ML_01

March 15, 2022

0.0.1 *ML-101 MACHINE LEARNING CHILLA FIRST ASSIGNMENT*

Machine Learning

Question: What is Machine Learnig?

Answer: If we wanna learn in a desi style then Machine leaning is to treat a machine like a child and teach them how to do their work efficiently. But Science describes ML as a data analysis model which learn form data and make decision.

There are four types of ML in general which are given below as follow:

Types of Machine Learning

1. Supervised Learning
2. Unsupervised Learning
3. Semi-Supevised Learning
4. Reinforcement Learning

let's go into deep...

Supervised Learning

First the desi example, supervised learning is like teaching a child English alphabets by holding playing cards and pointing to them. In science, SML means that we feed the model with the data and associated labels for training means it works in supervision as like a child is learning in supervision of his guardian, i.e. we train a classification model with images of cats and dogs and their associated labels to ensure that our model treats the image we feed it as the correct animal. There are lot of supervised learning like, Linear regression, Logistic regression, SVM, Navie Bayes, K-Means, Decision tree and so on.

Unisupervised Learning

First the desi example, unsupervised learning is to push a friend in a swimming pool, again and again, whit out any assistance until he learns swimming by himself. According to science, USML is a model in which no supervision in involved. We can feed a data for training with any labels. There are many USML i.e. K-means clustering, KNN (k-nearest neighbors), Hierarchal clustering, Anomaly detection, Neural Networks etc.

Semi-Supervised Learning

Desi example, teach a cycle to a friend and let him ride a bike. According to science SSl is a combination of SL and USML in which a model is trained in semi supervision for example feed a half training data with labels and half without labels. Examples of SSL learning is as follow, Classification, Clustering, Regression, Data Cleaning.

Reinforcement Learning

A typical desi example by Ammar bhai is it's like to get a Sazza o Jazza after some sort of work we have done, one form my side to make a person greedy by showing him different heart touching things. According to science, RL is a learning method in which a model learns for the rewards, if the model learns perfectly it will get a reward otherwise a sort of punishment needs to learn again and depends on the feedback. The examples are as follow, Deep Q Learning, Deep Deterministic Policy Gradient, etc.

1 Machine Learning

1.1 Simple linear regression

1.1.1 Step-1 Import data set

```python
import pandas as pd
df = pd.read_csv("salary_data.csv")
df.head()
```

```
   YearsExperience  Salary
0              1.1   39343
1              1.3   46205
2              1.5   37731
3              2.0   43525
4              2.2   39891
```

Step-2 Splitting data into train and tes

```python
X = df[['YearsExperience']]
y = df["Salary"]
X.head()
```

```
   YearsExperience
0              1.1
1              1.3
2              1.5
3              2.0
4              2.2
```

```python
y.head()
```

```
[ ]: 0    39343
      1    46205
      2    37731
      3    43525
      4    39891
      Name: Salary, dtype: int64
```

```
[ ]: # Import Library

      from sklearn.model_selection import train_test_split
      X_train, X_test, y_train,y_test = train_test_split(X,y, test_size=0.2,␣
       ↪random_state=0)
```
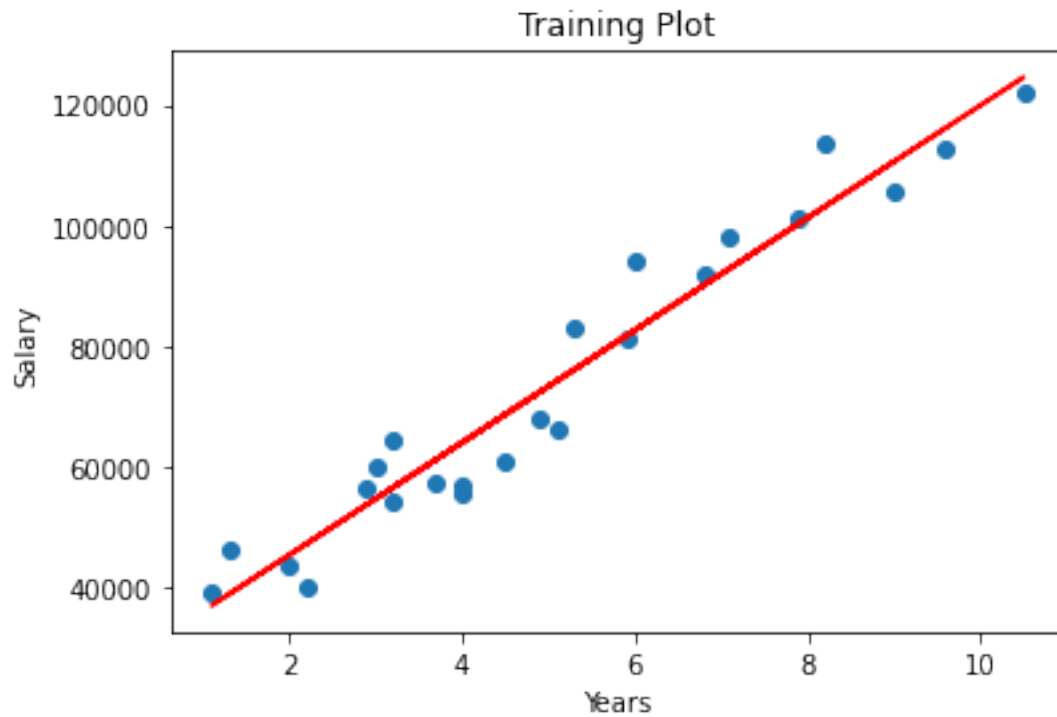
Step-3 Fit model

```
[ ]: from sklearn.linear_model import LinearRegression
      model = LinearRegression()
      model = model.fit(X_train,y_train)
      model
```

```
[ ]: LinearRegression()
```

1.1.2 Step-4 Plotting

```
[ ]: import matplotlib.pyplot as plt
      plt.scatter(X_train,y_train)
      plt.plot(X_train,model.predict(X_train), color='red')
      plt.xlabel("Years")
      plt.ylabel("Salary")
      plt.title("Training Plot")
```

```
[ ]: Text(0.5, 1.0, 'Training Plot')
```

Training Plot

```
import matplotlib.pyplot as plt
plt.scatter(X_test,y_test)
plt.plot(X_test,model.predict(X_test), color='red')
plt.xlabel("Years")
plt.ylabel("Salary")
plt.title("Training Plot")
```

[ ]: Text(0.5, 1.0, 'Training Plot')
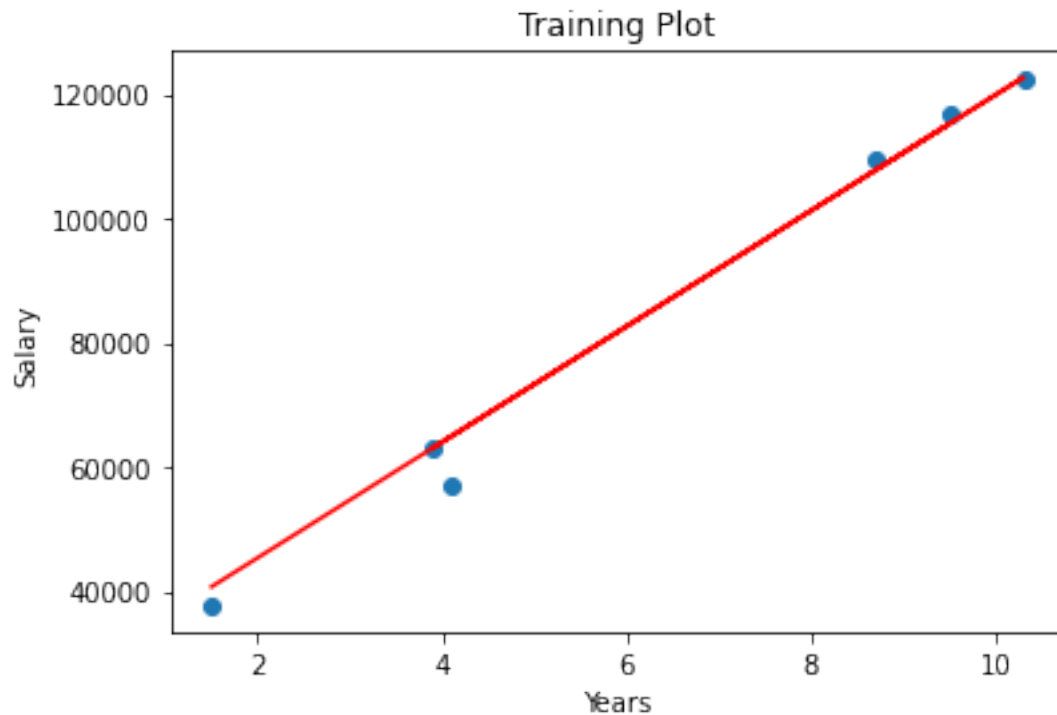
1.2 Step-5 Testing or Evaluation (Model Fitness)

```python
print("Score of test data ", model.score(X_test,y_test))
```

Score of test data 0.988169515729126

```python
print("Score of train data ",model.score(X_train,y_train))
```

Score of train data 0.9411949620562126

Step-6 Prediction of unknown Values

```python
model.predict([[10],[5],[8]])
```

C:\Users\Sartaj\AppData\Local\Programs\Python\Python39\lib\site-
packages\sklearn\base.py:450: UserWarning: X does not have valid feature names,
but LinearRegression was fitted with feature names
  warnings.warn(

```
array([119905.85041792,  73342.97478427, 101280.70016446])
```

```python
x = ([10], [20],[30],[40])

model.predict(x)
```

```
C:\Users\Sartaj\AppData\Local\Programs\Python\Python39\lib\site-
packages\sklearn\base.py:450: UserWarning: X does not have valid feature names,
but LinearRegression was fitted with feature names
  warnings.warn(
```

[ ]: array([119905.85041792, 213031.60168521, 306157.3529525 , 399283.1042198])