**Data Science & Business Analytics Tasks**

**Task #1 Prediction using Supervised ML**

**-By Rana Rajeshvari**

Predict the percentage of a student based on the no. of study hours.

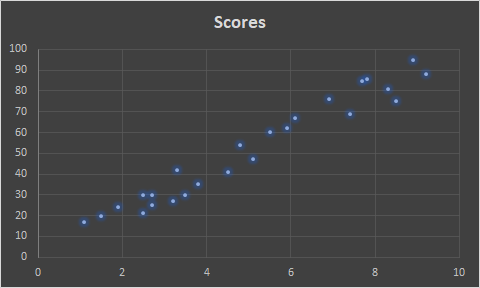
Data can be found at http://bit.ly/w-data

What will be the predicted score if a student studies for 9.25 hrs/ day?

|  |  |  |  |
| --- | --- | --- | --- |
| Hours | Scores | Hours | Scores |
| 2.5 | 21 | 3.3 | 42 |
| 5.1 | 47 | 1.1 | 17 |
| 3.2 | 27 | 8.9 | 95 |
| 8.5 | 75 | 2.5 | 30 |
| 3.5 | 30 | 1.9 | 24 |
| 1.5 | 20 | 6.1 | 67 |
| 9.2 | 88 | 7.4 | 69 |
| 5.5 | 60 | 2.7 | 30 |
| 8.3 | 81 | 4.8 | 54 |
| 2.7 | 25 | 3.8 | 35 |
| 7.7 | 85 | 6.9 | 76 |
| 5.9 | 62 | 7.8 | 86 |
| 4.5 | 41 | - | - |

**Analyzing the data**

**As per the data analysis that more than 9.5 hours of study student marks are proportional decrease**



**Task #2 Prediction using Unsupervised ML**

**From the given ‘Iris’ dataset, predict the optimum number of clusters, and represent it visually.**

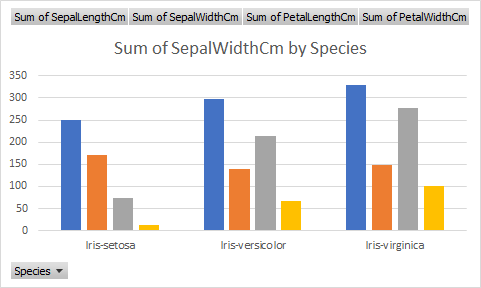
**Dataset: https://bit.ly/3kXTdox**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Id** | **SepalLengthCm** | **SepalWidthCm** | **PetalLengthCm** | **PetalWidthCm** | **Species** |
| **1** | **5.1** | **3.5** | **1.4** | **0.2** | **Iris-setosa** |
| **2** | **4.9** | **3** | **1.4** | **0.2** | **Iris-setosa** |
| **3** | **4.7** | **3.2** | **1.3** | **0.2** | **Iris-setosa** |
| **4** | **4.6** | **3.1** | **1.5** | **0.2** | **Iris-setosa** |
| **5** | **5** | **3.6** | **1.4** | **0.2** | **Iris-setosa** |
| **6** | **5.4** | **3.9** | **1.7** | **0.4** | **Iris-setosa** |
| **7** | **4.6** | **3.4** | **1.4** | **0.3** | **Iris-setosa** |
| **8** | **5** | **3.4** | **1.5** | **0.2** | **Iris-setosa** |
| **9** | **4.4** | **2.9** | **1.4** | **0.2** | **Iris-setosa** |
| **10** | **4.9** | **3.1** | **1.5** | **0.1** | **Iris-setosa** |
| **11** | **5.4** | **3.7** | **1.5** | **0.2** | **Iris-setosa** |
| **12** | **4.8** | **3.4** | **1.6** | **0.2** | **Iris-setosa** |
| **13** | **4.8** | **3** | **1.4** | **0.1** | **Iris-setosa** |
| **14** | **4.3** | **3** | **1.1** | **0.1** | **Iris-setosa** |
| **15** | **5.8** | **4** | **1.2** | **0.2** | **Iris-setosa** |
| **16** | **5.7** | **4.4** | **1.5** | **0.4** | **Iris-setosa** |
| **17** | **5.4** | **3.9** | **1.3** | **0.4** | **Iris-setosa** |
| **18** | **5.1** | **3.5** | **1.4** | **0.3** | **Iris-setosa** |
| **19** | **5.7** | **3.8** | **1.7** | **0.3** | **Iris-setosa** |
| **20** | **5.1** | **3.8** | **1.5** | **0.3** | **Iris-setosa** |
| **21** | **5.4** | **3.4** | **1.7** | **0.2** | **Iris-setosa** |
| **22** | **5.1** | **3.7** | **1.5** | **0.4** | **Iris-setosa** |
| **23** | **4.6** | **3.6** | **1** | **0.2** | **Iris-setosa** |
| **24** | **5.1** | **3.3** | **1.7** | **0.5** | **Iris-setosa** |
| **25** | **4.8** | **3.4** | **1.9** | **0.2** | **Iris-setosa** |
| **26** | **5** | **3** | **1.6** | **0.2** | **Iris-setosa** |
| **27** | **5** | **3.4** | **1.6** | **0.4** | **Iris-setosa** |
| **28** | **5.2** | **3.5** | **1.5** | **0.2** | **Iris-setosa** |
| **29** | **5.2** | **3.4** | **1.4** | **0.2** | **Iris-setosa** |
| **30** | **4.7** | **3.2** | **1.6** | **0.2** | **Iris-setosa** |
| **31** | **4.8** | **3.1** | **1.6** | **0.2** | **Iris-setosa** |
| **32** | **5.4** | **3.4** | **1.5** | **0.4** | **Iris-setosa** |
| **33** | **5.2** | **4.1** | **1.5** | **0.1** | **Iris-setosa** |
| **34** | **5.5** | **4.2** | **1.4** | **0.2** | **Iris-setosa** |
| **35** | **4.9** | **3.1** | **1.5** | **0.1** | **Iris-setosa** |
| **36** | **5** | **3.2** | **1.2** | **0.2** | **Iris-setosa** |
| **37** | **5.5** | **3.5** | **1.3** | **0.2** | **Iris-setosa** |
| **38** | **4.9** | **3.1** | **1.5** | **0.1** | **Iris-setosa** |
| **39** | **4.4** | **3** | **1.3** | **0.2** | **Iris-setosa** |
| **40** | **5.1** | **3.4** | **1.5** | **0.2** | **Iris-setosa** |
| **41** | **5** | **3.5** | **1.3** | **0.3** | **Iris-setosa** |
| **42** | **4.5** | **2.3** | **1.3** | **0.3** | **Iris-setosa** |
| **43** | **4.4** | **3.2** | **1.3** | **0.2** | **Iris-setosa** |
| **44** | **5** | **3.5** | **1.6** | **0.6** | **Iris-setosa** |
| **45** | **5.1** | **3.8** | **1.9** | **0.4** | **Iris-setosa** |
| **46** | **4.8** | **3** | **1.4** | **0.3** | **Iris-setosa** |
| **47** | **5.1** | **3.8** | **1.6** | **0.2** | **Iris-setosa** |
| **48** | **4.6** | **3.2** | **1.4** | **0.2** | **Iris-setosa** |
| **49** | **5.3** | **3.7** | **1.5** | **0.2** | **Iris-setosa** |
| **50** | **5** | **3.3** | **1.4** | **0.2** | **Iris-setosa** |
| **51** | **7** | **3.2** | **4.7** | **1.4** | **Iris-versicolor** |
| **52** | **6.4** | **3.2** | **4.5** | **1.5** | **Iris-versicolor** |
| **53** | **6.9** | **3.1** | **4.9** | **1.5** | **Iris-versicolor** |
| **54** | **5.5** | **2.3** | **4** | **1.3** | **Iris-versicolor** |
| **55** | **6.5** | **2.8** | **4.6** | **1.5** | **Iris-versicolor** |
| **56** | **5.7** | **2.8** | **4.5** | **1.3** | **Iris-versicolor** |
| **57** | **6.3** | **3.3** | **4.7** | **1.6** | **Iris-versicolor** |
| **58** | **4.9** | **2.4** | **3.3** | **1** | **Iris-versicolor** |
| **59** | **6.6** | **2.9** | **4.6** | **1.3** | **Iris-versicolor** |
| **60** | **5.2** | **2.7** | **3.9** | **1.4** | **Iris-versicolor** |
| **61** | **5** | **2** | **3.5** | **1** | **Iris-versicolor** |
| **62** | **5.9** | **3** | **4.2** | **1.5** | **Iris-versicolor** |
| **63** | **6** | **2.2** | **4** | **1** | **Iris-versicolor** |
| **64** | **6.1** | **2.9** | **4.7** | **1.4** | **Iris-versicolor** |
| **65** | **5.6** | **2.9** | **3.6** | **1.3** | **Iris-versicolor** |
| **66** | **6.7** | **3.1** | **4.4** | **1.4** | **Iris-versicolor** |
| **67** | **5.6** | **3** | **4.5** | **1.5** | **Iris-versicolor** |
| **68** | **5.8** | **2.7** | **4.1** | **1** | **Iris-versicolor** |
| **69** | **6.2** | **2.2** | **4.5** | **1.5** | **Iris-versicolor** |
| **70** | **5.6** | **2.5** | **3.9** | **1.1** | **Iris-versicolor** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **71** | **5.9** | **3.2** | **4.8** | **1.8** | **Iris-versicolor** |
| **72** | **6.1** | **2.8** | **4** | **1.3** | **Iris-versicolor** |
| **73** | **6.3** | **2.5** | **4.9** | **1.5** | **Iris-versicolor** |
| **74** | **6.1** | **2.8** | **4.7** | **1.2** | **Iris-versicolor** |
| **75** | **6.4** | **2.9** | **4.3** | **1.3** | **Iris-versicolor** |
| **76** | **6.6** | **3** | **4.4** | **1.4** | **Iris-versicolor** |
| **77** | **6.8** | **2.8** | **4.8** | **1.4** | **Iris-versicolor** |
| **78** | **6.7** | **3** | **5** | **1.7** | **Iris-versicolor** |
| **79** | **6** | **2.9** | **4.5** | **1.5** | **Iris-versicolor** |
| **80** | **5.7** | **2.6** | **3.5** | **1** | **Iris-versicolor** |
| **81** | **5.5** | **2.4** | **3.8** | **1.1** | **Iris-versicolor** |
| **82** | **5.5** | **2.4** | **3.7** | **1** | **Iris-versicolor** |
| **83** | **5.8** | **2.7** | **3.9** | **1.2** | **Iris-versicolor** |
| **84** | **6** | **2.7** | **5.1** | **1.6** | **Iris-versicolor** |
| **85** | **5.4** | **3** | **4.5** | **1.5** | **Iris-versicolor** |
| **86** | **6** | **3.4** | **4.5** | **1.6** | **Iris-versicolor** |
| **87** | **6.7** | **3.1** | **4.7** | **1.5** | **Iris-versicolor** |
| **88** | **6.3** | **2.3** | **4.4** | **1.3** | **Iris-versicolor** |
| **89** | **5.6** | **3** | **4.1** | **1.3** | **Iris-versicolor** |
| **90** | **5.5** | **2.5** | **4** | **1.3** | **Iris-versicolor** |
| **91** | **5.5** | **2.6** | **4.4** | **1.2** | **Iris-versicolor** |
| **92** | **6.1** | **3** | **4.6** | **1.4** | **Iris-versicolor** |
| **93** | **5.8** | **2.6** | **4** | **1.2** | **Iris-versicolor** |
| **94** | **5** | **2.3** | **3.3** | **1** | **Iris-versicolor** |
| **95** | **5.6** | **2.7** | **4.2** | **1.3** | **Iris-versicolor** |
| **96** | **5.7** | **3** | **4.2** | **1.2** | **Iris-versicolor** |
| **97** | **5.7** | **2.9** | **4.2** | **1.3** | **Iris-versicolor** |
| **98** | **6.2** | **2.9** | **4.3** | **1.3** | **Iris-versicolor** |
| **99** | **5.1** | **2.5** | **3** | **1.1** | **Iris-versicolor** |
| **100** | **5.7** | **2.8** | **4.1** | **1.3** | **Iris-versicolor** |
| **101** | **6.3** | **3.3** | **6** | **2.5** | **Iris-virginica** |
| **102** | **5.8** | **2.7** | **5.1** | **1.9** | **Iris-virginica** |
| **103** | **7.1** | **3** | **5.9** | **2.1** | **Iris-virginica** |
| **104** | **6.3** | **2.9** | **5.6** | **1.8** | **Iris-virginica** |
| **105** | **6.5** | **3** | **5.8** | **2.2** | **Iris-virginica** |
| **106** | **7.6** | **3** | **6.6** | **2.1** | **Iris-virginica** |
| **107** | **4.9** | **2.5** | **4.5** | **1.7** | **Iris-virginica** |
| **108** | **7.3** | **2.9** | **6.3** | **1.8** | **Iris-virginica** |
| **109** | **6.7** | **2.5** | **5.8** | **1.8** | **Iris-virginica** |
| **110** | **7.2** | **3.6** | **6.1** | **2.5** | **Iris-virginica** |
| **111** | **6.5** | **3.2** | **5.1** | **2** | **Iris-virginica** |
| **112** | **6.4** | **2.7** | **5.3** | **1.9** | **Iris-virginica** |
| **113** | **6.8** | **3** | **5.5** | **2.1** | **Iris-virginica** |
| **114** | **5.7** | **2.5** | **5** | **2** | **Iris-virginica** |
| **115** | **5.8** | **2.8** | **5.1** | **2.4** | **Iris-virginica** |
| **116** | **6.4** | **3.2** | **5.3** | **2.3** | **Iris-virginica** |
| **117** | **6.5** | **3** | **5.5** | **1.8** | **Iris-virginica** |
| **118** | **7.7** | **3.8** | **6.7** | **2.2** | **Iris-virginica** |
| **119** | **7.7** | **2.6** | **6.9** | **2.3** | **Iris-virginica** |
| **120** | **6** | **2.2** | **5** | **1.5** | **Iris-virginica** |
| **121** | **6.9** | **3.2** | **5.7** | **2.3** | **Iris-virginica** |
| **122** | **5.6** | **2.8** | **4.9** | **2** | **Iris-virginica** |
| **123** | **7.7** | **2.8** | **6.7** | **2** | **Iris-virginica** |
| **124** | **6.3** | **2.7** | **4.9** | **1.8** | **Iris-virginica** |
| **125** | **6.7** | **3.3** | **5.7** | **2.1** | **Iris-virginica** |
| **126** | **7.2** | **3.2** | **6** | **1.8** | **Iris-virginica** |
| **127** | **6.2** | **2.8** | **4.8** | **1.8** | **Iris-virginica** |
| **128** | **6.1** | **3** | **4.9** | **1.8** | **Iris-virginica** |
| **129** | **6.4** | **2.8** | **5.6** | **2.1** | **Iris-virginica** |
| **130** | **7.2** | **3** | **5.8** | **1.6** | **Iris-virginica** |
| **131** | **7.4** | **2.8** | **6.1** | **1.9** | **Iris-virginica** |
| **132** | **7.9** | **3.8** | **6.4** | **2** | **Iris-virginica** |
| **133** | **6.4** | **2.8** | **5.6** | **2.2** | **Iris-virginica** |
| **134** | **6.3** | **2.8** | **5.1** | **1.5** | **Iris-virginica** |
| **135** | **6.1** | **2.6** | **5.6** | **1.4** | **Iris-virginica** |
| **136** | **7.7** | **3** | **6.1** | **2.3** | **Iris-virginica** |
| **137** | **6.3** | **3.4** | **5.6** | **2.4** | **Iris-virginica** |
| **138** | **6.4** | **3.1** | **5.5** | **1.8** | **Iris-virginica** |
| **139** | **6** | **3** | **4.8** | **1.8** | **Iris-virginica** |
| **140** | **6.9** | **3.1** | **5.4** | **2.1** | **Iris-virginica** |
| **141** | **6.7** | **3.1** | **5.6** | **2.4** | **Iris-virginica** |
| **142** | **6.9** | **3.1** | **5.1** | **2.3** | **Iris-virginica** |
| **143** | **5.8** | **2.7** | **5.1** | **1.9** | **Iris-virginica** |
| **144** | **6.8** | **3.2** | **5.9** | **2.3** | **Iris-virginica** |
| **145** | **6.7** | **3.3** | **5.7** | **2.5** | **Iris-virginica** |
| **146** | **6.7** | **3** | **5.2** | **2.3** | **Iris-virginica** |
| **147** | **6.3** | **2.5** | **5** | **1.9** | **Iris-virginica** |
| **148** | **6.5** | **3** | **5.2** | **2** | **Iris-virginica** |
| **149** | **6.2** | **3.4** | **5.4** | **2.3** | **Iris-virginica** |
| **150** | **5.9** | **3** | **5.1** | **1.8** | **Iris-virginica** |

**Analyzing data**

 After exploring different data, I found 3 clusters as optional.

****

With the help of the pivot table, I found that there is the highest total sum of SepalLengthCm, Sum of petalWidthCm has the lowest total of lris

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Row Labels** | **Sum of SepalLengthCm** | **Sum of SepalWidthCm** | **Sum of PetalLengthCm** | **Sum of PetalWidthCm** |
| **Iris-setosa** | **250.3** | **170.9** | **73.2** | **12.2** |
| **Iris-versicolor** | **296.8** | **138.5** | **213** | **66.3** |
| **Iris-virginica** | **329.4** | **148.7** | **277.6** | **101.3** |
| **Grand Total** | **876.5** | **458.1** | **563.8** | **179.8** |

**End of Task**