DYP
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Title : Linear Regression using Deep Learning.

Objective : To implement Boston house price prediction by using the linear regression.

Problem Statement : Implement Boston housing price prediction problem linear regression using deep neural network, use boston house datasets.

Outcome : Students should be able perform linear regression by the Deep neural network on boston housing datasets.

Hardware & Software Requirements :
Intel i3 core, 4 GB RAM.
Software : Jupyter notebook, python.

Theory :
linear regression :
linear regression is a machine learning algorithm on supervised algorithm. Linear regression is statistical analysis that is commonly used to model the relationship between dependent and one or more independent variable. It assumes that the relationship between the variables and uses mathematical method.
Regression model targets a value based on independent variables. It is mostly used for finding out the relation between variables and forecasting.
Hypothesis function for linear regression.

$$y = \theta_1 + \theta_2 n$$

It performs the task to predict a dependent variable value (y) based on a given independent variable (x). y is called the criterion variable and x is the single feature or multiple feature representing the problem.

Deep Neural Network:

A Deep Neural Network DNN is an ANN with multiple layers between the input and output layer. DNN can model complex non-linear relationships. DNN architecture generates composition model where the object is expression as layers composition as primitives. DNN are a types of machine learning algorithm that are modelled after the structure and function of the human brain. They wrists of multiple layer at interconnected network neurons that process data and learn from it to make predictions or classifications.

Each layer of the network performes a specific type of processing on the data such as identifying patterns or correlations between features and passes the result to the next layers. The layer closest to the input are known as "Input layers" while the layers closest to the output are known as "output layers".

Deep Neural Network are trained using a process known back propagation which involves adjusting the weights and bias of the node based on the error between the predicted output and the actual output.

How does neural network work:

Boston housing price prediction is a common example used to illustrated how a deep neural network

```
model = sequential()
model.add(Dense(128, input_shape=(13,), acti
model.add(Dense(164, activation='relu', name='den
model.add(Dense(32, activation='~~relu~~', name='d
model.add(Dense(1, activation='linear', name='dense
model.compile(optimizer='adam', loss='mse')
```

* Model summary.

Model = 'sequential'

Layer (type)	output shape	param
dense-1 (Dense)	(None, 128)	1792
dense-2 (Dense)	(None, 64)	8256
dense-3 (Dense)	(None, 32)	2080
dense_output (Dense)	(None, 1)	33

Total params : 12161
Trainable params : 12161
Non trainable params: 0.

can work for regression tasks the goal of this tasks is to predict the price of house in boston on various features Here is how a deep neural network can walk.

1) Data preprocessing
2) model architecture.
3) Model training & compile.
4) Model fitting and evaluation.
5) Model prediction.

Algorithm:

1) Import all the requirement libraries and datasets.
2) load the boston housing datasets.
3) Load data and split into training data & testing data.
4) Get the shape of train data & validation.
5) Design DNN architecture add the ~~dfrorse~~ dense layer with proper activation function.
6) ~~Get~~ Get the summary of the model.
7) Configure the model using mean squared error, check loss.
8) again train model and predict x-valid & y-valid data.

Conclusion: Successfully implemented the boston housing prediction by linear regression using deep neural network.