**题目**

根据要求，选择并完成一篇关于数据分析与处理方面的小论文。具体题目如下：

**第一题.** 表1 为2007年各地区农村居民家庭平均每人生活消费支出数据，分别为X1：食品, X2：衣着, X3：居住, X4：家庭设备及服务, X5：交通和通讯, X6：文教娱乐用品及服务，X7：医疗保健，X8：其他商品及服务。分析反映各地区农村居民家庭消费支出的主要成分；并对各地区农村居民家庭消费支出情况进行排序和分析。

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 单位：元 |  | | | | | | | |
| 地区 | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 |
| 北 京 | 2132.51 | 513.44 | 1023.21 | 340.15 | 778.52 | 870.12 | 629.56 | 111.75 |
| 天 津 | 1367.75 | 286.33 | 674.81 | 126.74 | 400.11 | 312.07 | 306.19 | 64.30 |
| 河 北 | 1025.72 | 185.68 | 627.98 | 140.45 | 318.19 | 243.30 | 188.06 | 57.40 |
| 山 西 | 1033.68 | 260.88 | 392.78 | 120.86 | 268.75 | 370.97 | 170.85 | 63.81 |
| 内蒙古 | 1280.05 | 228.40 | 473.98 | 117.64 | 375.58 | 423.75 | 281.46 | 75.29 |
| 辽 宁 | 1334.18 | 281.19 | 513.11 | 142.07 | 361.77 | 362.78 | 265.01 | 108.05 |
| 吉 林 | 1240.93 | 227.96 | 399.11 | 120.95 | 337.46 | 339.77 | 311.37 | 87.89 |
| 黑龙江 | 1077.34 | 254.01 | 691.02 | 104.99 | 335.28 | 312.32 | 272.49 | 69.98 |
| 上 海 | 3259.48 | 475.51 | 2097.21 | 451.40 | 883.71 | 857.47 | 571.06 | 249.04 |
| 江 苏 | 1968.88 | 251.29 | 752.73 | 228.51 | 543.97 | 642.52 | 263.85 | 134.41 |
| 浙 江 | 2430.60 | 405.32 | 1498.50 | 338.80 | 782.98 | 750.69 | 452.44 | 142.26 |
| 安 徽 | 1192.57 | 166.31 | 479.46 | 144.23 | 258.29 | 283.17 | 177.04 | 52.98 |
| 福 建 | 1870.32 | 235.61 | 660.55 | 184.21 | 465.40 | 356.26 | 174.12 | 107.00 |
| 江 西 | 1492.02 | 147.71 | 474.49 | 121.54 | 277.15 | 252.78 | 167.71 | 61.08 |
| 山 东 | 1369.20 | 224.18 | 682.13 | 195.99 | 422.36 | 424.89 | 230.84 | 71.98 |
| 河 南 | 1017.43 | 189.71 | 615.62 | 136.37 | 269.46 | 212.36 | 173.19 | 62.26 |
| 湖 北 | 1479.04 | 168.64 | 434.91 | 166.25 | 281.12 | 284.13 | 178.77 | 97.13 |
| 湖 南 | 1675.16 | 161.79 | 508.33 | 152.60 | 278.78 | 293.89 | 219.95 | 86.88 |
| 广 东 | 2087.58 | 162.33 | 763.01 | 163.85 | 443.24 | 254.94 | 199.31 | 128.06 |
| 广 西 | 1378.78 | 86.90 | 554.14 | 112.24 | 245.97 | 172.45 | 149.01 | 47.98 |
| 海 南 | 1430.31 | 86.26 | 305.90 | 93.26 | 248.08 | 223.98 | 95.55 | 73.23 |
| 重 庆 | 1376.00 | 136.34 | 263.73 | 138.34 | 208.69 | 195.97 | 168.57 | 39.06 |
| 四 川 | 1435.52 | 156.65 | 366.45 | 142.64 | 241.49 | 177.19 | 174.75 | 52.56 |
| 贵 州 | 998.39 | 99.44 | 329.64 | 70.93 | 154.52 | 147.31 | 79.31 | 34.16 |
| 云 南 | 1226.69 | 112.52 | 586.07 | 107.15 | 216.67 | 181.73 | 167.92 | 38.43 |
| 西 藏 | 1079.83 | 245.00 | 418.83 | 133.26 | 156.57 | 65.39 | 50.00 | 68.74 |
| 陕 西 | 941.81 | 161.08 | 512.40 | 106.80 | 254.74 | 304.54 | 222.51 | 55.71 |
| 甘 肃 | 944.14 | 112.20 | 295.23 | 91.40 | 186.17 | 208.90 | 149.82 | 29.36 |
| 青 海 | 1069.04 | 191.80 | 359.74 | 122.17 | 292.10 | 135.13 | 229.28 | 47.23 |
| 宁 夏 | 1019.35 | 184.26 | 450.55 | 109.27 | 265.76 | 192.00 | 239.40 | 68.17 |
| 新 疆 | 939.03 | 218.18 | 445.02 | 91.45 | 234.70 | 166.27 | 210.69 | 45.25 |

**第二题.** 表2 为全国大部分省市某年度工业经济发展主要指标数据，主要考虑的因素有x1工业增加值率（％），x2总资产贡献率（％），x3资产负债率（％），x4流动资产周转次数（次），x5工业成本费用利润率（％），x6全员劳动生产率（万元/人·年），x7产品销售率（％），分析反映我国工业经济发展的主要因素，并对各省市工业经济发展进行排序和评价。

表2 不同地区工业经济发展数据

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 序号 | 地 区 | x1 | x2 | x3 | x4 | x5 | x6 | x7 |
| 1 | 北 京 | 26.91 | 4.5 | 31.14 | 1.88 | 6.39 | 17.96 | 98.99 |
| 2 | 上 海 | 28 | 11.72 | 43.6 | 1.99 | 8.57 | 27.57 | 99.2 |
| 3 | 天 津 | 32.9 | 13.91 | 60.19 | 2.2 | 10.77 | 21.27 | 98.4 |
| 4 | 河 北 | 30.38 | 10.44 | 64.01 | 2.31 | 5.96 | 11.28 | 98.67 |
| 5 | 山 西 | 37.48 | 9.38 | 67.82 | 1.71 | 6.82 | 7.93 | 97.85 |
| 6 | 内蒙古 | 43.44 | 9.82 | 64.32 | 2.08 | 7.94 | 16.34 | 98.23 |
| 7 | 辽 宁 | 28.76 | 7.45 | 59.33 | 2.15 | 2.78 | 14.19 | 99.86 |
| 8 | 吉 林 | 29.48 | 8.49 | 60.57 | 2.11 | 3.45 | 12.29 | 99.45 |
| 9 | 江 苏 | 24.34 | 11.26 | 59.67 | 2.29 | 4.89 | 15.97 | 99.41 |
| 10 | 浙 江 | 24.85 | 13.37 | 57.41 | 2.92 | 5.28 | 24.62 | 99.72 |
| 11 | 安 徽 | 34.54 | 11.2 | 62.83 | 2.18 | 6.15 | 11.77 | 98.89 |
| 12 | 福 建 | 28.87 | 11.89 | 56.16 | 2.38 | 5.74 | 15.38 | 99.49 |
| 13 | 江 西 | 27.21 | 9.74 | 69.38 | 2.01 | 4 | 8.86 | 99.49 |
| 14 | 山 东 | 36.59 | 15.84 | 60.18 | 2.55 | 10.83 | 18.17 | 99.06 |
| 15 | 河 南 | 31.9 | 10.22 | 65.62 | 2.06 | 5.34 | 8.83 | 98.61 |
| 16 | 湖 北 | 33.27 | 9.18 | 57.34 | 1.69 | 9.05 | 13.68 | 99.63 |
| 17 | 湖 南 | 37.13 | 12.74 | 67.23 | 2.07 | 4.24 | 12.71 | 99.52 |
| 18 | 广 西 | 31.64 | 10.82 | 62.91 | 2.09 | 5.88 | 10.42 | 99.69 |
| 19 | 海 南 | 35.44 | 11.72 | 54.23 | 1.97 | 10.95 | 14.26 | 97.6 |
| 20 | 重 庆 | 25.95 | 8.15 | 58.92 | 1.58 | 3.71 | 8.34 | 99.38 |
| 21 | 四 川 | 36.29 | 9.08 | 64.34 | 1.56 | 7.31 | 11.26 | 99.3 |
| 22 | 贵 州 | 36.45 | 9.7 | 66.39 | 1.52 | 5.77 | 9.52 | 99.06 |
| 23 | 陕 西 | 41.01 | 15.87 | 61.88 | 1.7 | 18.95 | 12.28 | 98.76 |
| 24 | 甘 肃 | 25.76 | 9.54 | 59.32 | 2.3 | 3.55 | 9.02 | 98.96 |
| 25 | 青 海 | 38.77 | 12.16 | 68.56 | 1.38 | 22.44 | 17 | 97.9 |
| 26 | 宁 夏 | 33.62 | 5.62 | 60.94 | 1.46 | 3.37 | 9 | 99.38 |
| 27 | 黑龙江 | 50.1 | 35.35 | 54.5 | 2.42 | 39.49 | 19.81 | 97.71 |
| 28 | 云 南 | 44.76 | 20.08 | 47.44 | 1.5 | 13.41 | 22.54 | 99.8 |
| 29 | 新 疆 | 45.21 | 23.85 | 50.58 | 3.15 | 27.1 | 24.83 | 99.93 |
| 30 | 广 东 | 26.51 | 13.03 | 53.21 | 2.39 | 6.7 | 24.34 | 98.71 |
| 31 | 西 藏 | 55.73 | 4.68 | 25.48 | 0.97 | 11.8 | 6.31 | 93.68 |

**第三题.**表3 为2006年度全国主要城市平均气温数据，选择合适的聚类数，对其进行聚类，并进行聚类有效性评价，对聚类结果进行分析。

表3 2006年度全国主要城市平均气温数据

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 城 市 | 1月 | 2月 | 3月 | 4月 | 5月 | 6月 | 7月 | 8月 | 9月 | 10月 | 11月 | 12月 |
| 北 京 | -1.9 | -0.9 | 8.0 | 13.5 | 20.4 | 25.9 | 25.9 | 26.4 | 21.8 | 16.1 | 6.7 | -1.0 |
| 天 津 | -2.7 | -1.4 | 7.5 | 13.2 | 20.3 | 26.4 | 25.9 | 26.4 | 21.3 | 16.2 | 6.5 | -1.7 |
| 石 家 庄 | -0.9 | 1.6 | 10.3 | 15.1 | 21.3 | 27.4 | 27.0 | 25.9 | 21.8 | 17.8 | 8.0 | 0.4 |
| 太 原 | -3.6 | -0.4 | 6.8 | 14.5 | 19.1 | 23.2 | 25.7 | 23.1 | 17.4 | 13.4 | 4.4 | -2.5 |
| 呼和浩特 | -9.2 | -7.0 | 2.2 | 10.3 | 17.4 | 21.8 | 24.5 | 22.0 | 16.3 | 11.5 | 1.3 | -7.7 |
| 沈 阳 | -12.7 | -8.1 | 0.5 | 8.0 | 18.3 | 21.6 | 24.2 | 24.3 | 17.5 | 11.6 | 0.8 | -6.7 |
| 长 春 | -14.5 | -10.6 | -1.3 | 6.1 | 17.0 | 20.2 | 23.5 | 23.3 | 17.1 | 9.6 | -2.3 | -9.3 |
| 哈 尔 滨 | -17.7 | -12.6 | -2.8 | 5.9 | 17.1 | 19.9 | 23.4 | 23.1 | 16.2 | 7.4 | -4.5 | -12.1 |
| 上 海 | 5.7 | 5.6 | 11.1 | 16.6 | 20.8 | 25.6 | 29.4 | 30.2 | 23.9 | 22.1 | 15.7 | 8.2 |
| 南 京 | 3.9 | 4.3 | 11.3 | 17.1 | 21.2 | 26.5 | 28.7 | 29.5 | 22.5 | 20.3 | 12.8 | 5.2 |
| 杭 州 | 5.8 | 6.1 | 12.4 | 18.3 | 21.5 | 25.9 | 30.1 | 30.6 | 23.3 | 21.9 | 15.1 | 7.7 |
| 合 肥 | 3.4 | 4.5 | 11.7 | 17.2 | 21.7 | 26.7 | 28.8 | 29.0 | 22.2 | 20.4 | 12.8 | 5.0 |
| 福 州 | 12.5 | 12.5 | 14.0 | 19.4 | 22.3 | 26.5 | 29.4 | 29.0 | 25.9 | 24.4 | 19.8 | 14.1 |
| 南 昌 | 6.6 | 6.5 | 12.7 | 19.3 | 22.7 | 26.0 | 30.0 | 30.0 | 24.3 | 22.1 | 15.0 | 8.1 |
| 济 南 | 0.0 | 2.1 | 10.2 | 16.5 | 21.5 | 26.9 | 27.4 | 26.0 | 21.4 | 19.5 | 10.0 | 1.6 |
| 郑 州 | 0.3 | 3.9 | 11.5 | 17.1 | 21.8 | 27.8 | 27.1 | 26.1 | 21.2 | 19.0 | 10.8 | 3.0 |
| 武 汉 | 4.2 | 5.8 | 12.8 | 19.0 | 23.9 | 28.4 | 30.2 | 29.7 | 24.0 | 21.0 | 14.0 | 6.8 |
| 长 沙 | 5.3 | 6.2 | 12.5 | 19.9 | 23.6 | 27.0 | 30.1 | 29.5 | 24.0 | 21.3 | 14.7 | 7.8 |
| 广 州 | 15.8 | 17.3 | 17.9 | 23.6 | 25.3 | 27.8 | 29.8 | 29.4 | 27.0 | 26.4 | 21.9 | 16.0 |
| 南 宁 | 14.3 | 14.3 | 17.5 | 23.9 | 25.2 | 27.6 | 28.0 | 27.2 | 25.7 | 25.6 | 20.4 | 14.0 |
| 海 口 | 18.5 | 20.5 | 21.8 | 26.7 | 28.3 | 29.4 | 30.0 | 28.5 | 27.4 | 27.1 | 25.3 | 20.8 |
| 重 庆 | 7.8 | 9.0 | 13.3 | 19.2 | 22.9 | 25.4 | 31.0 | 32.4 | 24.8 | 20.6 | 14.6 | 9.4 |
| 温 州 | 5.8 | 7.5 | 12.1 | 17.9 | 21.6 | 24.0 | 26.9 | 26.6 | 20.9 | 19.0 | 13.3 | 6.9 |
| 贵 阳 | 4.3 | 5.4 | 10.2 | 17.0 | 18.9 | 21.1 | 23.8 | 23.2 | 20.5 | 16.7 | 11.2 | 5.8 |
| 昆 明 | 10.8 | 13.2 | 15.9 | 18.0 | 18.0 | 20.4 | 21.3 | 20.6 | 18.3 | 16.9 | 13.2 | 9.8 |
| 拉 萨 | 2.7 | 5.0 | 6.2 | 8.3 | 12.8 | 17.8 | 18.3 | 17.1 | 14.7 | 8.6 | 3.7 | 1.2 |
| 西 安 | -0.2 | 4.3 | 10.8 | 16.8 | 21.4 | 26.5 | 28.2 | 26.0 | 19.5 | 16.8 | 9.4 | 2.3 |
| 兰 州 | -6.9 | -2.6 | 3.2 | 10.3 | 15.6 | 20.0 | 22.2 | 21.9 | 13.8 | 10.2 | 1.5 | -7.4 |
| 西 宁 | -6.5 | -3.0 | 1.4 | 7.1 | 12.0 | 15.5 | 18.7 | 18.2 | 11.7 | 7.6 | 0.3 | -6.4 |
| 银 川 | -7.4 | -2.2 | 4.9 | 13.6 | 18.8 | 23.7 | 24.8 | 23.8 | 16.5 | 13.7 | 4.4 | -4.3 |
| 乌鲁木齐 | -14.2 | -6.7 | 1.2 | 12.0 | 16.8 | 23.2 | 24.5 | 24.1 | 17.6 | 11.4 | 1.9 | -8.8 |

**第四题.**表4是1984年洛杉矶奥运会35个国家和地区男子径赛成绩数据，选择合适的聚类数，对其进行聚类，并进行聚类有效性评价，对聚类结果进行分析。

表4 1984年洛杉矶奥运会35个国家和地区男子径赛成绩数据

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 国家 | 100米 | 200米 | 400米 | 800米 | 1500米 | 5000米 | 10000米 | 马拉松 |
| 阿根廷 | 10.39 | 20.81 | 46.84 | 1.81 | 3.7 | 14.04 | 29.36 | 137.72 |
| 澳大利亚 | 10.31 | 20.06 | 44.84 | 1.74 | 3.57 | 13.28 | 27.66 | 128.3 |
| 奥地利 | 10.44 | 20.81 | 46.82 | 1.79 | 3.6 | 13.26 | 27.72 | 135.9 |
| 比利时 | 10.34 | 20.68 | 45.04 | 1.73 | 3.6 | 13.22 | 27.45 | 129.95 |
| 百慕大 | 10.28 | 20.58 | 45.91 | 1.8 | 3.75 | 14.68 | 30.55 | 146.62 |
| 巴西 | 10.22 | 20.43 | 45.21 | 1.73 | 3.66 | 13.62 | 28.62 | 133.13 |
| 缅甸 | 10.64 | 21.52 | 48.3 | 1.8 | 3.85 | 14.45 | 30.28 | 139.95 |
| 加拿大 | 10.17 | 20.22 | 45.68 | 1.76 | 3.63 | 13.55 | 28.09 | 130.15 |
| 智利 | 10.34 | 20.8 | 46.2 | 1.79 | 3.71 | 13.61 | 29.3 | 134.03 |
| 中国 | 10.51 | 21.04 | 47.3 | 1.81 | 3.73 | 13.9 | 29.13 | 133.53 |
| 哥伦比亚 | 10.43 | 21.05 | 46.1 | 1.82 | 3.74 | 13.49 | 27.88 | 131.35 |
| 库克群岛 | 12.18 | 23.2 | 52.94 | 2.02 | 4.24 | 16.7 | 35.38 | 164.7 |
| 哥斯达黎加 | 10.94 | 21.9 | 48.66 | 1.87 | 3.84 | 14.03 | 28.81 | 136.58 |
| 捷克斯洛伐克 | 10.35 | 20.65 | 45.64 | 1.76 | 3.58 | 13.42 | 28.19 | 134.32 |
| 丹麦 | 10.56 | 20.52 | 45.89 | 1.78 | 3.61 | 13.5 | 28.11 | 130.78 |
| 多米尼加共和国 | 10.14 | 20.65 | 46.8 | 1.82 | 3.82 | 14.91 | 31.45 | 154.12 |
| 芬兰 | 10.43 | 20.69 | 45.49 | 1.74 | 3.61 | 13.27 | 27.52 | 130.87 |
| 法国 | 10.11 | 20.38 | 45.28 | 1.73 | 3.57 | 13.34 | 27.97 | 132.3 |
| 德意志民主共和国 | 10.12 | 20.33 | 44.87 | 1.73 | 3.56 | 13.17 | 27.42 | 129.92 |
| 德意志联邦共和国 | 10.16 | 20.37 | 44.5 | 1.73 | 3.53 | 13.21 | 27.61 | 132.23 |
| 大不列颠及北爱尔兰 | 10.11 | 20.21 | 44.93 | 1.7 | 3.51 | 13.01 | 27.51 | 129.13 |
| 希腊 | 10.22 | 20.71 | 46.56 | 1.78 | 3.64 | 14.59 | 28.45 | 134.6 |
| 危地马拉 | 10.98 | 21.82 | 48.4 | 1.89 | 3.8 | 14.16 | 30.11 | 139.33 |
| 匈牙利 | 10.26 | 20.62 | 46.02 | 1.77 | 3.62 | 13.49 | 28.44 | 132.58 |
| 印度 | 10.6 | 21.42 | 45.73 | 1.76 | 3.73 | 13.77 | 28.81 | 131.98 |
| 印度尼西亚 | 10.59 | 21.49 | 47.8 | 1.84 | 3.92 | 14.73 | 30.79 | 148.83 |
| 以色列 | 10.61 | 20.96 | 46.3 | 1.79 | 3.56 | 13.32 | 27.81 | 132.35 |
| 爱尔兰 | 10.71 | 21 | 47.8 | 1.77 | 3.72 | 13.66 | 28.93 | 137.55 |
| 意大利 | 10.01 | 19.72 | 45.26 | 1.73 | 3.6 | 13.23 | 27.52 | 131.08 |
| 日本 | 10.34 | 20.81 | 45.86 | 1.79 | 3.64 | 13.41 | 27.72 | 128.63 |
| 肯尼亚 | 10.46 | 20.66 | 44.92 | 1.73 | 3.55 | 13.1 | 27.38 | 129.75 |
| 韩国 | 10.34 | 20.89 | 46.9 | 1.79 | 3.77 | 13.96 | 29.23 | 136.25 |
| 朝鲜人民民主共和国 | 10.91 | 21.94 | 47.3 | 1.85 | 3.77 | 14.13 | 29.67 | 130.87 |
| 卢森堡 | 10.35 | 20.77 | 47.4 | 1.82 | 3.67 | 13.64 | 29.08 | 141.27 |
| 马来西亚 | 10.4 | 20.92 | 46.3 | 1.82 | 3.8 | 14.64 | 31.01 | 154.1 |

**第五题.** 表5 为1952年到1988年度某个地区农业总产值数据，分析数据特征并建立预测模型，分析预测模型的可靠性。并用该模型预测1989年到1991年货运量数据。

表5 货运量数据表

|  |  |
| --- | --- |
| 年 | 农业总产值 |
| 1952 | 100 |
| 1953 | 101.6 |
| 1954 | 103.3 |
| 1955 | 111.5 |
| 1956 | 116.5 |
| 1957 | 120.1 |
| 1958 | 120.3 |
| 1959 | 100.6 |
| 1960 | 83.6 |
| 1961 | 84.7 |
| 1962 | 88.7 |
| 1963 | 98.9 |
| 1964 | 111.9 |
| 1965 | 122.9 |
| 1966 | 131.9 |
| 1967 | 134.2 |
| 1968 | 131.6 |
| 1969 | 132.2 |
| 1970 | 139.8 |
| 1971 | 142 |
| 1972 | 140.5 |
| 1973 | 153.1 |
| 1974 | 159.2 |
| 1975 | 162.3 |
| 1976 | 159.1 |
| 1977 | 155.1 |
| 1978 | 161.2 |
| 1979 | 171.5 |
| 1980 | 168.4 |
| 1981 | 180.4 |
| 1982 | 201.6 |
| 1983 | 218.7 |
| 1984 | 247 |
| 1985 | 253.7 |
| 1986 | 261.4 |
| 1987 | 273.2 |
| 1988 | 279.4 |

**第六题.** 表6 为1917年到1975年度某个地区每万人生育率数据，分析数据特征并建立预测模型，分析预测模型的可靠性。并用该模型预测1976年到1978年出口总额数据。

表6 出口总额数据表

|  |  |
| --- | --- |
| 年份 | 出口总额 |
| 年 | 每万人生育率 |
| 1917 | 183.1 |
| 1918 | 183.9 |
| 1919 | 163.1 |
| 1920 | 179.5 |
| 1921 | 181.4 |
| 1922 | 173.4 |
| 1923 | 167.6 |
| 1924 | 177.4 |
| 1925 | 171.7 |
| 1926 | 170.1 |
| 1927 | 163.7 |
| 1928 | 151.9 |
| 1929 | 145.4 |
| 1930 | 145 |
| 1931 | 138.9 |
| 1932 | 131.5 |
| 1933 | 125.7 |
| 1934 | 129.5 |
| 1935 | 129.6 |
| 1936 | 129.5 |
| 1937 | 132.2 |
| 1938 | 134.1 |
| 1939 | 132.1 |
| 1940 | 137.4 |
| 1941 | 148.1 |
| 1942 | 174.1 |
| 1943 | 174.7 |
| 1944 | 156.7 |
| 1945 | 143.3 |
| 1946 | 189.7 |
| 1947 | 212 |
| 1948 | 200.4 |
| 1949 | 201.8 |
| 1950 | 200.7 |
| 1951 | 215.6 |
| 1952 | 222.5 |
| 1953 | 231.5 |
| 1954 | 237.9 |
| 1955 | 244 |
| 1956 | 259.4 |
| 1957 | 268.8 |
| 1958 | 264.3 |
| 1959 | 264.5 |
| 1960 | 268.1 |
| 1961 | 264 |
| 1962 | 252.8 |
| 1963 | 240 |
| 1964 | 229.1 |
| 1965 | 204.8 |
| 1966 | 193.3 |
| 1967 | 179 |
| 1968 | 178.1 |
| 1969 | 181.1 |
| 1970 | 165.6 |
| 1971 | 159.8 |
| 1972 | 136.1 |
| 1973 | 126.3 |
| 1974 | 123.3 |
| 1975 | 118.5 |

**第七题.** 鸢尾花数据集是常用的分类实验数据集，由Fisher于1936年收集整理。Iris也称鸢尾花卉数据集，是一类多重变量分析的数据集。数据集包含150个数据集，分为3类，每类50个数据，每个数据包含4个属性。可通过花萼长度，花萼宽度，花瓣长度，花瓣宽度4个属性预测鸢尾花卉属于（Setosa，Versicolour，Virginica）三个种类中的哪一类。表7-1为已知类别鸢尾花数据，构造分类模型，验证模型的有效性，并对表7-2未知类别鸢尾花数据进行分类。

**表7-1 已知类别鸢尾花数据表**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 序号 | 类别 | x1 | x2 | x3 | x4 |
| 1 | 1 | 50 | 33 | 14 | 2 |
| 2 | 3 | 64 | 28 | 56 | 22 |
| 3 | 2 | 65 | 28 | 46 | 15 |
| 4 | 3 | 67 | 31 | 56 | 24 |
| 5 | 3 | 63 | 28 | 51 | 15 |
| 6 | 1 | 46 | 34 | 14 | 3 |
| 7 | 3 | 69 | 31 | 51 | 23 |
| 8 | 2 | 62 | 22 | 45 | 15 |
| 9 | 2 | 59 | 32 | 48 | 18 |
| 10 | 1 | 46 | 36 | 10 | 2 |
| 11 | 2 | 61 | 30 | 46 | 14 |
| 12 | 2 | 60 | 27 | 51 | 16 |
| 13 | 3 | 65 | 30 | 52 | 20 |
| 14 | 2 | 56 | 25 | 39 | 11 |
| 15 | 3 | 65 | 30 | 55 | 18 |
| 16 | 3 | 58 | 27 | 51 | 19 |
| 17 | 3 | 68 | 32 | 59 | 23 |
| 18 | 1 | 51 | 33 | 17 | 5 |
| 19 | 2 | 57 | 28 | 45 | 13 |
| 20 | 3 | 62 | 34 | 54 | 23 |
| 21 | 3 | 77 | 38 | 67 | 22 |
| 22 | 2 | 63 | 33 | 47 | 16 |
| 23 | 3 | 67 | 33 | 57 | 25 |
| 24 | 3 | 76 | 30 | 66 | 21 |
| 25 | 3 | 49 | 25 | 45 | 17 |
| 26 | 1 | 55 | 35 | 13 | 2 |
| 27 | 3 | 67 | 30 | 52 | 23 |
| 28 | 2 | 70 | 32 | 47 | 14 |
| 29 | 2 | 64 | 32 | 45 | 15 |
| 30 | 2 | 61 | 28 | 40 | 13 |
| 31 | 1 | 48 | 31 | 16 | 2 |
| 32 | 3 | 59 | 30 | 51 | 18 |
| 33 | 2 | 55 | 24 | 38 | 11 |
| 34 | 3 | 63 | 25 | 50 | 19 |
| 35 | 3 | 64 | 32 | 53 | 23 |
| 36 | 1 | 52 | 34 | 14 | 2 |
| 37 | 1 | 49 | 36 | 14 | 1 |
| 38 | 2 | 54 | 30 | 45 | 15 |
| 39 | 3 | 79 | 38 | 64 | 20 |
| 40 | 1 | 44 | 32 | 13 | 2 |
| 41 | 3 | 67 | 33 | 57 | 21 |
| 42 | 1 | 50 | 35 | 16 | 6 |
| 43 | 2 | 58 | 26 | 40 | 12 |
| 44 | 1 | 44 | 30 | 13 | 2 |
| 45 | 3 | 77 | 28 | 67 | 20 |
| 46 | 3 | 63 | 27 | 49 | 18 |
| 47 | 1 | 47 | 32 | 16 | 2 |
| 48 | 2 | 55 | 26 | 44 | 12 |
| 49 | 2 | 50 | 23 | 33 | 10 |
| 50 | 3 | 72 | 32 | 60 | 18 |
| 51 | 1 | 48 | 30 | 14 | 3 |
| 52 | 1 | 51 | 38 | 16 | 2 |
| 53 | 3 | 61 | 30 | 49 | 18 |
| 54 | 1 | 48 | 34 | 19 | 2 |
| 55 | 1 | 50 | 30 | 16 | 2 |
| 56 | 1 | 50 | 32 | 12 | 2 |
| 57 | 3 | 61 | 26 | 56 | 14 |
| 58 | 3 | 64 | 28 | 56 | 21 |
| 59 | 1 | 43 | 30 | 11 | 1 |
| 60 | 1 | 58 | 40 | 12 | 2 |
| 61 | 1 | 51 | 38 | 19 | 4 |
| 62 | 2 | 67 | 31 | 44 | 14 |
| 63 | 3 | 62 | 28 | 48 | 18 |
| 64 | 1 | 49 | 30 | 14 | 2 |
| 65 | 1 | 51 | 35 | 14 | 2 |
| 66 | 2 | 56 | 30 | 45 | 15 |
| 67 | 2 | 58 | 27 | 41 | 10 |
| 68 | 1 | 50 | 34 | 16 | 4 |
| 69 | 1 | 46 | 32 | 14 | 2 |
| 70 | 2 | 60 | 29 | 45 | 15 |
| 71 | 2 | 57 | 26 | 35 | 10 |
| 72 | 1 | 57 | 44 | 15 | 4 |
| 73 | 1 | 50 | 36 | 14 | 2 |
| 74 | 3 | 77 | 30 | 61 | 23 |
| 75 | 3 | 63 | 34 | 56 | 24 |
| 76 | 3 | 58 | 27 | 51 | 19 |
| 77 | 2 | 57 | 19 | 42 | 13 |
| 78 | 3 | 72 | 30 | 58 | 16 |
| 79 | 1 | 54 | 34 | 15 | 4 |
| 80 | 1 | 52 | 42 | 15 | 1 |
| 81 | 3 | 71 | 30 | 59 | 21 |
| 82 | 3 | 64 | 31 | 55 | 18 |
| 83 | 3 | 60 | 30 | 48 | 18 |
| 84 | 3 | 63 | 29 | 56 | 18 |
| 85 | 2 | 49 | 24 | 33 | 10 |
| 86 | 2 | 56 | 27 | 42 | 13 |
| 87 | 2 | 57 | 30 | 42 | 12 |
| 88 | 1 | 55 | 42 | 14 | 2 |
| 89 | 1 | 49 | 31 | 15 | 2 |
| 90 | 3 | 77 | 26 | 69 | 23 |
| 91 | 3 | 60 | 22 | 50 | 15 |
| 92 | 1 | 54 | 39 | 17 | 4 |
| 93 | 2 | 66 | 29 | 46 | 13 |
| 94 | 2 | 52 | 27 | 39 | 14 |
| 95 | 2 | 60 | 34 | 45 | 16 |
| 96 | 1 | 50 | 34 | 15 | 2 |
| 97 | 1 | 44 | 19 | 14 | 2 |
| 98 | 2 | 50 | 20 | 35 | 10 |
| 99 | 2 | 55 | 24 | 37 | 10 |
| 100 | 2 | 58 | 27 | 39 | 12 |

**表7-2 待分类鸢尾花数据表**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 序号 | x1 | x2 | x3 | x4 |
| 101 | 47 | 32 | 13 | 2 |
| 102 | 46 | 31 | 15 | 2 |
| 103 | 69 | 32 | 57 | 23 |
| 104 | 62 | 29 | 43 | 13 |
| 105 | 74 | 28 | 61 | 19 |
| 106 | 59 | 30 | 42 | 15 |

**第八题.** Wine数据集来自于UCI[数据库](https://www.2cto.com/database/)，记录的是意大利同一地区3中不同品种的葡萄酒13中化学成分含量，以期通过科学的方法，达到自动分类葡萄酒的目的。表8-1为已知类别Wine数据，构造分类模型，验证模型的有效性，并对表8-2未知类别Wine数据进行分类。

**表8-1 已知类别Wine数据表**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 类别 | x1 | x2 | x3 | X4 | X5 | X6 | X7 | X8 | X9 | x10 | x11 | X12 | X13 |
| 1 | 14.23 | 1.71 | 2.43 | 15.6 | 127 | 2.8 | 3.06 | 0.28 | 2.29 | 5.64 | 1.04 | 3.92 | 1065 |
| 1 | 13.2 | 1.78 | 2.14 | 11.2 | 100 | 2.65 | 2.76 | 0.26 | 1.28 | 4.38 | 1.05 | 3.4 | 1050 |
| 1 | 13.16 | 2.36 | 2.67 | 18.6 | 101 | 2.8 | 3.24 | 0.3 | 2.81 | 5.68 | 1.03 | 3.17 | 1185 |
| 1 | 14.37 | 1.95 | 2.5 | 16.8 | 113 | 3.85 | 3.49 | 0.24 | 2.18 | 7.8 | 0.86 | 3.45 | 1480 |
| 1 | 13.24 | 2.59 | 2.87 | 21 | 118 | 2.8 | 2.69 | 0.39 | 1.82 | 4.32 | 1.04 | 2.93 | 735 |
| 1 | 14.2 | 1.76 | 2.45 | 15.2 | 112 | 3.27 | 3.39 | 0.34 | 1.97 | 6.75 | 1.05 | 2.85 | 1450 |
| 1 | 14.39 | 1.87 | 2.45 | 14.6 | 96 | 2.5 | 2.52 | 0.3 | 1.98 | 5.25 | 1.02 | 3.58 | 1290 |
| 1 | 14.06 | 2.15 | 2.61 | 17.6 | 121 | 2.6 | 2.51 | 0.31 | 1.25 | 5.05 | 1.06 | 3.58 | 1295 |
| 1 | 14.83 | 1.64 | 2.17 | 14 | 97 | 2.8 | 2.98 | 0.29 | 1.98 | 5.2 | 1.08 | 2.85 | 1045 |
| 1 | 13.86 | 1.35 | 2.27 | 16 | 98 | 2.98 | 3.15 | 0.22 | 1.85 | 7.22 | 1.01 | 3.55 | 1045 |
| 1 | 14.1 | 2.16 | 2.3 | 18 | 105 | 2.95 | 3.32 | 0.22 | 2.38 | 5.75 | 1.25 | 3.17 | 1510 |
| 1 | 14.12 | 1.48 | 2.32 | 16.8 | 95 | 2.2 | 2.43 | 0.26 | 1.57 | 5 | 1.17 | 2.82 | 1280 |
| 1 | 13.75 | 1.73 | 2.41 | 16 | 89 | 2.6 | 2.76 | 0.29 | 1.81 | 5.6 | 1.15 | 2.9 | 1320 |
| 1 | 14.75 | 1.73 | 2.39 | 11.4 | 91 | 3.1 | 3.69 | 0.43 | 2.81 | 5.4 | 1.25 | 2.73 | 1150 |
| 1 | 14.38 | 1.87 | 2.38 | 12 | 102 | 3.3 | 3.64 | 0.29 | 2.96 | 7.5 | 1.2 | 3 | 1547 |
| 1 | 13.63 | 1.81 | 2.7 | 17.2 | 112 | 2.85 | 2.91 | 0.3 | 1.46 | 7.3 | 1.28 | 2.88 | 1310 |
| 1 | 14.3 | 1.92 | 2.72 | 20 | 120 | 2.8 | 3.14 | 0.33 | 1.97 | 6.2 | 1.07 | 2.65 | 1280 |
| 1 | 13.83 | 1.57 | 2.62 | 20 | 115 | 2.95 | 3.4 | 0.4 | 1.72 | 6.6 | 1.13 | 2.57 | 1130 |
| 1 | 14.19 | 1.59 | 2.48 | 16.5 | 108 | 3.3 | 3.93 | 0.32 | 1.86 | 8.7 | 1.23 | 2.82 | 1680 |
| 1 | 13.64 | 3.1 | 2.56 | 15.2 | 116 | 2.7 | 3.03 | 0.17 | 1.66 | 5.1 | 0.96 | 3.36 | 845 |
| 1 | 14.06 | 1.63 | 2.28 | 16 | 126 | 3 | 3.17 | 0.24 | 2.1 | 5.65 | 1.09 | 3.71 | 780 |
| 1 | 12.93 | 3.8 | 2.65 | 18.6 | 102 | 2.41 | 2.41 | 0.25 | 1.98 | 4.5 | 1.03 | 3.52 | 770 |
| 1 | 13.71 | 1.86 | 2.36 | 16.6 | 101 | 2.61 | 2.88 | 0.27 | 1.69 | 3.8 | 1.11 | 4 | 1035 |
| 1 | 12.85 | 1.6 | 2.52 | 17.8 | 95 | 2.48 | 2.37 | 0.26 | 1.46 | 3.93 | 1.09 | 3.63 | 1015 |
| 1 | 13.5 | 1.81 | 2.61 | 20 | 96 | 2.53 | 2.61 | 0.28 | 1.66 | 3.52 | 1.12 | 3.82 | 845 |
| 1 | 13.05 | 2.05 | 3.22 | 25 | 124 | 2.63 | 2.68 | 0.47 | 1.92 | 3.58 | 1.13 | 3.2 | 830 |
| 1 | 13.39 | 1.77 | 2.62 | 16.1 | 93 | 2.85 | 2.94 | 0.34 | 1.45 | 4.8 | 0.92 | 3.22 | 1195 |
| 1 | 13.3 | 1.72 | 2.14 | 17 | 94 | 2.4 | 2.19 | 0.27 | 1.35 | 3.95 | 1.02 | 2.77 | 1285 |
| 1 | 13.87 | 1.9 | 2.8 | 19.4 | 107 | 2.95 | 2.97 | 0.37 | 1.76 | 4.5 | 1.25 | 3.4 | 915 |
| 1 | 14.02 | 1.68 | 2.21 | 16 | 96 | 2.65 | 2.33 | 0.26 | 1.98 | 4.7 | 1.04 | 3.59 | 1035 |
| 1 | 13.73 | 1.5 | 2.7 | 22.5 | 101 | 3 | 3.25 | 0.29 | 2.38 | 5.7 | 1.19 | 2.71 | 1285 |
| 1 | 13.58 | 1.66 | 2.36 | 19.1 | 106 | 2.86 | 3.19 | 0.22 | 1.95 | 6.9 | 1.09 | 2.88 | 1515 |
| 1 | 13.68 | 1.83 | 2.36 | 17.2 | 104 | 2.42 | 2.69 | 0.42 | 1.97 | 3.84 | 1.23 | 2.87 | 990 |
| 1 | 13.76 | 1.53 | 2.7 | 19.5 | 132 | 2.95 | 2.74 | 0.5 | 1.35 | 5.4 | 1.25 | 3 | 1235 |
| 1 | 13.51 | 1.8 | 2.65 | 19 | 110 | 2.35 | 2.53 | 0.29 | 1.54 | 4.2 | 1.1 | 2.87 | 1095 |
| 1 | 13.48 | 1.81 | 2.41 | 20.5 | 100 | 2.7 | 2.98 | 0.26 | 1.86 | 5.1 | 1.04 | 3.47 | 920 |
| 1 | 13.28 | 1.64 | 2.84 | 15.5 | 110 | 2.6 | 2.68 | 0.34 | 1.36 | 4.6 | 1.09 | 2.78 | 880 |
| 1 | 13.05 | 1.65 | 2.55 | 18 | 98 | 2.45 | 2.43 | 0.29 | 1.44 | 4.25 | 1.12 | 2.51 | 1105 |
| 1 | 13.07 | 1.5 | 2.1 | 15.5 | 98 | 2.4 | 2.64 | 0.28 | 1.37 | 3.7 | 1.18 | 2.69 | 1020 |
| 1 | 14.22 | 3.99 | 2.51 | 13.2 | 128 | 3 | 3.04 | 0.2 | 2.08 | 5.1 | 0.89 | 3.53 | 760 |
| 1 | 13.56 | 1.71 | 2.31 | 16.2 | 117 | 3.15 | 3.29 | 0.34 | 2.34 | 6.13 | 0.95 | 3.38 | 795 |
| 1 | 13.41 | 3.84 | 2.12 | 18.8 | 90 | 2.45 | 2.68 | 0.27 | 1.48 | 4.28 | 0.91 | 3 | 1035 |
| 1 | 13.88 | 1.89 | 2.59 | 15 | 101 | 3.25 | 3.56 | 0.17 | 1.7 | 5.43 | 0.88 | 3.56 | 1095 |
| 1 | 13.24 | 3.98 | 2.29 | 17.5 | 103 | 2.64 | 2.63 | 0.32 | 1.66 | 4.36 | 0.82 | 3 | 680 |
| 1 | 13.05 | 1.77 | 2.1 | 17 | 107 | 3 | 3 | 0.28 | 2.03 | 5.04 | 0.88 | 3.35 | 885 |
| 1 | 14.21 | 4.04 | 2.44 | 18.9 | 111 | 2.85 | 2.65 | 0.3 | 1.25 | 5.24 | 0.87 | 3.33 | 1080 |
| 1 | 14.38 | 3.59 | 2.28 | 16 | 102 | 3.25 | 3.17 | 0.27 | 2.19 | 4.9 | 1.04 | 3.44 | 1065 |
| 1 | 13.9 | 1.68 | 2.12 | 16 | 101 | 3.1 | 3.39 | 0.21 | 2.14 | 6.1 | 0.91 | 3.33 | 985 |
| 1 | 14.1 | 2.02 | 2.4 | 18.8 | 103 | 2.75 | 2.92 | 0.32 | 2.38 | 6.2 | 1.07 | 2.75 | 1060 |
| 1 | 13.94 | 1.73 | 2.27 | 17.4 | 108 | 2.88 | 3.54 | 0.32 | 2.08 | 8.9 | 1.12 | 3.1 | 1260 |
| 1 | 13.05 | 1.73 | 2.04 | 12.4 | 92 | 2.72 | 3.27 | 0.17 | 2.91 | 7.2 | 1.12 | 2.91 | 1150 |
| 1 | 13.83 | 1.65 | 2.6 | 17.2 | 94 | 2.45 | 2.99 | 0.22 | 2.29 | 5.6 | 1.24 | 3.37 | 1265 |
| 1 | 13.82 | 1.75 | 2.42 | 14 | 111 | 3.88 | 3.74 | 0.32 | 1.87 | 7.05 | 1.01 | 3.26 | 1190 |
| 1 | 13.77 | 1.9 | 2.68 | 17.1 | 115 | 3 | 2.79 | 0.39 | 1.68 | 6.3 | 1.13 | 2.93 | 1375 |
| 1 | 13.74 | 1.67 | 2.25 | 16.4 | 118 | 2.6 | 2.9 | 0.21 | 1.62 | 5.85 | 0.92 | 3.2 | 1060 |
| 1 | 13.56 | 1.73 | 2.46 | 20.5 | 116 | 2.96 | 2.78 | 0.2 | 2.45 | 6.25 | 0.98 | 3.03 | 1120 |
| 1 | 14.22 | 1.7 | 2.3 | 16.3 | 118 | 3.2 | 3 | 0.26 | 2.03 | 6.38 | 0.94 | 3.31 | 970 |
| 1 | 13.29 | 1.97 | 2.68 | 16.8 | 102 | 3 | 3.23 | 0.31 | 1.66 | 6 | 1.07 | 2.84 | 1270 |
| 1 | 13.72 | 1.43 | 2.5 | 16.7 | 108 | 3.4 | 3.67 | 0.19 | 2.04 | 6.8 | 0.89 | 2.87 | 1285 |
| 2 | 12.37 | 0.94 | 1.36 | 10.6 | 88 | 1.98 | 0.57 | 0.28 | 0.42 | 1.95 | 1.05 | 1.82 | 520 |
| 2 | 12.33 | 1.1 | 2.28 | 16 | 101 | 2.05 | 1.09 | 0.63 | 0.41 | 3.27 | 1.25 | 1.67 | 680 |
| 2 | 12.64 | 1.36 | 2.02 | 16.8 | 100 | 2.02 | 1.41 | 0.53 | 0.62 | 5.75 | 0.98 | 1.59 | 450 |
| 2 | 13.67 | 1.25 | 1.92 | 18 | 94 | 2.1 | 1.79 | 0.32 | 0.73 | 3.8 | 1.23 | 2.46 | 630 |
| 2 | 12.37 | 1.13 | 2.16 | 19 | 87 | 3.5 | 3.1 | 0.19 | 1.87 | 4.45 | 1.22 | 2.87 | 420 |
| 2 | 12.17 | 1.45 | 2.53 | 19 | 104 | 1.89 | 1.75 | 0.45 | 1.03 | 2.95 | 1.45 | 2.23 | 355 |
| 2 | 12.37 | 1.21 | 2.56 | 18.1 | 98 | 2.42 | 2.65 | 0.37 | 2.08 | 4.6 | 1.19 | 2.3 | 678 |
| 2 | 13.11 | 1.01 | 1.7 | 15 | 78 | 2.98 | 3.18 | 0.26 | 2.28 | 5.3 | 1.12 | 3.18 | 502 |
| 2 | 12.37 | 1.17 | 1.92 | 19.6 | 78 | 2.11 | 2 | 0.27 | 1.04 | 4.68 | 1.12 | 3.48 | 510 |
| 2 | 13.34 | 0.94 | 2.36 | 17 | 110 | 2.53 | 1.3 | 0.55 | 0.42 | 3.17 | 1.02 | 1.93 | 750 |
| 2 | 12.21 | 1.19 | 1.75 | 16.8 | 151 | 1.85 | 1.28 | 0.14 | 2.5 | 2.85 | 1.28 | 3.07 | 718 |
| 2 | 12.29 | 1.61 | 2.21 | 20.4 | 103 | 1.1 | 1.02 | 0.37 | 1.46 | 3.05 | 0.906 | 1.82 | 870 |
| 2 | 13.86 | 1.51 | 2.67 | 25 | 86 | 2.95 | 2.86 | 0.21 | 1.87 | 3.38 | 1.36 | 3.16 | 410 |
| 2 | 13.49 | 1.66 | 2.24 | 24 | 87 | 1.88 | 1.84 | 0.27 | 1.03 | 3.74 | 0.98 | 2.78 | 472 |
| 2 | 12.99 | 1.67 | 2.6 | 30 | 139 | 3.3 | 2.89 | 0.21 | 1.96 | 3.35 | 1.31 | 3.5 | 985 |
| 2 | 11.96 | 1.09 | 2.3 | 21 | 101 | 3.38 | 2.14 | 0.13 | 1.65 | 3.21 | 0.99 | 3.13 | 886 |
| 2 | 11.66 | 1.88 | 1.92 | 16 | 97 | 1.61 | 1.57 | 0.34 | 1.15 | 3.8 | 1.23 | 2.14 | 428 |
| 2 | 13.03 | 0.9 | 1.71 | 16 | 86 | 1.95 | 2.03 | 0.24 | 1.46 | 4.6 | 1.19 | 2.48 | 392 |
| 2 | 11.84 | 2.89 | 2.23 | 18 | 112 | 1.72 | 1.32 | 0.43 | 0.95 | 2.65 | 0.96 | 2.52 | 500 |
| 2 | 12.33 | 0.99 | 1.95 | 14.8 | 136 | 1.9 | 1.85 | 0.35 | 2.76 | 3.4 | 1.06 | 2.31 | 750 |
| 2 | 12.7 | 3.87 | 2.4 | 23 | 101 | 2.83 | 2.55 | 0.43 | 1.95 | 2.57 | 1.19 | 3.13 | 463 |
| 2 | 12 | 0.92 | 2 | 19 | 86 | 2.42 | 2.26 | 0.3 | 1.43 | 2.5 | 1.38 | 3.12 | 278 |
| 2 | 12.72 | 1.81 | 2.2 | 18.8 | 86 | 2.2 | 2.53 | 0.26 | 1.77 | 3.9 | 1.16 | 3.14 | 714 |
| 2 | 12.08 | 1.13 | 2.51 | 24 | 78 | 2 | 1.58 | 0.4 | 1.4 | 2.2 | 1.31 | 2.72 | 630 |
| 2 | 13.05 | 3.86 | 2.32 | 22.5 | 85 | 1.65 | 1.59 | 0.61 | 1.62 | 4.8 | 0.84 | 2.01 | 515 |
| 2 | 11.84 | 0.89 | 2.58 | 18 | 94 | 2.2 | 2.21 | 0.22 | 2.35 | 3.05 | 0.79 | 3.08 | 520 |
| 2 | 12.67 | 0.98 | 2.24 | 18 | 99 | 2.2 | 1.94 | 0.3 | 1.46 | 2.62 | 1.23 | 3.16 | 450 |
| 2 | 12.16 | 1.61 | 2.31 | 22.8 | 90 | 1.78 | 1.69 | 0.43 | 1.56 | 2.45 | 1.33 | 2.26 | 495 |
| 2 | 11.65 | 1.67 | 2.62 | 26 | 88 | 1.92 | 1.61 | 0.4 | 1.34 | 2.6 | 1.36 | 3.21 | 562 |
| 2 | 11.64 | 2.06 | 2.46 | 21.6 | 84 | 1.95 | 1.69 | 0.48 | 1.35 | 2.8 | 1 | 2.75 | 680 |
| 2 | 12.08 | 1.33 | 2.3 | 23.6 | 70 | 2.2 | 1.59 | 0.42 | 1.38 | 1.74 | 1.07 | 3.21 | 625 |
| 2 | 12.08 | 1.83 | 2.32 | 18.5 | 81 | 1.6 | 1.5 | 0.52 | 1.64 | 2.4 | 1.08 | 2.27 | 480 |
| 2 | 12 | 1.51 | 2.42 | 22 | 86 | 1.45 | 1.25 | 0.5 | 1.63 | 3.6 | 1.05 | 2.65 | 450 |
| 2 | 12.69 | 1.53 | 2.26 | 20.7 | 80 | 1.38 | 1.46 | 0.58 | 1.62 | 3.05 | 0.96 | 2.06 | 495 |
| 2 | 12.29 | 2.83 | 2.22 | 18 | 88 | 2.45 | 2.25 | 0.25 | 1.99 | 2.15 | 1.15 | 3.3 | 290 |
| 2 | 11.62 | 1.99 | 2.28 | 18 | 98 | 3.02 | 2.26 | 0.17 | 1.35 | 3.25 | 1.16 | 2.96 | 345 |
| 2 | 12.47 | 1.52 | 2.2 | 19 | 162 | 2.5 | 2.27 | 0.32 | 3.28 | 2.6 | 1.16 | 2.63 | 937 |
| 2 | 11.81 | 2.12 | 2.74 | 21.5 | 134 | 1.6 | 0.99 | 0.14 | 1.56 | 2.5 | 0.95 | 2.26 | 625 |
| 2 | 12.29 | 1.41 | 1.98 | 16 | 85 | 2.55 | 2.5 | 0.29 | 1.77 | 2.9 | 1.23 | 2.74 | 428 |
| 2 | 12.37 | 1.07 | 2.1 | 18.5 | 88 | 3.52 | 3.75 | 0.24 | 1.95 | 4.5 | 1.04 | 2.77 | 660 |
| 2 | 12.29 | 3.17 | 2.21 | 18 | 88 | 2.85 | 2.99 | 0.45 | 2.81 | 2.3 | 1.42 | 2.83 | 406 |
| 2 | 12.08 | 2.08 | 1.7 | 17.5 | 97 | 2.23 | 2.17 | 0.26 | 1.4 | 3.3 | 1.27 | 2.96 | 710 |
| 2 | 12.6 | 1.34 | 1.9 | 18.5 | 88 | 1.45 | 1.36 | 0.29 | 1.35 | 2.45 | 1.04 | 2.77 | 562 |
| 2 | 12.34 | 2.45 | 2.46 | 21 | 98 | 2.56 | 2.11 | 0.34 | 1.31 | 2.8 | 0.8 | 3.38 | 438 |
| 2 | 11.82 | 1.72 | 1.88 | 19.5 | 86 | 2.5 | 1.64 | 0.37 | 1.42 | 2.06 | 0.94 | 2.44 | 415 |
| 2 | 12.51 | 1.73 | 1.98 | 20.5 | 85 | 2.2 | 1.92 | 0.32 | 1.48 | 2.94 | 1.04 | 3.57 | 672 |
| 2 | 12.42 | 2.55 | 2.27 | 22 | 90 | 1.68 | 1.84 | 0.66 | 1.42 | 2.7 | 0.86 | 3.3 | 315 |
| 3 | 12.86 | 1.35 | 2.32 | 18 | 122 | 1.51 | 1.25 | 0.21 | 0.94 | 4.1 | 0.76 | 1.29 | 630 |
| 3 | 12.88 | 2.99 | 2.4 | 20 | 104 | 1.3 | 1.22 | 0.24 | 0.83 | 5.4 | 0.74 | 1.42 | 530 |
| 3 | 12.81 | 2.31 | 2.4 | 24 | 98 | 1.15 | 1.09 | 0.27 | 0.83 | 5.7 | 0.66 | 1.36 | 560 |
| 3 | 12.7 | 3.55 | 2.36 | 21.5 | 106 | 1.7 | 1.2 | 0.17 | 0.84 | 5 | 0.78 | 1.29 | 600 |
| 3 | 12.51 | 1.24 | 2.25 | 17.5 | 85 | 2 | 0.58 | 0.6 | 1.25 | 5.45 | 0.75 | 1.51 | 650 |
| 3 | 12.6 | 2.46 | 2.2 | 18.5 | 94 | 1.62 | 0.66 | 0.63 | 0.94 | 7.1 | 0.73 | 1.58 | 695 |
| 3 | 12.25 | 4.72 | 2.54 | 21 | 89 | 1.38 | 0.47 | 0.53 | 0.8 | 3.85 | 0.75 | 1.27 | 720 |
| 3 | 12.53 | 5.51 | 2.64 | 25 | 96 | 1.79 | 0.6 | 0.63 | 1.1 | 5 | 0.82 | 1.69 | 515 |
| 3 | 13.49 | 3.59 | 2.19 | 19.5 | 88 | 1.62 | 0.48 | 0.58 | 0.88 | 5.7 | 0.81 | 1.82 | 580 |
| 3 | 12.84 | 2.96 | 2.61 | 24 | 101 | 2.32 | 0.6 | 0.53 | 0.81 | 4.92 | 0.89 | 2.15 | 590 |
| 3 | 12.93 | 2.81 | 2.7 | 21 | 96 | 1.54 | 0.5 | 0.53 | 0.75 | 4.6 | 0.77 | 2.31 | 600 |
| 3 | 13.36 | 2.56 | 2.35 | 20 | 89 | 1.4 | 0.5 | 0.37 | 0.64 | 5.6 | 0.7 | 2.47 | 780 |
| 3 | 13.52 | 3.17 | 2.72 | 23.5 | 97 | 1.55 | 0.52 | 0.5 | 0.55 | 4.35 | 0.89 | 2.06 | 520 |
| 3 | 13.62 | 4.95 | 2.35 | 20 | 92 | 2 | 0.8 | 0.47 | 1.02 | 4.4 | 0.91 | 2.05 | 550 |
| 3 | 12.25 | 3.88 | 2.2 | 18.5 | 112 | 1.38 | 0.78 | 0.29 | 1.14 | 8.21 | 0.65 | 2 | 855 |
| 3 | 13.16 | 3.57 | 2.15 | 21 | 102 | 1.5 | 0.55 | 0.43 | 1.3 | 4 | 0.6 | 1.68 | 830 |
| 3 | 13.88 | 5.04 | 2.23 | 20 | 80 | 0.98 | 0.34 | 0.4 | 0.68 | 4.9 | 0.58 | 1.33 | 415 |
| 3 | 12.87 | 4.61 | 2.48 | 21.5 | 86 | 1.7 | 0.65 | 0.47 | 0.86 | 7.65 | 0.54 | 1.86 | 625 |
| 3 | 13.32 | 3.24 | 2.38 | 21.5 | 92 | 1.93 | 0.76 | 0.45 | 1.25 | 8.42 | 0.55 | 1.62 | 650 |
| 3 | 13.08 | 3.9 | 2.36 | 21.5 | 113 | 1.41 | 1.39 | 0.34 | 1.14 | 9.4 | 0.57 | 1.33 | 550 |
| 3 | 13.5 | 3.12 | 2.62 | 24 | 123 | 1.4 | 1.57 | 0.22 | 1.25 | 8.6 | 0.59 | 1.3 | 500 |
| 3 | 12.79 | 2.67 | 2.48 | 22 | 112 | 1.48 | 1.36 | 0.24 | 1.26 | 10.8 | 0.48 | 1.47 | 480 |
| 3 | 13.11 | 1.9 | 2.75 | 25.5 | 116 | 2.2 | 1.28 | 0.26 | 1.56 | 7.1 | 0.61 | 1.33 | 425 |
| 3 | 13.23 | 3.3 | 2.28 | 18.5 | 98 | 1.8 | 0.83 | 0.61 | 1.87 | 10.52 | 0.56 | 1.51 | 675 |
| 3 | 12.58 | 1.29 | 2.1 | 20 | 103 | 1.48 | 0.58 | 0.53 | 1.4 | 7.6 | 0.58 | 1.55 | 640 |
| 3 | 13.17 | 5.19 | 2.32 | 22 | 93 | 1.74 | 0.63 | 0.61 | 1.55 | 7.9 | 0.6 | 1.48 | 725 |
| 3 | 13.84 | 4.12 | 2.38 | 19.5 | 89 | 1.8 | 0.83 | 0.48 | 1.56 | 9.01 | 0.57 | 1.64 | 480 |
| 3 | 12.45 | 3.03 | 2.64 | 27 | 97 | 1.9 | 0.58 | 0.63 | 1.14 | 7.5 | 0.67 | 1.73 | 880 |

**表8-2 待分类Wine数据表**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12.37 | 1.63 | 2.3 | 24.5 | 88 | 2.22 | 2.45 | 0.4 | 1.9 | 2.12 | 0.89 | 2.78 | 342 |
| 12.04 | 4.3 | 2.38 | 22 | 80 | 2.1 | 1.75 | 0.42 | 1.35 | 2.6 | 0.79 | 2.57 | 580 |
| 13.17 | 2.59 | 2.37 | 20 | 120 | 1.65 | 0.68 | 0.53 | 1.46 | 9.3 | 0.6 | 1.62 | 840 |
| 14.13 | 4.1 | 2.74 | 24.5 | 96 | 2.05 | 0.76 | 0.56 | 1.35 | 9.2 | 0.61 | 1.6 | 560 |
| 13.29 | 1.97 | 2.68 | 16.8 | 102 | 3 | 3.23 | 0.31 | 1.66 | 6 | 1.07 | 2.84 | 1270 |
| 13.72 | 1.43 | 2.5 | 16.7 | 108 | 3.4 | 3.67 | 0.19 | 2.04 | 6.8 | 0.89 | 2.87 | 1285 |