Domas Budrys – Assignment 6 CSCI5080

Question 1 (Time spent: 3h 30min):

a)

Eyes -because it has the highest information gain across all attributes.

b)

$Info(D) = -\frac{3}{6}log_2\left(\frac{3}{6}\right) - \frac{3}{6}log_2\left(\frac{3}{6}\right) = 1$

$Info_{height}(D) = \frac{3}{6}\left(-\frac{1}{3}log_2\left(\frac{1}{3}\right) - \frac{2}{3}log_2\left(\frac{2}{3}\right)\right) + \frac{3}{6}\left(-\frac{2}{3}log_2\left(\frac{2}{3}\right) - \frac{1}{3}log_2\left(\frac{1}{3}\right)\right) = .9183\ bits$

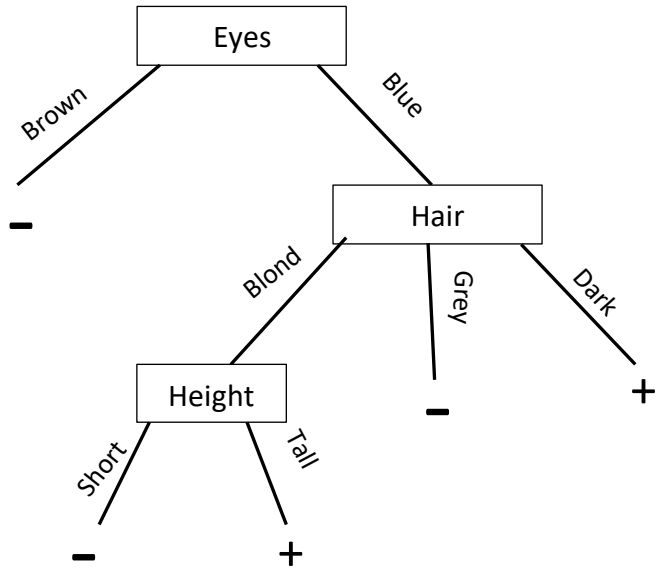
$\boldsymbol{Gain(height) = 1 - .9123 = .0817\ bits}$

$Info_{hair}(D) = \frac{3}{6}\left(-\frac{2}{3}log_2\left(\frac{2}{3}\right) - \frac{1}{3}log_2\left(\frac{1}{3}\right)\right) + \frac{2}{6}\left(-\frac{1}{2}log_2\left(\frac{1}{2}\right) - \frac{1}{2}log_2\left(\frac{1}{2}\right)\right) + \frac{1}{6}\left(-\frac{1}{1}log_2\left(\frac{1}{1}\right)\right) = .7925\ bits$

$\boldsymbol{Gain(hair) = 1 - .7925 = .2075\ bits}$

$Info_{eyes}(D) = \frac{4}{6}\left(-\frac{3}{4}log_2\left(\frac{3}{4}\right) - \frac{1}{4}log_2\left(\frac{1}{4}\right)\right) + \frac{2}{6}\left(-\frac{2}{2}log_2\left(\frac{2}{2}\right)\right) = .5409$

$\boldsymbol{Gain(eyes) = 1 - .5409 = .4591\ bits}$



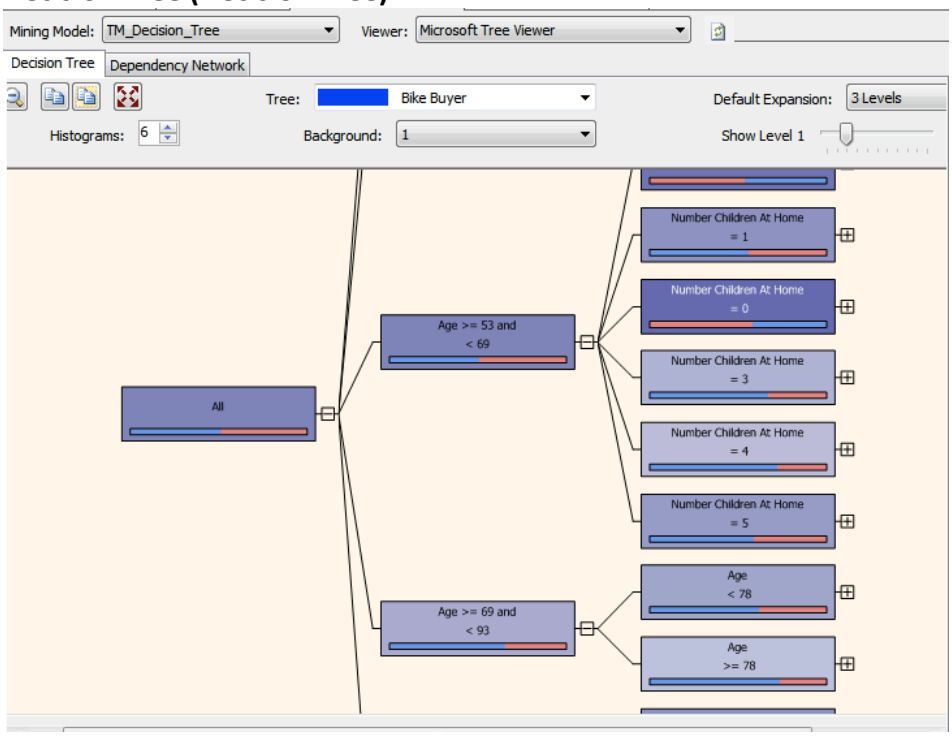
c)

Example	height	hair	eyes	Class
*X*7	short	gray	brown	–
*X*8	tall	dark	brown	–

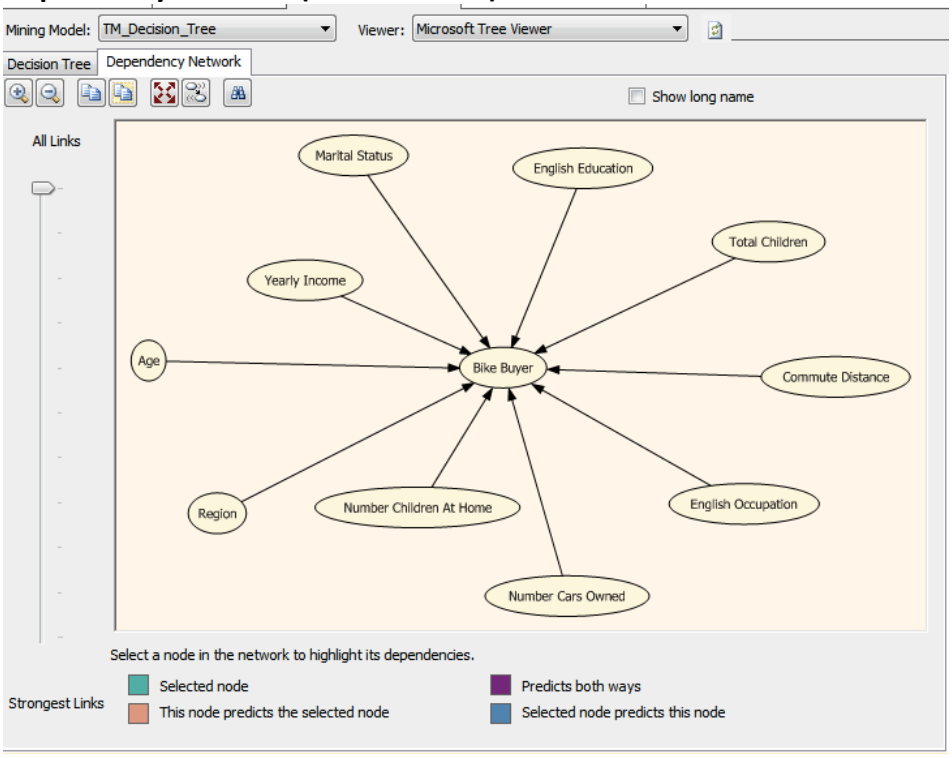
Question 2 (Time spent: 3h):

(2):

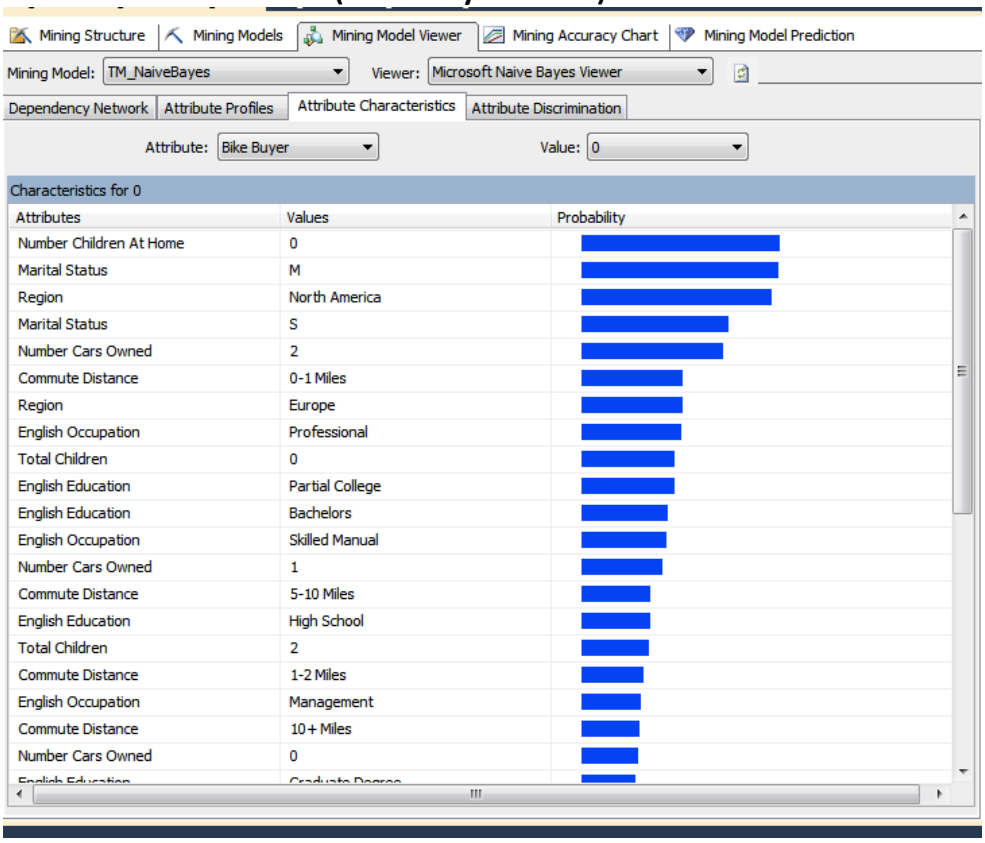
Decision Tree (Decision Tree)



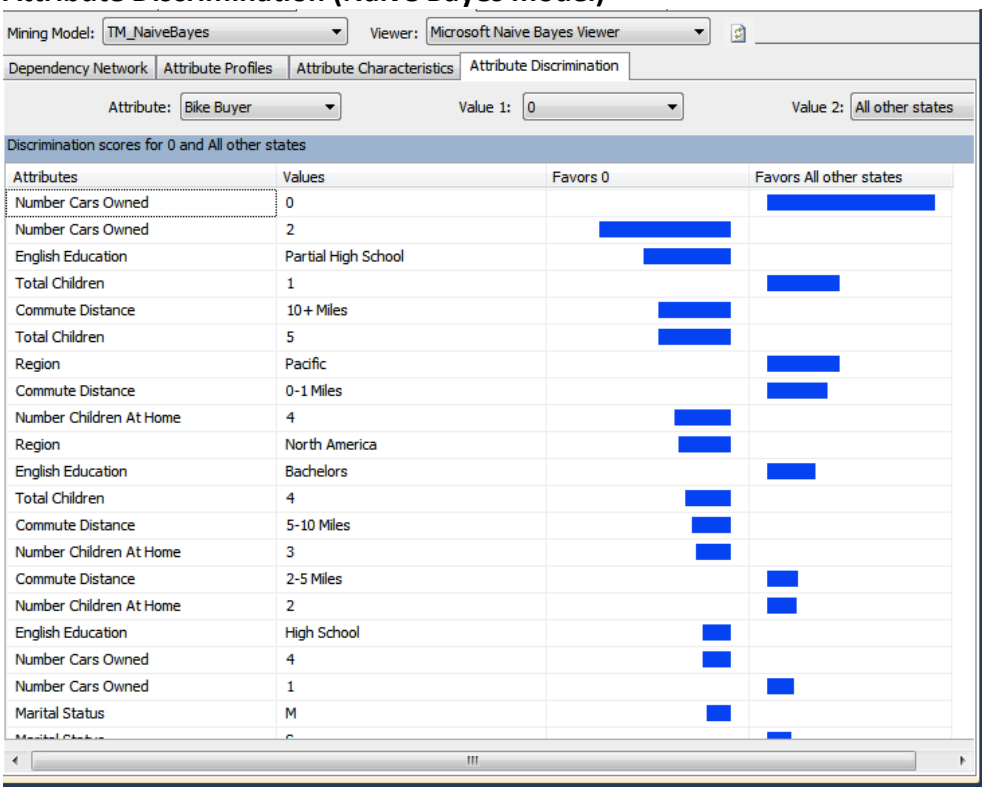
Dependency Network (Decision Tree)



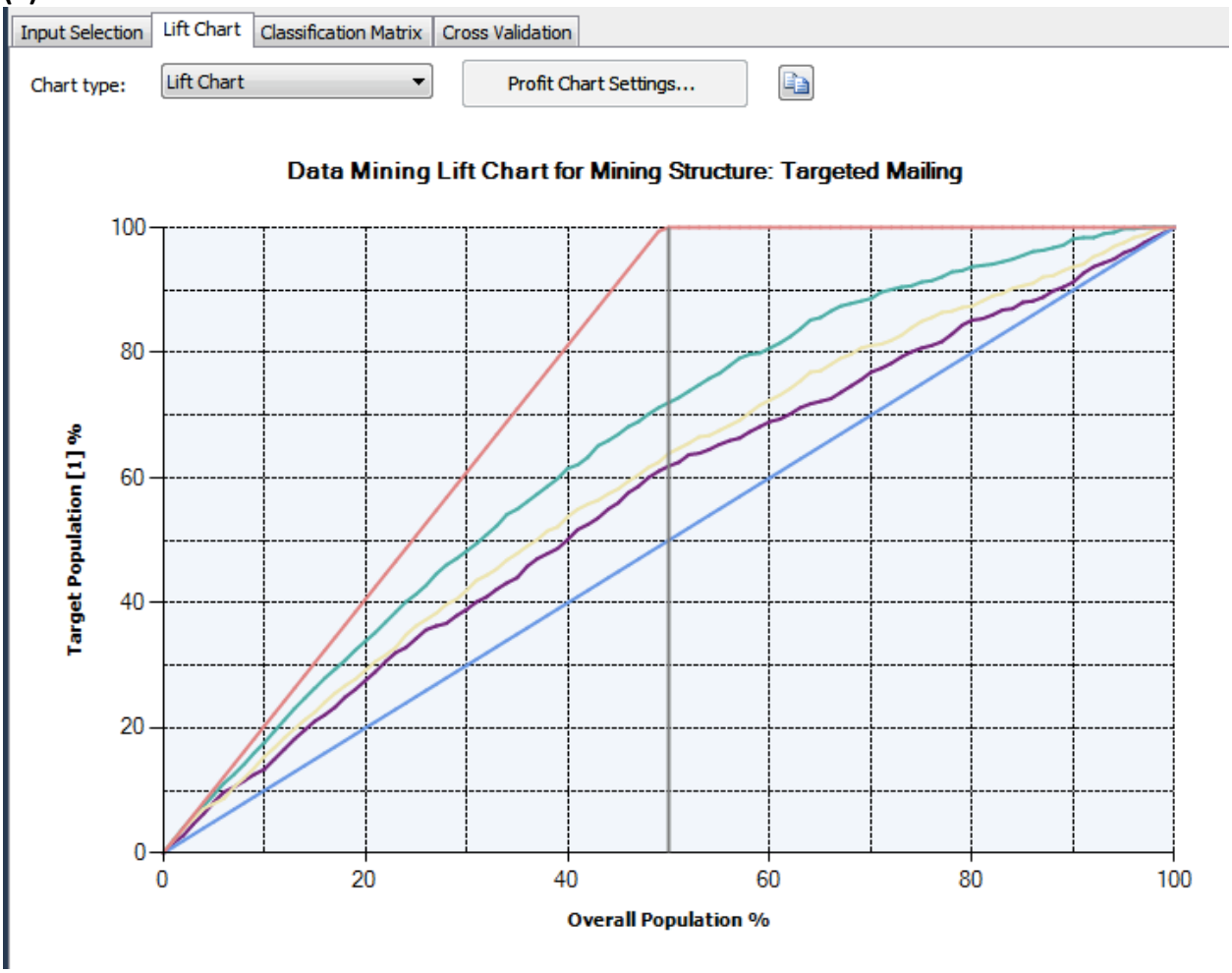
Attribute Characteristics (Naïve Bayes model)



Attribute Discrimination (Naïve Bayes model)



(3):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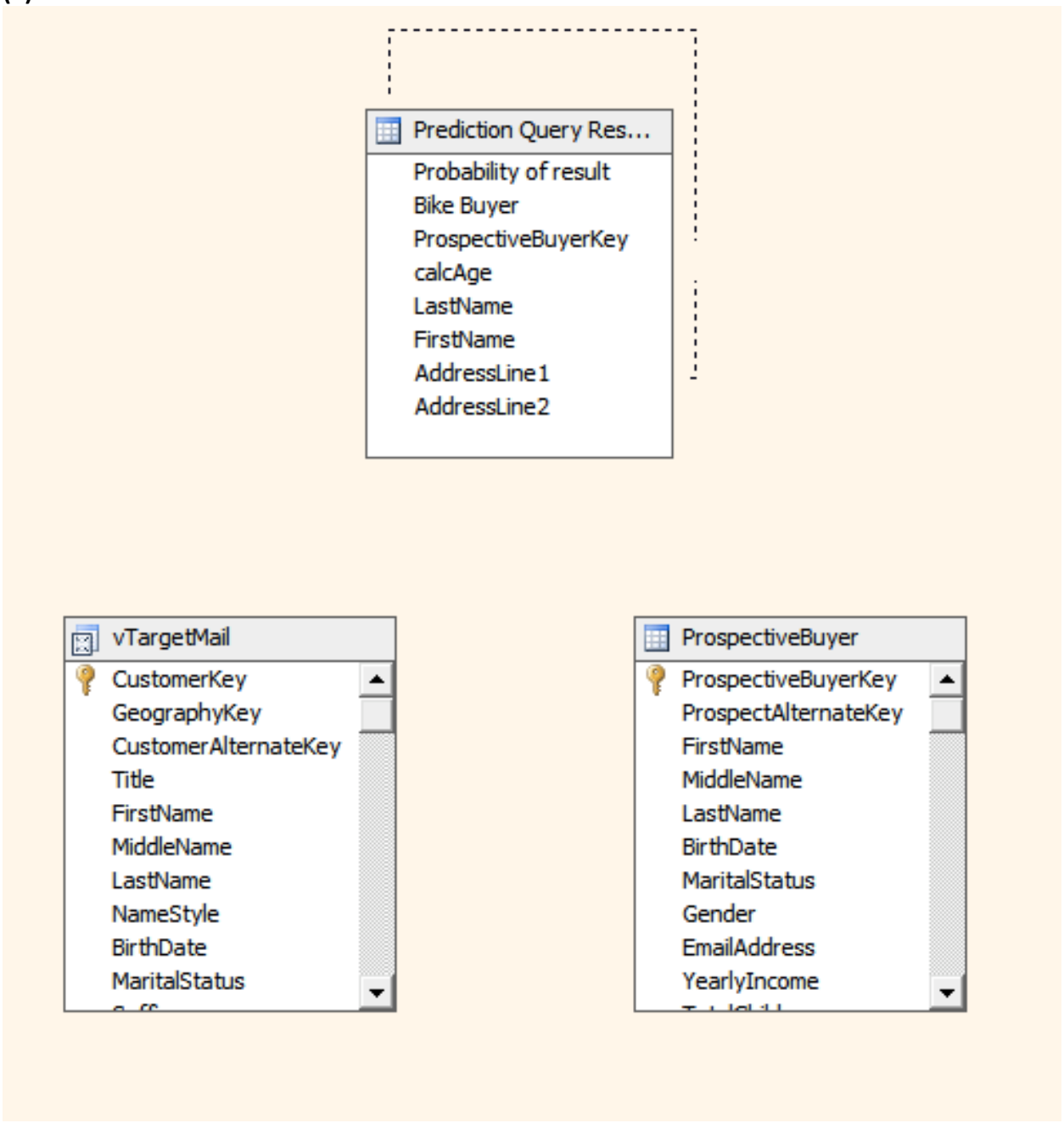
Lift Chart
Classification Matrix
Cross Validation
Chart type:
Lift Chart
Profit Chart Settings...
Data Mining Lift Chart for Mining Structure: Targeted Mailing
Target Population [1] %
Overall Population %
0
20
40
60
80
100

(4)


Prediction Query Res...
Probability of result
Bike Buyer
ProspectiveBuyerKey
calcAge
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FirstName
AddressLine1
AddressLine2
vTargetMail
CustomerKey
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Title
FirstName
MiddleName
LastName
NameStyle
BirthDate
MaritalStatus
ProspectiveBuyer
ProspectiveBuyerKey
ProspectAlternateKey
FirstName
MiddleName
LastName
BirthDate
MaritalStatus
Gender
EmailAddress
YearlyIncome