**Practical work assignments 1**

In this work, each student will have to complete two tasks according to their variant number. The variant number corresponds to the student's number in the journal.

**Task 1**

You need to device with a data table so that there are numeric, ordinal, nominal, and binary attributes. Next, find the average value, median, deviation of the numerical feature and the mode of the binary feature.

Example of a table:

|  |  |  |  |
| --- | --- | --- | --- |
| Flat | Аrea | Wall material | Elevator availability |
| 1 | 50 | brick | yes |
| 2 | 70 | panel | yes |
| 3 | 100 | wood | no |

**Task 2**

Using binary encoding, represent the drawing as a vector:

**Variants:**

1. **2. 3.**

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**4. 5. 6.**

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**7. 8. 9.**

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**10. 11. 12.**

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**13. 14. 15.**

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**16. 17. 18.**

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**19. 20. 21.**

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**22. 23. 24.**

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**25. 26. 27.**

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**28. 29. 30.**

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**Task 3**

Determine which class an unlabeled object belongs to. Use the KNN method. The calculations are performed using the Manhattan distance, the Euclidean distance and the Chebyshev distance.

**Variants:**

1.

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| --- | --- | --- | --- |
| **№** | **Steps (thousands)** | **Exercise equipment (watches)** | **Class** |
| 1 | 3 | 0.5 | Sedentary |
| 2 | 4 | 1 | Sedentary |
| 3 | 5 | 1 | Sedentary |
| 4 | 5 | 2 | Sedentary |
| 5 | 8 | 2.5 | Moderate |
| 6 | 9 | 3 | Moderate |
| 7 | 10 | 2.5 | Moderate |
| 8 | 11 | 2 | Moderate |
| 9 | 6 | 4.5 | Active |
| 10 | 7 | 6 | Active |
| 11 | 7 | 4 | ? |

2.

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| --- | --- | --- | --- |
| **Object** | **Feature 1** | **Feature 2** | **Label** |
| 1 | 0.23 | 0.11 | 0 |
| 2 | 0.56 | 0.78 | 1 |
| 3 | 0.91 | 0.35 | 0 |
| 4 | 0.19 | 0.67 | 1 |
| 5 | 0.85 | 0.42 | 0 |
| 6 | 0.31 | 0.59 | 1 |
| 7 | 0.48 | 0.26 | 0 |
| 8 | 0.62 | 0.83 | 1 |
| 9 | 0.75 | 0.51 | 0 |
| 10 | 0.39 | 0.94 | 1 |
| **11** | **0,31** | **0,78** | ? |

3.

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| --- | --- | --- | --- |
| **Object** | **Feature 1** | **Feature 2** | **Class** |
| 1 | 1.2 | -0,1 | 1 |
| 2 | 4 | 5,5 | 1 |
| 3 | 2,3 | 2,5 | 1 |
| 4 | 1 | 3 | 2 |
| 5 | -0,5 | 1,3 | 2 |
| 6 | 2,2 | 0,2 | 2 |
| 7 | 1 | -2,2 | 3 |
| 8 | 3,3 | 6,4 | 3 |
| 9 | 2,5 | 7 | 3 |
| 10 | 2,4 | 3,9 | 1 |
| 11 | 2,1 | 0 | ? |

4.

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| --- | --- | --- | --- |
| **Object** | **Tire width (cm)** | **Tire height (cm)** | **Name** |
| 1 | 24 | 18 | BMW |
| 2 | 25 | 29 | Mercedes |
| 3 | 27 | 31 | Toyota |
| 4 | 16 | 30 | Mercedes |
| 5 | 30 | 20 | BMW |
| 6 | 26 | 32 | Toyota |
| 7 | 13 | 30 | ? |

5.

|  |  |  |
| --- | --- | --- |
| **% juice** | **% water** | **Drink name** |
| 88 | 12 | J7 |
| 96 | 4 | Rich |
| 70 | 30 | Gardens |
| 76 | 24 | I |
| 65 | 35 | Gardens |
| 98 | 2 | Rich |
| 90 | 10 | J7 |
| 87 | 13 | ? |

6.

|  |  |  |
| --- | --- | --- |
| **Petal width(cm)** | **Petal length (cm)** | **Flower name** |
| 5 | 9 | Dandelion |
| 9 | 12 | Lily |
| 4 | 5 | Sunflower |
| 6 | 10 | Lily |
| 3 | 6 | Dandelion |
| 12 | 13 | Lily |
| 7 | 12 | ? |

7.

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| --- | --- | --- |
| **Cookie weight (grams)** | **% of chocolate in cookies** | **Name** |
| 150 | 60 | Milka |
| 155 | 63 | Milka |
| 165 | 72 | Like |
| 185 | 75 | Like |
| 195 | 87 | Kinder |
| 200 | 90 | Kinder |
| 170 | 85 | ? |

8.

|  |  |  |
| --- | --- | --- |
| **Frame Length** | **Frame width** | **Bike name** |
| 11 | 28 | Dodge |
| 17 | 34 | Suzuki |
| 10 | 25 | Yamaha |
| 16 | 35 | Suzuki |
| 12 | 29 | Dodge |
| 11 | 24 | Yamaha |
| 15 | 37 | ? |

9.

|  |  |  |
| --- | --- | --- |
| **Width (cm)** | **Length (cm)** | **Keyboard name** |
| 5 | 4 | Logitech |
| 4 | 2 | Razer |
| 5 | 5 | HyperX |
| 2 | 3 | Logitech |
| 3 | 1 | Razer |
| 4 | 6 | HyperX |
| 3 | 5 | ? |

10.

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| **Response (ms)** | **Sensitivity in %** | **Mouse name** |
| 7 | 11 | Ardor |
| 10 | 6 | Logitech |
| 12 | 10 | Razer |
| 5 | 14 | HyperX |
| 11 | 5 | Logitech |
| 6 | 15 | HyperX |
| 7 | 12 | Ardor |
| 8 | 12 | ? |

11.

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| --- | --- | --- |
| **Monitor Length** | **Monitor Width** | **Monitor Name** |
| 50 | 35 | ASUS |
| 30 | 35 | LG |
| 45 | 25 | HP |
| 40 | 30 | ASUS |
| 32 | 35 | LG |
| 42 | 25 | HP |
| 35 | 40 | ? |

12.

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| --- | --- | --- |
| **Volume** | **Noise Reduction** | **Microphone Name** |
| 40 | 220 | Ardor |
| 70 | 200 | Logitech |
| 90 | 240 | Razer |
| 80 | 205 | HyperX |
| 80 | 270 | Logitech |
| 55 | 230 | HyperX |
| 85 | 240 | ? |

13.

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| **Resolution** | **Quality** | **Web-camera name** |
| 720 | 1080 | Logitech |
| 930 | 1440 | HyperX |
| 1020 | 1920 | Razer |
| 710 | 1090 | Logitech |
| 940 | 1450 | HyperX |
| 1010 | 1800 | Razer |
| 940 | 1450 | ? |

14.

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| --- | --- | --- |
| **Tire Width (cm)** | **Tire Length (cm)** | **Car name** |
| 29 | 19 | BMW |
| 27 | 30 | Mercedes |
| 29 | 12 | BMW |
| 16 | 30 | Mercedes |
| 27 | 31 | Toyota |
| 26 | 32 | Toyota |
| 25 | 31 | ? |

15.

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| --- | --- | --- | --- |
| Musical Instrument | Evaluation of musicians | High Cost | **Campaign manufacturer** |
| Piano | 7,6 | 8,3 | YAMAHA |
| Violin | 8 | 7,3 | Fender |
| Accordion | 6,9 | 5 | Roland |
| Violin | 7 | 6 | Roland |
| Accordion | 7 | 8 | YAMAHA |
| Piano | 9,2 | 9 | Fender |
| Violin | 9,1 | 9,7 | YAMAHA |
| Piano | 8,3 | 8,2 | ? |

16.

|  |  |  |
| --- | --- | --- |
| **% juice** | **% water** | **Juice name** |
| 88 | 13 | Rich |
| 95 | 5 | J7 |
| 70 | 30 | I |
| 76 | 24 | I |
| 80 | 15 | Rich |
| 98 | 2 | J7 |
| 82 | 18 | ? |

17.

|  |  |  |
| --- | --- | --- |
| **Petal width(cm)** | **Petal length (cm)** | **Flower name** |
| 5 | 9 | Lily |
| 9 | 12 | Sunflower |
| 4 | 5 | Dandelion |
| 6 | 10 | Sunflower |
| 3 | 6 | Lily |
| 7 | 3 | Dandelion |
| 9 | 13 | ? |

18.

|  |  |  |
| --- | --- | --- |
| **Cookie weight (grams)** | **% of chocolate in cookies** | **Name** |
| 150 | 60 | Kinder |
| 155 | 63 | Kinder |
| 165 | 72 | Like |
| 185 | 75 | Like |
| 195 | 87 | Milka |
| 200 | 90 | Milka |
| 188 | 85 | ? |

19.

|  |  |  |
| --- | --- | --- |
| **Frame length** | **Frame width** | **Bike name** |
| 11 | 28 | Dodge |
| 17 | 34 | Suzuki |
| 10 | 25 | Yamaha |
| 16 | 35 | Suzuki |
| 12 | 29 | Dodge |
| 11 | 24 | Yamaha |
| 19 | 40 | ? |

20.

|  |  |  |
| --- | --- | --- |
| **Width (cm)** | **Length (cm)** | **Keyboard name** |
| 5 | 4 | Logitech |
| 6 | 2 | Razer |
| 8 | 5 | HyperX |
| 3 | 3 | Logitech |
| 6 | 1 | Razer |
| 8 | 6 | HyperX |
| 4 | 6 | ? |

21.

|  |  |  |
| --- | --- | --- |
| **Response (ms)** | **Sensitivity in %** | **Mouse name** |
| 7 | 11 | HyperX |
| 10 | 6 | Razer |
| 12 | 10 | Logitech |
| 5 | 14 | Ardor |
| 11 | 5 | Razer |
| 6 | 15 | Ardor |
| 7 | 12 | HyperX |
| 10 | 12 | ? |

22.

|  |  |  |
| --- | --- | --- |
| **Monitor Length** | **Monitor Width** | **Monitor Name** |
| 49 | 35 | ASUS |
| 30 | 35 | LG |
| 45 | 25 | HP |
| 40 | 30 | ASUS |
| 32 | 35 | LG |
| 51 | 25 | HP |
| 40 | 40 | ? |

23.

|  |  |  |
| --- | --- | --- |
| **Volume** | **Noise Reduction** | **Microphone Name** |
| 45 | 220 | Logitech |
| 70 | 200 | HyperX |
| 90 | 240 | Razer |
| 80 | 210 | HyperX |
| 80 | 270 | Razer |
| 55 | 230 | Logitech |
| 99 | 235 | ? |

24.

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| --- | --- | --- |
| **Resolution** | **Quality** | **Web-camera name** |
| 800 | 900 | Logitech |
| 960 | 1440 | HyperX |
| 1020 | 1920 | Razer |
| 850 | 1090 | Logitech |
| 980 | 1455 | HyperX |
| 1015 | 1850 | Razer |
| 930 | 1400 | ? |

25.

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| --- | --- | --- |
| **P** | **Q** | **Type** |
| 4.24 | 2.96 | A |
| 4.08 | 3.04 | A |
| 5.76 | 2.4 | B |
| 4.32 | 2.72 | A |
| 4.08 | 2.64 | A |
| 4.32 | 3.12 | A |
| 5.92 | 2.24 | B |
| 4.88 | 2.24 | C |
| 5.51 | 2.3 | B |
| 4.76 | 2.2 | C |
| 4.16 | 2.48 | ? |

26.

A training sample is given.

What genre does the movie "The Expendables" belong to?

|  |  |  |  |
| --- | --- | --- | --- |
| **Title** | **Expert assessment** | **Audience assessment** | **Genre** |
| The Green Mile | 8,8 | 9,1 | Drama |
| Escape from Shawshank | 8,7 | 9,0 | Drama |
| The Lord of the Rings: The Fellowship of the Ring | 8,5 | 8,6 | Fantasy |
| Brother 2 | 7,8 | 8,6 | Action movie |
| Officers | 8,3 | 8,0 | Action movie |
| Ender's Game | 7,2 | 7,2 | Fantasy |
| Spider-Man | 7,0 | 7,3 | Fantasy |
| The Unstoppable | 6,4 | 6,9 | ? |

27.

A training sample of music albums is given. Determine whether the album "Good kid, m.A.A.d city" is included in the billboard top 100.

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| --- | --- | --- | --- |
| **The title** | **Personal Assessment** | **Listeners' assessment** | **Is in the billboard 100** |
| Revolver | 7,2 | 9,3 | Yes |
| Legends never die | 7,9 | 8,2 | Yes |
| Nevermind | 8 | 8,5 | No |
| The Eminem Show | 7,1 | 8,7 | No |
| Greatest Hits | 8,5 | 9,1 | Yes |
| DS4EVER | 6,7 | 7 | No |
| My Turn | 8 | 7,7 | Yes |
| Good kid, m.A.A.d city | 8,4 | 8,1 | ? |

28.

A training sample of canvases is given. Determine which company's canvas size is 333x222.

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| --- | --- | --- | --- |
| **Material** | **Length (cm)** | **Width (cm)** | **Firm** |
| Linen | 60 | 20 | Optima Group Company |
| Cotton | 120 | 100 | Manufacturer of TEMPIUM nonwoven fabric |
| Polyester | 240 | 200 | ML Tex Company |
| Cotton | 300 | 230 | ML Tex Company |
| Flax | 50 | 60 | TEMPIUM Nonwoven Fabric Manufacturer |
| Flax | 210 | 190 | TEMPIUM nonwoven fabric manufacturer |
| Polyester | 500 | 650 | Optima Group Company |
| Linen | 333 | 222 | ? |

29.

|  |  |  |
| --- | --- | --- |
| **Rating from the website** | **Rating of friends** | **Type of train** |
| 8.8 | 9.1 | Fast |
| 8.7 | 9.0 | Fast |
| 8.5 | 8.6 | Usual |
| 7.8 | 8.6 | Usual |
| 8.3 | 8.0 | Fast |
| 7.2 | 7.2 | Usual |
| 6.4 | 6.9 | ? |

30.

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| --- | --- | --- |
| **Evaluation of the site** | **Evaluation of acquaintances** | **Will the tourist book a hotel?** |
| 9.0 | 7.7 | Yes |
| 8.6 | 8.4 | Yes |
| 7.8 | 6.9 | NO |
| 6.6 | 7.2 | NO |
| 6.4 | 7.9 | NO |
| 6.9 | 9.2 | Yes |
| 9.4 | 6.8 | Yes |
| 8.4 | 7.6 | Yes |
| 7.5 | 7.5 | ? |