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MKT 568

Assignment 2, Spring 2020

Due: February 16th, 11:59 pm
Scoring: Indicated below in (_) (24 points total)

1. Below is output we got from our Logistic Regression Model:

Parameter Estimates

admit[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
1	Intercept	-5.541	1.138	23.709	1	.000			
	gre	.002	.001	4.284	1	.038	1.002	1.000	1.004
	gpa	.804	.332	5.872	1	.015	2.235	1.166	4.282
	[rank=1]	1.551	.418	13.787	1	.000	4.718	2.080	10.702
	[rank=2]	.876	.367	5.706	1	.017	2.401	1.170	4.927
	[rank=3]	.211	.393	.289	1	.591	1.235	.572	2.668
	[rank=4]	0[b]	.	.	0	.	.	.	.

a. The reference category is: 0.

b. This parameter is set to zero because it is redundant.

Here is the equation we obtained from performing this model:

Equation For 1

0.002264 * gre +
0.804 * gpa +
1.551 * [rank=1] +
0.876 * [rank=2] +
0.2113 * [rank=3] +
+ -5.541

So we can calculate:

log(p(Admit = Yes)/1-p(Admit = Yes)) = -5.541 + 0.002264 * gre + 0.804 * gpa + 0.876 * (rank = 2)

log(0.5/1-0.5) = -5.541 + 0.002264 * gre + 0.804 *(3.8) + 0.876*(2)

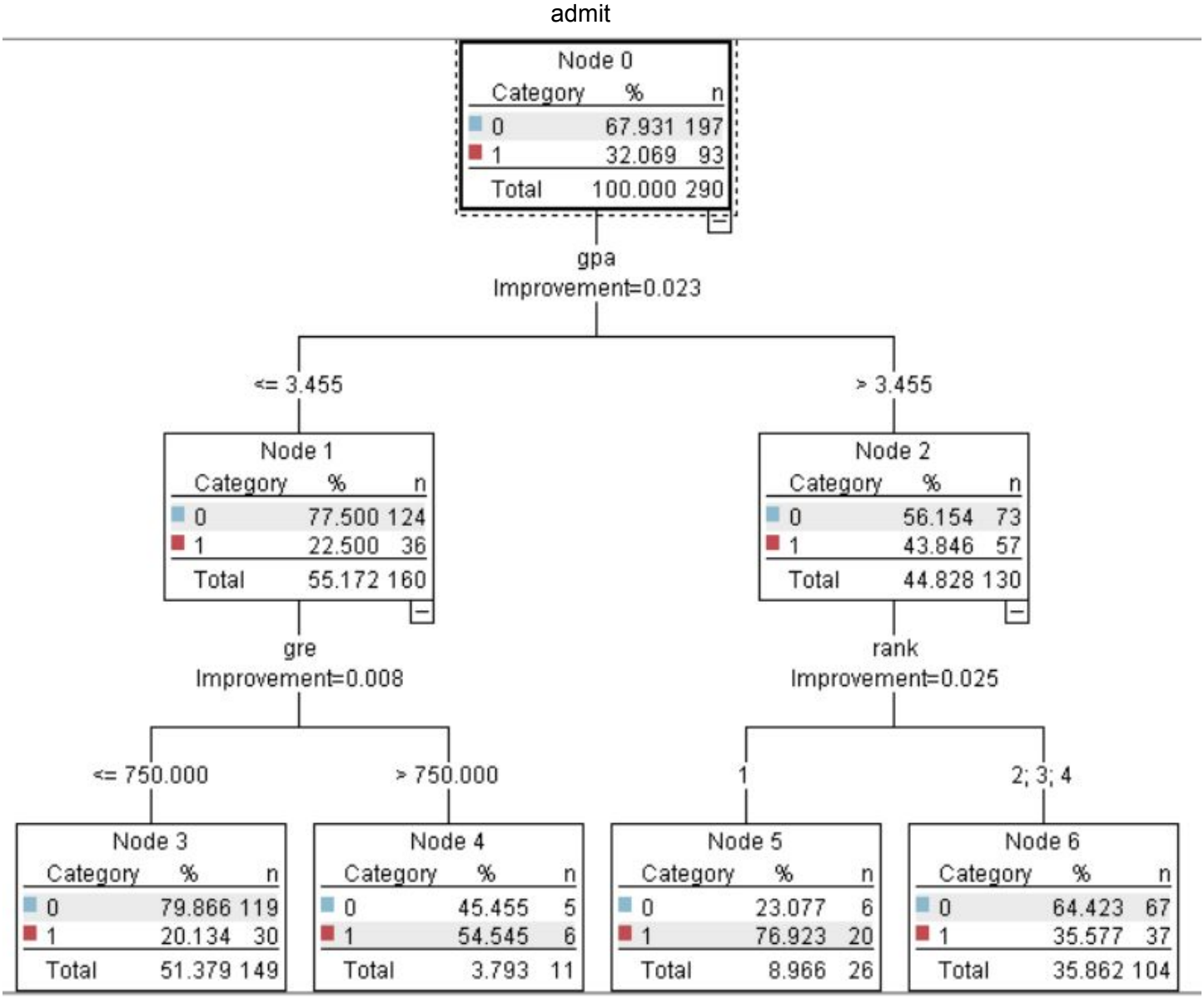
0 = -1.6098 + 0.002264 * gre

1.6098/0.002264 = gre

711.0424 = gre

So we can say the GRE score of the student should be 711 to have a 50% chance of admission.

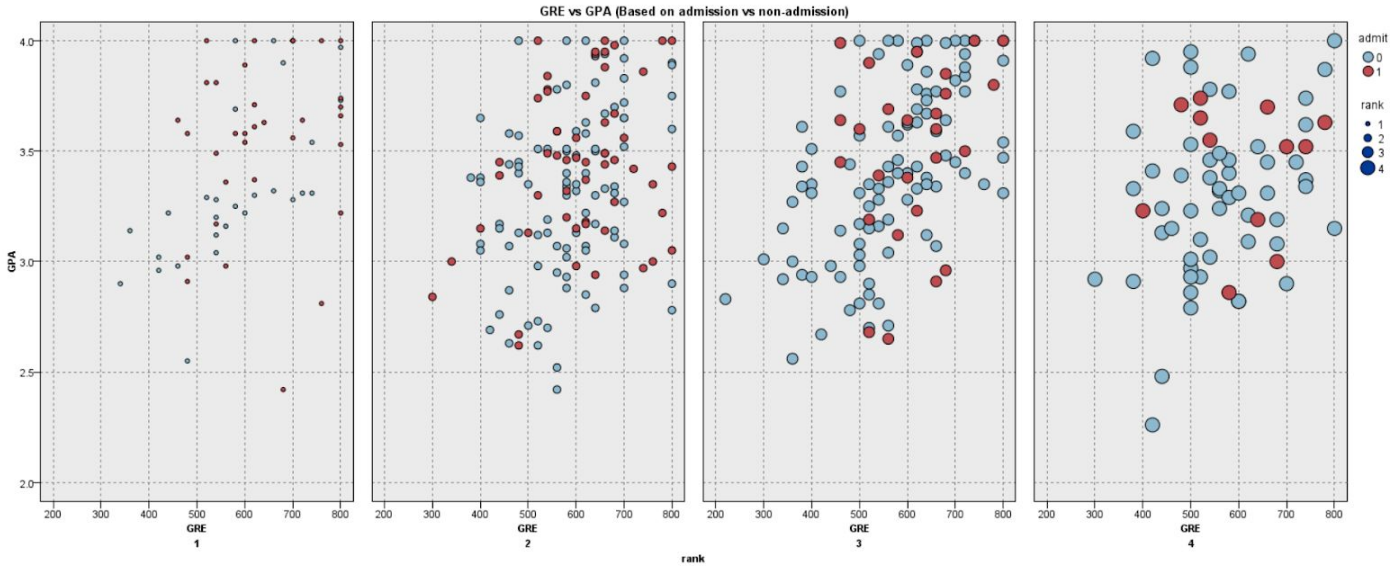
2. Below is output we got from our Classification Tree Analysis:



So, according to our Classification tree output, we can say that there are two ways a student can have at least 50% chance of admission such as:

If a student has more than 3.4 GPA then he or she should be from school with rank 1 or
If a student has less than or equal to 3.4 GPA then he/she should have a GRE score of more than 750.

3. Below is the scatterplot we obtained by plotting GRE vs GPA:



4. The policy makes it difficult for academic mobility because as we can see in the classification tree model ,the chance of admission for the students from schools with ranks 2 to 4 is only 35.5% which is significantly small when compared to students from schools with rank 1 who have a 76.9% chance of admission.

5. After doing analysis through Logistic Regression and Classification trees, It is clearly visible that having school rank 1 is the most favoured variable in making admission decisions. This result is based on the Logistic regression coefficient for rank =1 which is 1.551 which is the highest of any other coefficient for input variables. Yes, of course, through the classification tree model we found that having a higher GPA (above 3.455) alone has a 43% chance of admission as well as when having a lower GPA. A high GRE score increases the admission chances to 54%, but having a GPA greater than 3.455 as well as a school rank of 1 brings chances of admission up to 76%, which is a massive increase. So in conclusion we can say that the order of preference for admission is school rank, GPA and then GRE score.

6. Since we have used the graduate school's own data for training the Logistic Regression model, we don't believe that their strategy will change to a great extent.

According to the confusion matrix we have:

Results for output field admit

Comparing $L-admit with admit

Correct	284	71%
Wrong	116	29%
Total	400	

The accuracy is 71% for correct classification results, which can be used for an initial screening of admits. This accuracy can get better with more data but the strategy for giving admission won't change, since the graduate school mainly looks at rank, GPA, and GRE scores in that order. But, if the graduate admissions committee does look at the results of the LR analysis and realise that their strategy is ultimately not supporting academic mobility, then they can revise their strategy accordingly. Overall, our LR analysis will give them great insights about the patterns that are currently followed in their admission process.