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Student Id: 1001405034

Course Name: Machine Learning

Course Number: 6363

For Histograms

run:

yeast_training.txt yeast_test.txt histograms 7
Class 1, attribute 0, bin 0, P(bin class) = 0.00
Class 1, attribute 0, bin 1, P(bin class) = 0.16
Class 1, attribute 0, bin 2, P(bin class) = 1.10
Class 1, attribute 0, bin 3, P(bin class) = 4.24
Class 1, attribute 0, bin 4, P(bin class) = 1.22
Class 1, attribute 0, bin 5, P(bin class) = 0.16
Class 1, attribute 0, bin 6, P(bin class) = 0.00
Class 1, attribute 1, bin 0, P(bin class) = 0.00
Class 1, attribute 1, bin 1, P(bin class) = 0.06
Class 1, attribute 1, bin 2, P(bin class) = 1.27
Class 1, attribute 1, bin 3, P(bin class) = 3.32
Class 1, attribute 1, bin 4, P(bin class) = 0.20
Class 1, attribute 1, bin 5, P(bin class) = 0.03
Class 1, attribute 1, bin 6, P(bin class) = 0.00
Class 1, attribute 2, bin 0, P(bin class) = 0.00
Class 1, attribute 2, bin 1, P(bin class) = 0.33
Class 1, attribute 2, bin 2, P(bin class) = 1.32
Class 1, attribute 2, bin 3, P(bin class) = 5.06
Class 1, attribute 2, bin 4, P(bin class) = 2.42
Class 1, attribute 2, bin 5, P(bin class) = 0.17
Class 1, attribute 2, bin 6, P(bin class) = 0.00
Class 1, attribute 3, bin 0, P(bin class) = 0.00

Class 1, attribute 3, bin 1, P(bin | class) = 0.81

```
Class 1, attribute 3, bin 2, P(bin | class) = 1.46
```

```
Class 1, attribute 7, bin 5, P(bin | class) = 0.04
```

```
Class 2, attribute 4, bin 1, P(bin | class) = 7.95
```

```
Class 3, attribute 0, bin 4, P(bin | class) = 2.13
```

```
Class 3, attribute 5, bin 0, P(bin | class) = 0.00
```

```
Class 4, attribute 1, bin 3, P(bin | class) = 5.29
```

```
Class 4, attribute 5, bin 6, P(bin | class) = 0.00
```

```
Class 5, attribute 2, bin 2, P(bin | class) = 4.85
```

```
Class 5, attribute 6, bin 5, P(bin | class) = 0.76
```

```
Class 6, attribute 3, bin 1, P(bin | class) = 1.73
```

```
Class 6, attribute 7, bin 4, P(bin | class) = 0.00
```

```
Class 7, attribute 4, bin 0, P(bin | class) = 0.00
```

```
Class 8, attribute 0, bin 3, P(bin | class) = 0.79
```

```
Class 8, attribute 4, bin 6, P(bin | class) = 0.00
```

```
Class 9, attribute 1, bin 2, P(bin | class) = 1.50
```

```
Class 9, attribute 5, bin 5, P(bin | class) = 0.00
```

```
Class 10, attribute 2, bin 1, P(bin | class) = 4.00
```

Class 10, attribute 5, bin 2, P(bin | class) = 0.00

Class 10, attribute 5, bin 4, P(bin | class) = 0.00

Class 10, attribute 5, bin 5, P(bin | class) = 0.00

Class 10, attribute 5, bin 6, P(bin | class) = 0.00

Class 10, attribute 6, bin 0, P(bin | class) = 0.00

Class 10, attribute 6, bin 1, P(bin | class) = 20.00

Class 10, attribute 6, bin 2, P(bin | class) = 20.00

Class 10, attribute 6, bin 3, P(bin | class) = 20.00

Class 10, attribute 6, bin 4, P(bin | class) = 0.00

Class 10, attribute 6, bin 5, P(bin | class) = 20.00

Class 10, attribute 6, bin 6, P(bin | class) = 0.00

Class 10, attribute 7, bin 0, P(bin | class) = 0.00

Class 10, attribute 7, bin 1, P(bin | class) = 100.00

Class 10, attribute 7, bin 2, P(bin | class) = 0.00

Class 10, attribute 7, bin 3, P(bin | class) = 0.00

Class 10, attribute 7, bin 4, P(bin | class) = 0.00

Class 10, attribute 7, bin 5, P(bin | class) = 33.33

Class 10, attribute 7, bin 6, P(bin | class) = 0.00

classification accuracy=0.2025

For Gaussian

run:

yeast_training.txt yeast_test.txt gaussians Class 1, attribute 0, mean = 0.52, std = 0.10 Class 1, attribute 1, mean = 0.54, std = 0.10Class 1, attribute 2, mean = 0.52, std = 0.07 Class 1, attribute 3, mean = 0.41, std = 0.17Class 1, attribute 4, mean = 0.50, std = 0.01 Class 1, attribute 5, mean = 0.00, std = 0.01 Class 1, attribute 6, mean = 0.50, std = 0.05Class 1, attribute 7, mean = 0.24, std = 0.05 Class 2, attribute 0, mean = 0.45, std = 0.11Class 2, attribute 1, mean = 0.45, std = 0.10 Class 2, attribute 2, mean = 0.53, std = 0.06Class 2, attribute 3, mean = 0.23, std = 0.11 Class 2, attribute 4, mean = 0.50, std = 0.04Class 2, attribute 5, mean = 0.00, std = 0.01 Class 2, attribute 6, mean = 0.49, std = 0.06Class 2, attribute 7, mean = 0.33, std = 0.14 Class 3, attribute 0, mean = 0.43, std = 0.10Class 3, attribute 1, mean = 0.48, std = 0.11 Class 3, attribute 2, mean = 0.36, std = 0.06 Class 3, attribute 3, mean = 0.22, std = 0.08 Class 3, attribute 4, mean = 0.51, std = 0.05Class 3, attribute 5, mean = 0.00, std = 0.01 Class 3, attribute 6, mean = 0.51, std = 0.04 Class 3, attribute 7, mean = 0.27, std = 0.09Class 4, attribute 0, mean = 0.79, std = 0.07 Class 4, attribute 1, mean = 0.76, std = 0.07 Class 4, attribute 2, mean = 0.38, std = 0.06 Class 4, attribute 3, mean = 0.32, std = 0.11 Class 4, attribute 4, mean = 0.50, std = 0.01

Class 4, attribute 5, mean = 0.00, std = 0.01

Class 4, attribute 6, mean = 0.51, std = 0.07

Class 4, attribute 7, mean = 0.27, std = 0.09

Class 5, attribute 0, mean = 0.74, std = 0.15

Class 5, attribute 1, mean = 0.62, std = 0.12

Class 5, attribute 2, mean = 0.42, std = 0.08

Class 5, attribute 3, mean = 0.30, std = 0.12

Class 5, attribute 4, mean = 0.50, std = 0.01

Class 5, attribute 5, mean = 0.00, std = 0.01

Class 5, attribute 6, mean = 0.51, std = 0.06

Class 5, attribute 7, mean = 0.24, std = 0.04

Class 6, attribute 0, mean = 0.54, std = 0.14

Class 6, attribute 1, mean = 0.50, std = 0.12

Class 6, attribute 2, mean = 0.51, std = 0.05

Class 6, attribute 3, mean = 0.24, std = 0.10

Class 6, attribute 4, mean = 0.50, std = 0.01

Class 6, attribute 5, mean = 0.49, std = 0.38

Class 6, attribute 6, mean = 0.51, std = 0.03

Class 6, attribute 7, mean = 0.24, std = 0.05

Class 7, attribute 0, mean = 0.48, std = 0.11

Class 7, attribute 1, mean = 0.47, std = 0.09

Class 7, attribute 2, mean = 0.54, std = 0.06

Class 7, attribute 3, mean = 0.22, std = 0.12

Class 7, attribute 4, mean = 0.50, std = 0.04

Class 7, attribute 5, mean = 0.00, std = 0.03

Class 7, attribute 6, mean = 0.50, std = 0.06

Class 7, attribute 7, mean = 0.26, std = 0.09

Class 8, attribute 0, mean = 0.74, std = 0.10

Class 8, attribute 1, mean = 0.73, std = 0.11

Class 8, attribute 2, mean = 0.49, std = 0.05

Class 8, attribute 3, mean = 0.29, std = 0.07

Class 8, attribute 4, mean = 0.50, std = 0.01

Class 8, attribute 5, mean = 0.00, std = 0.01

Class 8, attribute 6, mean = 0.46, std = 0.08

Class 8, attribute 7, mean = 0.23, std = 0.02

Class 9, attribute 0, mean = 0.55, std = 0.14

Class 9, attribute 1, mean = 0.56, std = 0.15

Class 9, attribute 2, mean = 0.51, std = 0.06

Class 9, attribute 3, mean = 0.20, std = 0.06

Class 9, attribute 4, mean = 0.50, std = 0.01

Class 9, attribute 5, mean = 0.00, std = 0.01

Class 9, attribute 6, mean = 0.53, std = 0.05

Class 9, attribute 7, mean = 0.24, std = 0.04

Class 10, attribute 0, mean = 0.78, std = 0.05

Class 10, attribute 1, mean = 0.74, std = 0.11

Class 10, attribute 2, mean = 0.48, std = 0.09

Class 10, attribute 3, mean = 0.33, std = 0.06

Class 10, attribute 4, mean = 1.00, std = 0.01

Class 10, attribute 5, mean = 0.00, std = 0.01

Class 10, attribute 6, mean = 0.55, std = 0.02

Class 10, attribute 7, mean = 0.23, std = 0.01

classification accuracy=0.4504

BUILD SUCCESSFUL (total time: 2 seconds)

For Mixture Of Gaussian

run:

yeast_training.txt yeast_test.txt mixtures 3 Class 1, attribute 0, Gaussian 0, mean = 0.50, std = 0.06 Class 1, attribute 0, Gaussian 1, mean = 0.53, std = 0.10 Class 1, attribute 0, Gaussian 2, mean = 0.52, std = 0.12 Class 1, attribute 1, Gaussian 0, mean = 0.54, std = 0.08 Class 1, attribute 1, Gaussian 1, mean = 0.53, std = 0.09 Class 1, attribute 1, Gaussian 2, mean = 0.53, std = 0.18 Class 1, attribute 2, Gaussian 0, mean = 0.50, std = 0.10 Class 1, attribute 2, Gaussian 1, mean = 0.53, std = 0.06 Class 1, attribute 2, Gaussian 2, mean = 0.51, std = 0.05 Class 1, attribute 3, Gaussian 0, mean = 0.39, std = 0.17 Class 1, attribute 3, Gaussian 1, mean = 0.41, std = 0.17 Class 1, attribute 3, Gaussian 2, mean = 0.42, std = 0.17 Class 1, attribute 4, Gaussian 0, mean = 0.50, std = 0.01 Class 1, attribute 4, Gaussian 1, mean = 0.50, std = 0.01 Class 1, attribute 4, Gaussian 2, mean = 0.50, std = 0.01 Class 1, attribute 5, Gaussian 0, mean = 0.00, std = 0.01 Class 1, attribute 5, Gaussian 1, mean = 0.00, std = 0.01 Class 1, attribute 5, Gaussian 2, mean = 0.00, std = 0.01 Class 1, attribute 6, Gaussian 0, mean = 0.46, std = 0.09 Class 1, attribute 6, Gaussian 1, mean = 0.51, std = 0.03 Class 1, attribute 6, Gaussian 2, mean = 0.51, std = 0.03 Class 1, attribute 7, Gaussian 0, mean = 0.22, std = 0.01 Class 1, attribute 7, Gaussian 1, mean = 0.27, std = 0.01 Class 1, attribute 7, Gaussian 2, mean = 0.32, std = 0.10 Class 2, attribute 0, Gaussian 0, mean = 0.44, std = 0.10 Class 2, attribute 0, Gaussian 1, mean = 0.45, std = 0.10 Class 2, attribute 0, Gaussian 2, mean = 0.54, std = 0.17 Class 2, attribute 1, Gaussian 0, mean = 0.45, std = 0.10

```
Class 2, attribute 1, Gaussian 1, mean = 0.45, std = 0.10
```

- Class 3, attribute 3, Gaussian 2, mean = 0.34, std = 0.10
- Class 3, attribute 4, Gaussian 0, mean = 0.50, std = 0.01
- Class 3, attribute 4, Gaussian 1, mean = 0.50, std = 0.01
- Class 3, attribute 4, Gaussian 2, mean = 1.00, std = 0.01
- Class 3, attribute 5, Gaussian 0, mean = 0.00, std = 0.01
- Class 3, attribute 5, Gaussian 1, mean = 0.00, std = 0.01
- Class 3, attribute 5, Gaussian 2, mean = 0.00, std = 0.01
- Class 3, attribute 6, Gaussian 0, mean = 0.46, std = 0.04
- Class 3, attribute 6, Gaussian 1, mean = 0.52, std = 0.02
- Class 3, attribute 6, Gaussian 2, mean = 0.53, std = 0.02
- Class 3, attribute 7, Gaussian 0, mean = 0.22, std = 0.01
- Class 3, attribute 7, Gaussian 1, mean = 0.29, std = 0.03
- Class 3, attribute 7, Gaussian 2, mean = 0.48, std = 0.15
- Class 4, attribute 0, Gaussian 0, mean = 0.76, std = 0.05
- Class 4, attribute 0, Gaussian 1, mean = 0.76, std = 0.05
- Class 4, attribute 0, Gaussian 2, mean = 0.87, std = 0.07
- Class 4, attribute 1, Gaussian 0, mean = 0.76, std = 0.07
- Class 4, attribute 1, Gaussian 1, mean = 0.76, std = 0.07
- Class 4, attribute 1, Gaussian 2, mean = 0.76, std = 0.07
- Class 4, attribute 2, Gaussian 0, mean = 0.33, std = 0.03
- Class 4, attribute 2, Gaussian 1, mean = 0.40, std = 0.05
- Class 4, attribute 2, Gaussian 2, mean = 0.41, std = 0.05
- Class 4, attribute 3, Gaussian 0, mean = 0.29, std = 0.06
- Class 4, attribute 3, Gaussian 1, mean = 0.30, std = 0.06
- Class 4, attribute 3, Gaussian 2, mean = 0.39, std = 0.19
- Class 4, attribute 4, Gaussian 0, mean = 0.50, std = 0.01
- Class 4, attribute 4, Gaussian 1, mean = 0.50, std = 0.01
- Class 4, attribute 4, Gaussian 2, mean = 0.50, std = 0.01
- Class 4, attribute 5, Gaussian 0, mean = 0.00, std = 0.01
- Class 4, attribute 5, Gaussian 1, mean = 0.00, std = 0.01
- Class 4, attribute 5, Gaussian 2, mean = 0.00, std = 0.01

```
Class 4, attribute 6, Gaussian 0, mean = 0.40, std = 0.09
```

```
Class 6, attribute 0, Gaussian 1, mean = 0.58, std = 0.09
```

- Class 7, attribute 2, Gaussian 2, mean = 0.65, std = 0.12
- Class 7, attribute 3, Gaussian 0, mean = 0.16, std = 0.04
- Class 7, attribute 3, Gaussian 1, mean = 0.24, std = 0.06
- Class 7, attribute 3, Gaussian 2, mean = 0.41, std = 0.19
- Class 7, attribute 4, Gaussian 0, mean = 0.50, std = 0.01
- Class 7, attribute 4, Gaussian 1, mean = 0.50, std = 0.01
- Class 7, attribute 4, Gaussian 2, mean = 1.00, std = 0.01
- Class 7, attribute 5, Gaussian 0, mean = 0.00, std = 0.01
- Class 7, attribute 5, Gaussian 1, mean = 0.00, std = 0.01
- Class 7, attribute 5, Gaussian 2, mean = 0.50, std = 0.01
- Class 7, attribute 6, Gaussian 0, mean = 0.45, std = 0.12
- Class 7, attribute 6, Gaussian 1, mean = 0.49, std = 0.05
- Class 7, attribute 6, Gaussian 2, mean = 0.52, std = 0.03
- Class 7, attribute 7, Gaussian 0, mean = 0.22, std = 0.01
- Class 7, attribute 7, Gaussian 1, mean = 0.27, std = 0.03
- Class 7, attribute 7, Gaussian 2, mean = 0.31, std = 0.16
- Class 8, attribute 0, Gaussian 0, mean = 0.45, std = 0.04
- Class 8, attribute 0, Gaussian 1, mean = 0.77, std = 0.05
- Class 8, attribute 0, Gaussian 2, mean = 0.77, std = 0.05
- Class 8, attribute 1, Gaussian 0, mean = 0.54, std = 0.14
- Class 8, attribute 1, Gaussian 1, mean = 0.71, std = 0.08
- Class 8, attribute 1, Gaussian 2, mean = 0.78, std = 0.05
- Class 8, attribute 2, Gaussian 0, mean = 0.49, std = 0.05
- Class 8, attribute 2, Gaussian 1, mean = 0.49, std = 0.05
- Class 8, attribute 2, Gaussian 2, mean = 0.50, std = 0.05
- Class 8, attribute 3, Gaussian 0, mean = 0.29, std = 0.07
- Class 8, attribute 3, Gaussian 1, mean = 0.29, std = 0.07
- Class 8, attribute 3, Gaussian 2, mean = 0.29, std = 0.07
- Class 8, attribute 4, Gaussian 0, mean = 0.50, std = 0.01
- Class 8, attribute 4, Gaussian 1, mean = 0.50, std = 0.01
- Class 8, attribute 4, Gaussian 2, mean = 0.50, std = 0.01

```
Class 8, attribute 5, Gaussian 0, mean = 0.00, std = 0.01
```

Class 9, attribute 7, Gaussian 1, mean = 0.26, std = 0.01 Class 9, attribute 7, Gaussian 2, mean = 0.40, std = 0.01 Class 10, attribute 0, Gaussian 0, mean = 0.77, std = 0.05 Class 10, attribute 0, Gaussian 1, mean = 0.78, std = 0.05 Class 10, attribute 0, Gaussian 2, mean = 0.78, std = 0.05 Class 10, attribute 1, Gaussian 0, mean = 0.56, std = 0.01 Class 10, attribute 1, Gaussian 1, mean = 0.74, std = 0.01 Class 10, attribute 1, Gaussian 2, mean = 0.82, std = 0.02 Class 10, attribute 2, Gaussian 0, mean = 0.33, std = 0.01 Class 10, attribute 2, Gaussian 1, mean = 0.50, std = 0.01 Class 10, attribute 2, Gaussian 2, mean = 0.53, std = 0.04 Class 10, attribute 3, Gaussian 0, mean = 0.33, std = 0.06 Class 10, attribute 3, Gaussian 1, mean = 0.33, std = 0.06 Class 10, attribute 3, Gaussian 2, mean = 0.33, std = 0.06 Class 10, attribute 4, Gaussian 0, mean = 1.00, std = 0.01 Class 10, attribute 4, Gaussian 1, mean = 1.00, std = 0.01 Class 10, attribute 4, Gaussian 2, mean = 1.00, std = 0.01 Class 10, attribute 5, Gaussian 0, mean = 0.00, std = 0.01 Class 10, attribute 5, Gaussian 1, mean = 0.00, std = 0.01 Class 10, attribute 5, Gaussian 2, mean = 0.00, std = 0.01 Class 10, attribute 6, Gaussian 0, mean = 0.54, std = 0.01 Class 10, attribute 6, Gaussian 1, mean = 0.58, std = 0.01 Class 10, attribute 6, Gaussian 2, mean = 0.58, std = 0.01 Class 10, attribute 7, Gaussian 0, mean = 0.22, std = 0.01 Class 10, attribute 7, Gaussian 1, mean = 0.24, std = 0.01 Class 10, attribute 7, Gaussian 2, mean = 0.25, std = 0.01

BUILD SUCCESSFUL (total time: 7 seconds)