ORGANIC ANALYSIS

BUSINESS OBJECTIVE

The business goal is to decide whether a bank customer will subscribe to a bank product or not.

This will help to target our marketing efforts for this product.

DATA SCIENCE TASK

We will perform a cluster analysis by using the naïve bayes classification method to model the probability of subscribing to the product.

SELECT DATA

We will use 222223 records of 10 input variables (features) and one binary target variable (whether the customer subscribed to the product or not)

DATA EXPLORATION
DATA ANALYSIS

We applied the following steps in our analysis. The details of the analysis may be seen in the appendix.

We modeled the data using a Nive Bayes Classification method which yielded the prior and conditional probabilities for all model variables. The model is own in the appendix. These variables are interesting on their own as a look at how each feature variable impacts the target variable.

1. DemAffl
2. DemAge
3. DemCluster
4. DemClusterGroup
5. DemGender
6. Der
7. DemTVReg
8. PromClass
9. PromSpend
10. PromTime
11. TargetBuy
12. TargetAmt

APPLY ANALYSIS

We can use the Naïve Bayes Classification model to classify new customers as to their likelihood to subscribe or not. Customers likely to subscribe could be given a marketing message to entice to subscribe.

DEPLOY MODEL

We would create a random Control group and two experimental groups of the same number as the control one which the NB Model predicts will not subscribe. We would expect the subscribe experimental group to have a higher subscription rate compared to the control group and the non-subscribe experimental group to have a lower subscription rate compared to control group.

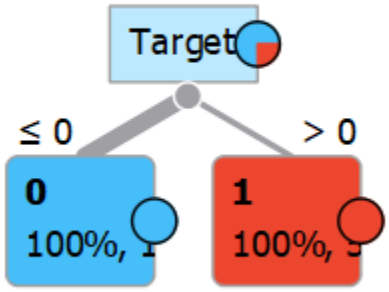
ASSESS RESULTS

We will evaluate the subscription rates of the control and two experimental groups to see if there was a statically significant and business value difference. If not, we will re-analyze the problem.

response rate for the targeted customers compared to the response rate for the random sample to see if there was a greater response rate for the xyz.

STRENGTHS OF XYZ ANALYSIS

CLASSIFICATION TREE



LOGISTIC REGRESSION ANALYSIS

Preprocessing

Rank - Orange

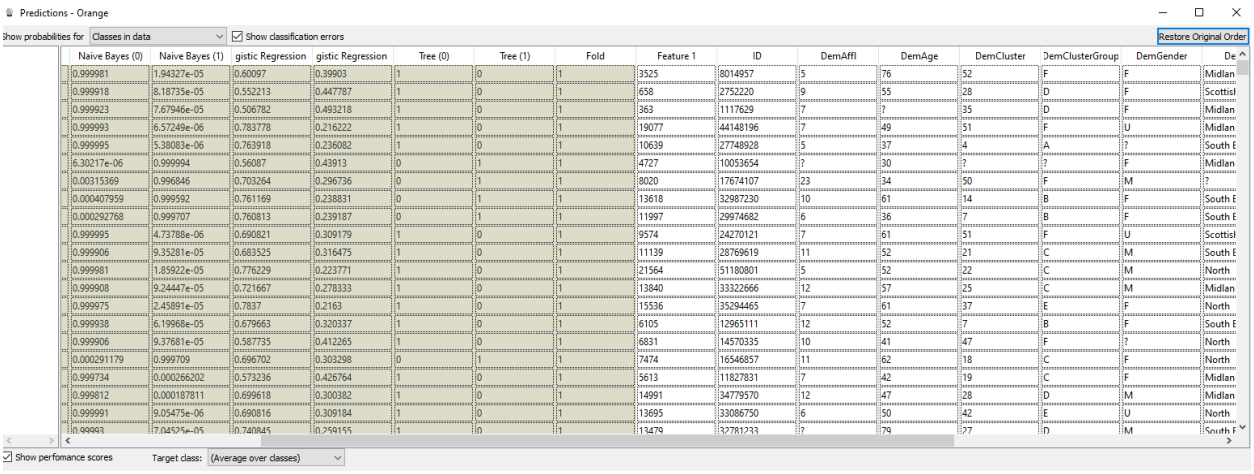
Scoring Methods

- [x] Information Gain
- [x] Information Gain Ratio
- [ ] Gini Decrease
- [ ] ANOVA
- [ ] χ^2
- [x] ReliefF
- [ ] FCBF

Select Attributes

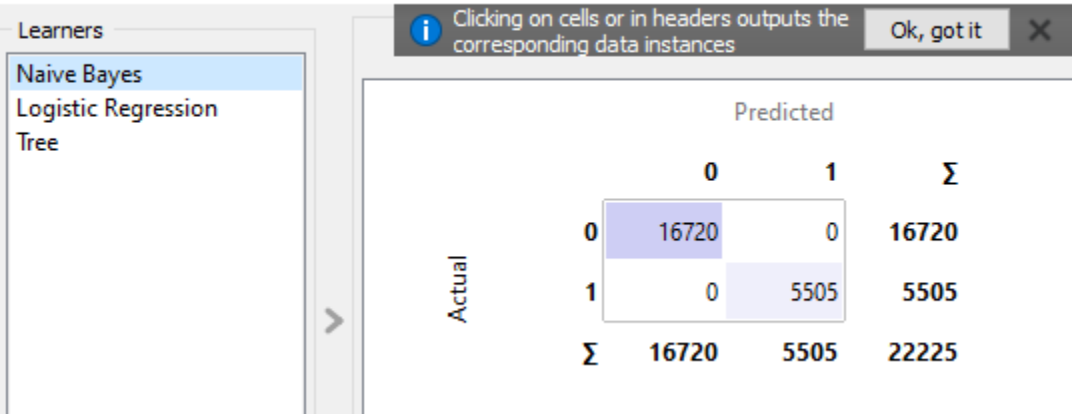
- ( ) None
- ( ) All
- (•) Manual
- ( ) Best ranked: 5

		#	Info. gain	Gain ratio	ReliefF
1	N TargetAmt		0.808	0.814	0.346
2	N DemAge		0.093	0.047	0.051
3	N DemAffl		0.070	0.035	0.018
4	C DemGender	3	0.044	0.035	0.023
5	N PromSpend		0.010	0.005	0.002
6	C PromClass	4	0.009	0.005	0.050
7	C DemClusterGroup	7	0.003	0.001	0.038
8	N DemCluster		0.003	0.001	0.011
9	N PromTime		0.003	0.001	0.013
10	C DemTVReg	13	0.001	0.000	0.026
11	C DemReg	5	0.000	0.000	0.009
12	N ID		0.000	0.000	0.019
13	N Feature 1		0.000	0.000	0.020

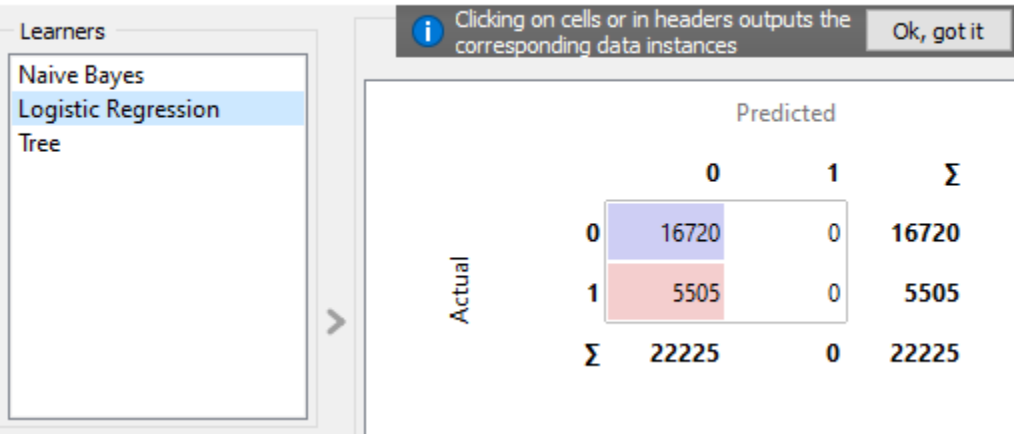


CONFUSION MATRICES

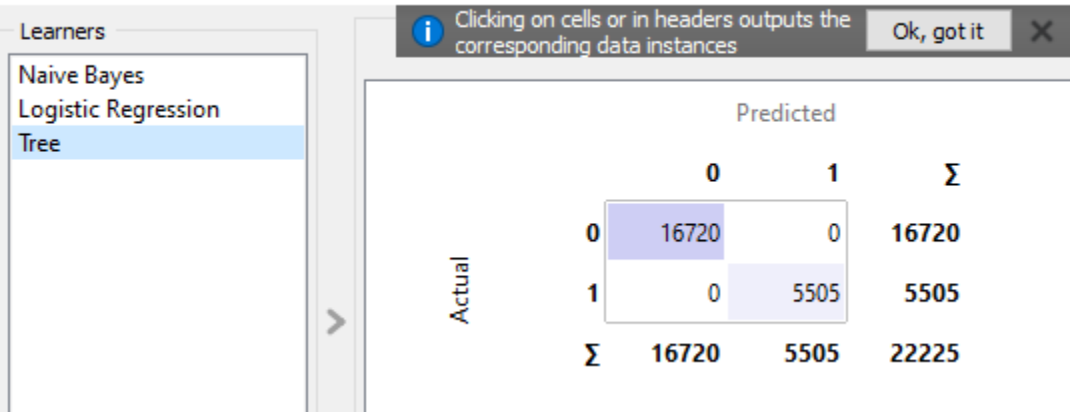
Confusion Matrix - Orange



Confusion Matrix - Orange



Confusion Matrix - Orange



APPENDIX

```
       X                ID              DemAffl          DemAge       DemCluster
 Min.   :    1   Min.   :     140   Min.   : 0.000   Min.   :18.0   Min.   : 1.00
 1st Qu.: 5556   1st Qu.:11694023   1st Qu.: 6.000   1st Qu.:44.0   1st Qu.:14.00
 Median :11112   Median :28748786   Median : 8.000   Median :54.0   Median :27.00
 Mean   :11112   Mean   :26055403   Mean   : 8.712   Mean   :53.8   Mean   :27.19
 3rd Qu.:16668   3rd Qu.:37454020   3rd Qu.:11.000   3rd Qu.:64.0   3rd Qu.:38.00
 Max.   :22223   Max.   :52856469   Max.   :34.000   Max.   :79.0   Max.   :55.00
                                    NA's   :1085     NA's   :1508   NA's   :674
 DemClusterGroup     DemGender            DemReg            DemTVReg          PromClass
 Length:22223       Length:22223       Length:22223       Length:22223       Length:22223
 Class :character   Class :character   Class :character   Class :character   Class :character
 Mode  :character   Mode  :character   Mode  :character   Mode  :character   Mode  :character


   PromSpend           PromTime        TargetBuy        TargetAmt
 Min.   :     0.01   Min.   : 0.000   Min.   :0.0000   Min.   :0.0000
 1st Qu.:     0.01   1st Qu.: 4.000   1st Qu.:0.0000   1st Qu.:0.0000
 Median :  2000.00   Median : 5.000   Median :0.0000   Median :0.0000
 Mean   :  4420.59   Mean   : 6.565   Mean   :0.2477   Mean   :0.2947
 3rd Qu.:  6000.00   3rd Qu.: 8.000   3rd Qu.:0.0000   3rd Qu.:0.0000
 Max.   :296313.85   Max.   :39.000   Max.   :1.0000   Max.   :3.0000
                     NA's   :281
```

```
     education
Y         primary  secondary   tertiary    unknown
  no  0.17216881 0.50978759 0.27613751 0.04192845
  yes 0.12800948 0.46450237 0.33180095 0.07587678

     default
Y              no         yes
  no  0.979323644 0.020687535
  yes 0.990568720 0.009526066

     housing
Y            no       yes
  no  0.4348854 0.5651258
  yes 0.6540758 0.3460190

     loan
Y            no       yes
  no  0.8541140 0.1458971
  yes 0.8957820 0.1043128

     contact
Y        cellular  telephone    unknown
  no  0.61878703 0.06987703 0.31135271
  yes 0.85312796 0.05218009 0.09483412

     duration
Y          [,1]     [,2]
  no  222.3756 209.9930
  yes 539.3555 437.6109

     poutcome
Y         failure      other    success    unknown
  no  0.10565120 0.03633874 0.01453885 0.84349357
  yes 0.09957346 0.06639810 0.15170616 0.68251185
```