gives continuous values in the output. Exponential has output increases or. Exponentially and logistic regression has probability which is 0 or one. And the Third Point is equation. We have three different equations and 4th 1 is uses of linear regression is to predict values of prices and temperature. Exponential will gives us growth or decay and logistic regression. Will tell us about spam detection, disease classification, etc. So last one is the relation, it's a linear relation between independent variable and target in the linear regression we have growth and decay relation in the exponential and in logistic it tells log or zip relation between feature and class. That's it. In conclusion, regression is discussed with all of its major types like linear, exponential and logistic regression. All of these can apply to one problem as well, and we can take different problems to apply all of these and. So that's the reason regression is a very important technique in machine learning. To summarise my lecture, we have discussed regression which is a super wide learning technique. It has three major types, linear, exponential and regression, logistic regression. So linear is very simple and easy. Exponential basically tells about the decay and logistic is used for binary classification. So, moving on to the references. So these are the references linked from where I prepare my topic, so that's it. Thank you so much. Watching and we are at the end. Take care. Bye. Bye. Thank you.