Pratham Nagar 59

ML_EXP_2 Linear Regression

```
import numpy as np

class SimpleLinearRegression:
    def __init__(self):
        self.intercept = 0
        self.slope = 0

    def fit(self, X, y):
        X_avg = np.mean(X)
        y_avg = np.mean(y)
        numerator, denominator = 0, 0

        for i in range(len(X)):
            numerator += (X[i] - X_avg) * (y[i] - y_avg)
            denominator += (X[i] - X_avg) ** 2

        self.slope = numerator / denominator
        self.intercept = y_avg - (self.slope * X_avg)
        return self.intercept, self.slope

    def predict(self, X):
        return self.intercept + (X * self.slope)

if __name__ == "__main__":
    X_data = np.array([160, 175, 168, 150, 180], ndmin=2)
    X_data = X_data.reshape(5, 1)
    y_data = np.array([55, 72, 63, 50, 77])

    model = SimpleLinearRegression()
    model.fit(X_data, y_data)

    prediction = model.predict([165])
    print(prediction)
```

```
[61.91036415]
```

Double-click (or enter) to edit

ML_EXP_2 Multiple Linear Regression

```
import numpy as np

class LinearRegression:
    def __init__ (self):
        self.params = np.zeros(int(np.random.random()), float)[:, np.newaxis]

    def fit (self, X, y):
        bias = np.ones(len(X))
        X_bias = np.c_[bias, X]
        lse = (np.linalg.inv(np.transpose(X_bias) @ X_bias) @ np.transpose(X_bias)) @ y
        self.params = lse
        return self.params

    def predict (self, X):
        bias_testing = np.ones(len(X))
        X_test = np.c_[bias_testing, X]
        y_hat = X_test @ self.params
        return y_hat

if __name__ == '__main__':
    X = np.array ([
        [2, 6],
        [3, 7],
        [5, 9],
        [6, 3]
    ])
```

```
y = np.array ([3, 7, 10, 14])

model = LinearRegression()
parameters = model.fit(X, y)
print(f'The parameters for the model are: {parameters}')

y_pred = model.predict([[7, 4]])
print(f'The predicted outcome is: {y_pred}')
```

```
The parameters for the model are: [ 0.10204082  2.41836735 -0.20408163]
The predicted outcome is: [16.21428571]
```