BDA – Assignment 6

Trisha P Malhotra(tpm6421)

**Linear Regression and Linear classifierson the adult income dataset::**

Output:

(Scroll down for snapshots of results and plots.)

Coefficients of linear regression model

[[ -3.24308971e-03 -6.58644232e-03 -1.37645630e-07 -8.76820273e-02

3.02555929e-01 1.26636066e-02 3.28432556e-03 7.60833347e-17

1.46583128e-01 -1.75801416e-05 -2.08634107e-04 -5.35306886e-03

1.54224907e-02]]

Mean squared error: 0.492800

Coefficients of ridge regression model, with alpha = 1e-15

[]

Mean squared error: 0.492800

Coefficients of ridge regression model, with alpha = 1e-10

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]])]

Mean squared error: 0.492800

Coefficients of ridge regression model, with alpha = 1e-08

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308971e-03, -6.58644231e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]])]

Mean squared error: 0.492800

Coefficients of ridge regression model, with alpha = 1e-05

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308971e-03, -6.58644231e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308977e-03, -6.58644141e-03, -1.37645628e-07,

-8.76820265e-02, 3.02555926e-01, 1.26636065e-02,

3.28432607e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801414e-05, -2.08634106e-04, -5.35306887e-03,

1.54224904e-02]])]

Mean squared error: 0.492800

Coefficients of ridge regression model, with alpha = 0.0001

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308971e-03, -6.58644231e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308977e-03, -6.58644141e-03, -1.37645628e-07,

-8.76820265e-02, 3.02555926e-01, 1.26636065e-02,

3.28432607e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801414e-05, -2.08634106e-04, -5.35306887e-03,

1.54224904e-02]]), array([[ -3.24315713e-03, -6.58553019e-03, -1.37643276e-07,

-8.76811804e-02, 3.02552335e-01, 1.26635606e-02,

3.28483843e-03, 0.00000000e+00, 1.46583306e-01,

-1.75800168e-05, -2.08632669e-04, -5.35308382e-03,

1.54221379e-02]])]

Mean squared error: 0.492800

Coefficients of ridge regression model, with alpha = 0.001

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308971e-03, -6.58644231e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308977e-03, -6.58644141e-03, -1.37645628e-07,

-8.76820265e-02, 3.02555926e-01, 1.26636065e-02,

3.28432607e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801414e-05, -2.08634106e-04, -5.35306887e-03,

1.54224904e-02]]), array([[ -3.24315713e-03, -6.58553019e-03, -1.37643276e-07,

-8.76811804e-02, 3.02552335e-01, 1.26635606e-02,

3.28483843e-03, 0.00000000e+00, 1.46583306e-01,

-1.75800168e-05, -2.08632669e-04, -5.35308382e-03,

1.54221379e-02]]), array([[ -3.24376378e-03, -6.57732240e-03, -1.37622091e-07,

-8.76735594e-02, 3.02519990e-01, 1.26631465e-02,

3.28945354e-03, 0.00000000e+00, 1.46584902e-01,

-1.75788936e-05, -2.08619726e-04, -5.35321842e-03,

1.54189629e-02]])]

Mean squared error: 0.492800

Coefficients of ridge regression model, with alpha = 0.01

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308971e-03, -6.58644231e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308977e-03, -6.58644141e-03, -1.37645628e-07,

-8.76820265e-02, 3.02555926e-01, 1.26636065e-02,

3.28432607e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801414e-05, -2.08634106e-04, -5.35306887e-03,

1.54224904e-02]]), array([[ -3.24315713e-03, -6.58553019e-03, -1.37643276e-07,

-8.76811804e-02, 3.02552335e-01, 1.26635606e-02,

3.28483843e-03, 0.00000000e+00, 1.46583306e-01,

-1.75800168e-05, -2.08632669e-04, -5.35308382e-03,

1.54221379e-02]]), array([[ -3.24376378e-03, -6.57732240e-03, -1.37622091e-07,

-8.76735594e-02, 3.02519990e-01, 1.26631465e-02,

3.28945354e-03, 0.00000000e+00, 1.46584902e-01,

-1.75788936e-05, -2.08619726e-04, -5.35321842e-03,

1.54189629e-02]]), array([[ -3.24981097e-03, -6.49537549e-03, -1.37410462e-07,

-8.75974334e-02, 3.02197073e-01, 1.26590040e-02,

3.33553546e-03, 0.00000000e+00, 1.46600666e-01,

-1.75676702e-05, -2.08490376e-04, -5.35455719e-03,

1.53872630e-02]])]

Mean squared error: 0.492812

Coefficients of ridge regression model, with alpha = 1

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308971e-03, -6.58644231e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308977e-03, -6.58644141e-03, -1.37645628e-07,

-8.76820265e-02, 3.02555926e-01, 1.26636065e-02,

3.28432607e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801414e-05, -2.08634106e-04, -5.35306887e-03,

1.54224904e-02]]), array([[ -3.24315713e-03, -6.58553019e-03, -1.37643276e-07,

-8.76811804e-02, 3.02552335e-01, 1.26635606e-02,

3.28483843e-03, 0.00000000e+00, 1.46583306e-01,

-1.75800168e-05, -2.08632669e-04, -5.35308382e-03,

1.54221379e-02]]), array([[ -3.24376378e-03, -6.57732240e-03, -1.37622091e-07,

-8.76735594e-02, 3.02519990e-01, 1.26631465e-02,

3.28945354e-03, 0.00000000e+00, 1.46584902e-01,

-1.75788936e-05, -2.08619726e-04, -5.35321842e-03,

1.54189629e-02]]), array([[ -3.24981097e-03, -6.49537549e-03, -1.37410462e-07,

-8.75974334e-02, 3.02197073e-01, 1.26590040e-02,

3.33553546e-03, 0.00000000e+00, 1.46600666e-01,

-1.75676702e-05, -2.08490376e-04, -5.35455719e-03,

1.53872630e-02]]), array([[ -3.30840030e-03, -5.68885318e-03, -1.35316501e-07,

-8.68444945e-02, 2.99020096e-01, 1.26173527e-02,

3.78949455e-03, 0.00000000e+00, 1.46738586e-01,

-1.74562070e-05, -2.07205153e-04, -5.36724000e-03,

1.50752470e-02]])]

Mean squared error: 0.527869

Coefficients of ridge regression model, with alpha = 5

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308971e-03, -6.58644231e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308977e-03, -6.58644141e-03, -1.37645628e-07,

-8.76820265e-02, 3.02555926e-01, 1.26636065e-02,

3.28432607e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801414e-05, -2.08634106e-04, -5.35306887e-03,

1.54224904e-02]]), array([[ -3.24315713e-03, -6.58553019e-03, -1.37643276e-07,

-8.76811804e-02, 3.02552335e-01, 1.26635606e-02,

3.28483843e-03, 0.00000000e+00, 1.46583306e-01,

-1.75800168e-05, -2.08632669e-04, -5.35308382e-03,

1.54221379e-02]]), array([[ -3.24376378e-03, -6.57732240e-03, -1.37622091e-07,

-8.76735594e-02, 3.02519990e-01, 1.26631465e-02,

3.28945354e-03, 0.00000000e+00, 1.46584902e-01,

-1.75788936e-05, -2.08619726e-04, -5.35321842e-03,

1.54189629e-02]]), array([[ -3.24981097e-03, -6.49537549e-03, -1.37410462e-07,

-8.75974334e-02, 3.02197073e-01, 1.26590040e-02,

3.33553546e-03, 0.00000000e+00, 1.46600666e-01,

-1.75676702e-05, -2.08490376e-04, -5.35455719e-03,

1.53872630e-02]]), array([[ -3.30840030e-03, -5.68885318e-03, -1.35316501e-07,

-8.68444945e-02, 2.99020096e-01, 1.26173527e-02,

3.78949455e-03, 0.00000000e+00, 1.46738586e-01,

-1.74562070e-05, -2.07205153e-04, -5.36724000e-03,

1.50752470e-02]]), array([[ -3.93636431e-03, 2.21892170e-02, -3.36513196e-08,

-4.65271264e-02, 1.55464683e-01, 8.68780727e-03,

1.90622887e-02, 0.00000000e+00, 1.16729537e-01,

-1.03023946e-05, -1.23714620e-04, -4.60212802e-03,

2.77341628e-03]])]

Mean squared error: 0.619652

Coefficients of ridge regression model, with alpha = 10

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308971e-03, -6.58644231e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308977e-03, -6.58644141e-03, -1.37645628e-07,

-8.76820265e-02, 3.02555926e-01, 1.26636065e-02,

3.28432607e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801414e-05, -2.08634106e-04, -5.35306887e-03,

1.54224904e-02]]), array([[ -3.24315713e-03, -6.58553019e-03, -1.37643276e-07,

-8.76811804e-02, 3.02552335e-01, 1.26635606e-02,

3.28483843e-03, 0.00000000e+00, 1.46583306e-01,

-1.75800168e-05, -2.08632669e-04, -5.35308382e-03,

1.54221379e-02]]), array([[ -3.24376378e-03, -6.57732240e-03, -1.37622091e-07,

-8.76735594e-02, 3.02519990e-01, 1.26631465e-02,

3.28945354e-03, 0.00000000e+00, 1.46584902e-01,

-1.75788936e-05, -2.08619726e-04, -5.35321842e-03,

1.54189629e-02]]), array([[ -3.24981097e-03, -6.49537549e-03, -1.37410462e-07,

-8.75974334e-02, 3.02197073e-01, 1.26590040e-02,

3.33553546e-03, 0.00000000e+00, 1.46600666e-01,

-1.75676702e-05, -2.08490376e-04, -5.35455719e-03,

1.53872630e-02]]), array([[ -3.30840030e-03, -5.68885318e-03, -1.35316501e-07,

-8.68444945e-02, 2.99020096e-01, 1.26173527e-02,

3.78949455e-03, 0.00000000e+00, 1.46738586e-01,

-1.74562070e-05, -2.07205153e-04, -5.36724000e-03,

1.50752470e-02]]), array([[ -3.93636431e-03, 2.21892170e-02, -3.36513196e-08,

-4.65271264e-02, 1.55464683e-01, 8.68780727e-03,

1.90622887e-02, 0.00000000e+00, 1.16729537e-01,

-1.03023946e-05, -1.23714620e-04, -4.60212802e-03,

2.77341628e-03]]), array([[ -1.97229699e-03, 1.58519830e-02, 2.47390784e-09,

-1.71624254e-02, 5.96976639e-02, 3.69184547e-03,

1.24849269e-02, 0.00000000e+00, 5.39065595e-02,

-3.94201247e-06, -4.80935673e-05, -2.17776743e-03,

-3.18349455e-04]])]

Mean squared error: 0.658575

Coefficients of ridge regression model, with alpha = 100

[array([[ -3.24308971e-03, -6.58644232e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308971e-03, -6.58644231e-03, -1.37645630e-07,

-8.76820273e-02, 3.02555929e-01, 1.26636066e-02,

3.28432556e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801416e-05, -2.08634107e-04, -5.35306886e-03,

1.54224907e-02]]), array([[ -3.24308977e-03, -6.58644141e-03, -1.37645628e-07,

-8.76820265e-02, 3.02555926e-01, 1.26636065e-02,

3.28432607e-03, 0.00000000e+00, 1.46583128e-01,

-1.75801414e-05, -2.08634106e-04, -5.35306887e-03,

1.54224904e-02]]), array([[ -3.24315713e-03, -6.58553019e-03, -1.37643276e-07,

-8.76811804e-02, 3.02552335e-01, 1.26635606e-02,

3.28483843e-03, 0.00000000e+00, 1.46583306e-01,

-1.75800168e-05, -2.08632669e-04, -5.35308382e-03,

1.54221379e-02]]), array([[ -3.24376378e-03, -6.57732240e-03, -1.37622091e-07,

-8.76735594e-02, 3.02519990e-01, 1.26631465e-02,

3.28945354e-03, 0.00000000e+00, 1.46584902e-01,

-1.75788936e-05, -2.08619726e-04, -5.35321842e-03,

1.54189629e-02]]), array([[ -3.24981097e-03, -6.49537549e-03, -1.37410462e-07,

-8.75974334e-02, 3.02197073e-01, 1.26590040e-02,

3.33553546e-03, 0.00000000e+00, 1.46600666e-01,

-1.75676702e-05, -2.08490376e-04, -5.35455719e-03,

1.53872630e-02]]), array([[ -3.30840030e-03, -5.68885318e-03, -1.35316501e-07,

-8.68444945e-02, 2.99020096e-01, 1.26173527e-02,

3.78949455e-03, 0.00000000e+00, 1.46738586e-01,

-1.74562070e-05, -2.07205153e-04, -5.36724000e-03,

1.50752470e-02]]), array([[ -3.93636431e-03, 2.21892170e-02, -3.36513196e-08,

-4.65271264e-02, 1.55464683e-01, 8.68780727e-03,

1.90622887e-02, 0.00000000e+00, 1.16729537e-01,

-1.03023946e-05, -1.23714620e-04, -4.60212802e-03,

2.77341628e-03]]), array([[ -1.97229699e-03, 1.58519830e-02, 2.47390784e-09,

-1.71624254e-02, 5.96976639e-02, 3.69184547e-03,

1.24849269e-02, 0.00000000e+00, 5.39065595e-02,

-3.94201247e-06, -4.80935673e-05, -2.17776743e-03,

-3.18349455e-04]]), array([[ -1.18361206e-03, 1.00217923e-02, 3.68705283e-09,

-9.67432356e-03, 3.41615792e-02, 2.14304780e-03,

7.83383903e-03, 0.00000000e+00, 3.19995630e-02,

-2.23412154e-06, -2.73988574e-05, -1.29552870e-03,

-3.53160028e-04]])]





