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asiejo,
            . MLab-3 Linear Regression:
19/3/25
a. Apply Linear Rejoession to predict 7th & 9th month data.
a. Apply Linear Repression to yi (sales in thousand)

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 tode;
                                               P(4=1/x) =
         pandas as pd
import
                         (2.10+00)=
         numpy as np
import
                         as plt
         matplotlib, py plot
import
df = pd, read_csv('sales.csv')
                                              : p(.yei/x) #s the
weeks = df['xi(week)']. & dues
 sales = df['yiCsales in thousand)']. values
# calc slope(m) & intercept (b) for LR
 n = len (weeks)
sum: x = np. sum (weeks)
sum-y = np. sum (sales)
 Sum - x2 = np, sum (weeks ** 2)
sum - xy = hp. sum ( weeks *sales)
 # slope(m) & intercept(b)
m = (n + sum - xy - sum - x + sum - y)/(n + sum - x2 - sum - x + 2)
b = (sum-y - m + sum-x)/n
 print (+"The regression eq" is : y = dm: .2+ yx + 16: .2+ y")
# predict the sales for 4th & 9th weeks
 week_7 = 7
 week - 9 = 9
 predicted_sales_7 = m + week_7 + b
 predicted-sales-9 = m * week-9 + b
 print (+" Predicted sales for the 7th week: of predicted_sales_7:.24y thousand)
              11 - 9th week: of predicted sales -9: . 24) thousand)
 print(+"
```

# plot the data points and the regression line plt. scatter (weeks, sales, color = 'blue', lobel = 'Data Ports') plt. plot (weeks, mx weeks + b, color = 'red', label = f'L'inear Peyorysion. y = 4m: . 2+1x+ 4b: . 2+4') ptt. x label ('Weeks') pst. ylabol ('Sales') plt. show() ('vas. scales ') vis hor by 0/P: The regression equation is: y = 0.66x + 0.54 Predicted sales for the 7th week: 5.16 thousand predicted sales for the 9th week: 6.48 thousand Sales Data and Linear Regression agoders. 24000 = X X-b = op. c. [op. cons(up(x), 1)), x]Hompsk &= ((x^T x)) x (-1) x (.y inde englinalgival (x.b.7. delk.b), del (a.b.7) dell to thatalo critation of 2.0-" Little + x fre : [o] cape y es "po noiscongot 1.0, 1.5 2.0 2.5 30 3.5 4.0 4.5 5.0 Weeks id+ 2-dow + or = F-6do? botsilon ported to posticion sales for the 5th week; Aprets Aleba Sales Sales Sills effathers.

2. Use matrix approach Linear Repression x; (week): y; (sales in thousand) ter alleritarials (19 x 10 ld (14 c)) (19 c) (20121) bader. 14 ( Cool 4) code: at = pd. read - cisv (' sales 2. csv') nothange notherpre sto weeks = df['sci(week)], values ! gales = df ['y' (coles in thousand)], values it sot also believed X = weeks. reshape (-1,1) room I have only whit Y = sales. reshape (-1, 1) X-b = np.c\_[np.ones((len(x), 1)), X] # compute 0 = ((x^T x)^(-1) xT). Y theta = np. linalg. inv (x-b. T. dot(x-b). dot (x-b. T), dot(y) b = theta[8] m = theta[1] print (+"The regression of is: y=qm[o]:, 24 x + (b[o]:, 24 y") 1.0 1.8 2.0 2.5 2.6 3.9 4.0 4.3 5.9. week-5 = 5 predicted\_sales\_7 = m \* week\_5 +b print (4" predicted sales for the 5th week: \* \* predicted - sales - \$[0]: . 2f & thoward")

ostput! The regression en is:  $y = 2.20 \times -1.50$ predicted sales for the 5th week: 9.50 thousand Sales Pata and Linear Regression (2009)9 (1) + 1. 1. 4 - 1 = (265) 4) 8. 1 = 60 , 300 A b. Calculate the probability that a status to 1 (129.5725) 1 (2259) 9 1 (2259) 9 1 1.0 1.5 2.0 2.5 3.0 3.5 4.0 bledernin lost in en 3 m filldodorg all ans 6 the stacker will prose 2409 : Wals fortiborg to at which is I (2), o) for three closes. Apply with most to where south to order to fill dodon with but a (15) 6 (15) 60000 thigh all to destroy que the should it gifts elsekarajes and made s