DL - lab Assignment - 1

Name :- Amit K. Birajdar
Class - BE Comp - B
Roll no - 1965008
Sub :- Deep learning.

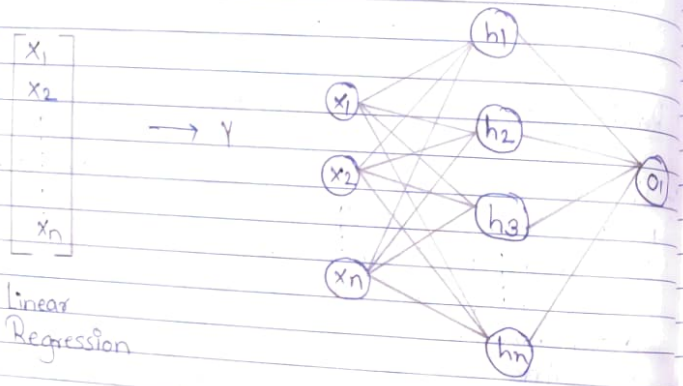
- Aim :- Implement Boston Housing price predicti -on problem by linear regression using Deep Neural Network. Use Boston Housing price prediction Dataset.

- Requirements :- Any Windows, Jupyter Notebook, pyt

- Theory :- linear regression is a popular method used for predicting a continous response variable based on 1 or more predictor variables.
Deep Nural Network (DNN) are a type of ML algorithm that can be used for a variety of task including regression.
To perform linear regressing using a DNN we can use a single-layer DNN with a linear activation function. The weights in the DNN are learned through a process called back propa -gation, which involves iteratively adjusting the weights to minimize the different between the predicted and actual value of response variable.
One advantage of using a DNN for linear regression is that it can automatically learn non-linear relationships between the predictor

variable and the response variable.
Additionally, DNN can handle high-onal data, making them useful for d with many predictor variables.

* Diagram



Linear Regression

Deep Neural Network

* Steps for linear Regression using DNN —

1) Collect and process the data — collect data you want to use for linear regr and process it as necessary. (clearing handling, missing values, etc)

2) Split the Data :— Split the data into training and testing tests.

3) Define Model :— Define a DNN model with a linear activation function for the output layer.

4) Compile the model :— Compile the model by specifying the loss function and optimizer for linear regression the mean squared Error (MSE) loss function is commonly used.

5) Train Model :— Train model on training data using fit method. During training, the model will adjust the weights and biases to minimize the MSE loss function.

6) Evaluate the Model :— Evaluate the model on testing data using the evaluate() method. This will give idea of how well the model generalizes to new data.

7) Fine-Tune the model :— If the model perfor-mances is not satisfact-ory, fine-tune the models by adjucting hyper-parameters such as number of hidden layers, no. of nodes per layer, learning rate, batch size.

8) Visualize the results :— Visualize the resu
linear regression usin
by plotting the prediction value against
actual values.

- Conclusion :— Hence, successfully predic
housing prices of Boston by
regression using DNN.

DL - Lab Assignment - 2

Name - Amit Kashinath Birajdar
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Class - BE Comp - B

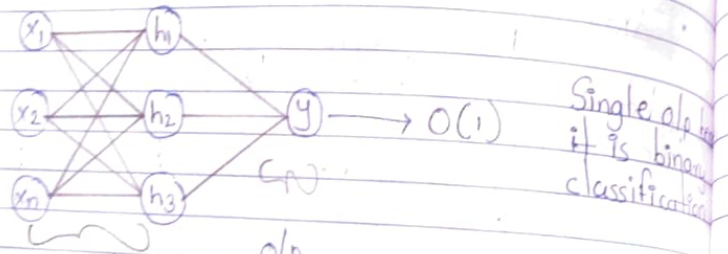
- **Aim** :- Binary classification using DNN
  Classification of movie reviews into 'positive' reviews and 'negative' reviews, just based on text content of the reviews.

- **Requirements** :- Any OS, python

- **Theory** :- Binary classification is a type of ML task where the goal is to predict whether an input belongs to one of 2 classes or categories.
  Deep neural networks consists of multiple layers of interconnected nodes, or neurons, that process the input data in a hierarchical manner.
  The input data is fed into first layer which applies a set of weights and baises to the input & produces an output that is passed on the next layer.
  The process continues until the final o/p layer, which produces the predicted class label.
  To train a deep neural network for binary classification, a dataset of labelled examples is typically used. The network is first initialized with random weights and biases, &

then weights and biases are iteratively adj during training to minimize the differen between predicted class labels and true cl in the training data.

Several techniques can be used to the performance of DNN for binary classifica tasks, including regularization to prevent ov dropout to reduce the effect of co-adapti and optimization techniques such as stochas gradient descent.



* Steps

1) Load the data :- Load dataset of labelled exa -es, where each examples associat with a binary label.

2) Preprocess the data :- Perform necessary prepro -ing steps such as normalizatio feature scaling or one-hot encoding, etc.

3) Define architecture :- Define architecture of DNN, including the number of layers, the number of neurons in each layer and activation function to used.

4) Initialize Parameters :- Initialize the weig & biases of the neural network with random values. It is important to use appropriate initialization techniques to avoid vanishing or exploding gradients.

5) Train the model :- Train the neural netwo on the training set using an optimization algorithm such as stochastic gradient descent or Adam.

6) Evaluate the model :- Evaluate the perform -nce of the trained model on validation set.

7) Tune hyperparameter :- Adjust the hyperpara -meters such as learning rate, number of hidden layers, number of neuro , & regularization strength to improve the performance of the model on validation set.

8) Test on model & deployment :- Test the final model to get the performance estimation and deploy it

on new real-world data setting.

* Conclusion :— Hence, successfully performed Binary classification using DNN of movie reviews into 'positive', 'negative' reviews.

DL - Lab Assignment - 3

Name :- Amit Kashinath Birajdar
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Aim :- Convolutional Neural Network.
Detection of plant disease using CNN.

Requirement :- Any OS, python.

Theory :- CNN is a type of deep learning neural network that is primarily used for image and video processing tasks. CNNs are designed to automatically learn relevent features and pattern from the input data by applying a series of convolutional filters and pooling layers.

The architecture of a CNN typically consists of multiple layers, including input, convolutional pooling, fully connected, o/p layers.

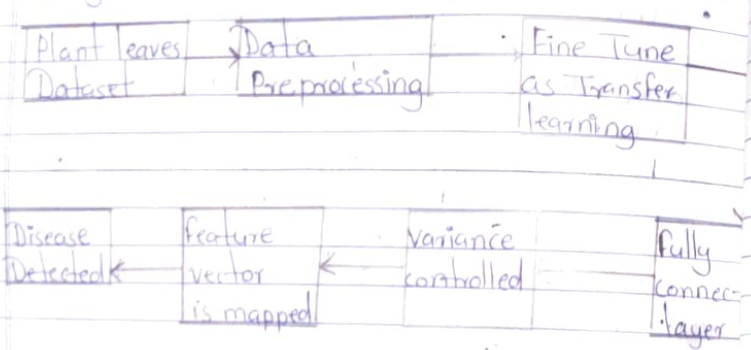
In CNN layers, filters are applied to the i/p image to extract important features while pooling layers downsample the feature map and reduce the capatial dimension of data.

The fully connected layers at the end of network combine the extracted features and o/p the final classifications.

A plant diseas detection system using CNN is a computer vision-based application that can automatically identify and classify

diseases in plants by analyzing images of lea
, stems and other plant parts.
The system uses a dataset or label
images of healty and disease. The traine
CNN model can be used to classify new i
or plants and identify any signs of disea
present.

- Diagram



* Steps :-

1) Collect and Preprocess the data :- Collect la
dataset of lab
images of different different healty & diseas
plants. Preprocess the images by resizing t
into fixed size & normalizing pixel values t
have zero mean and unit variance.

2) Define CNN architecture :- Define archite
-ture of CNN, including
number and type of layers, the activation
functions and the optimization algorithm.

3) Train & validate :- Train using labelled
dataset & validate
performance.

4) Evaluate Model :- Evaluate model perform
-ance on test set of
labelled images.

5) Deploy System :- Deploy system to make
predictions on new images of
plants.

The system can be deploy in variety of
settings including farms, greenhouse, resea
-ch labs, to help diagnose and prevent
the spread of plant diseases and ultim
-ately increas crop yield & quality.

Result :-
Hence, we sucessfully designed
plant disease detection system using CNN.