PREDICTING FACTORS THAT INFLUENCE GRADUATION RATES OF COLLEGES

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Background

❖ Benefits to having a college degree

❖ In recent years - decrease in graduation rates of colleges

❖ Many factors influence graduation rates

❖ Understanding these factors - beneficial to all parties involved

Previous Studies

Completion of an orientation course vs retention (Boudreau, C. A., & Kromrey, J. D. ,1994)

- Course participants did perform better in regards to retention
- No difference in overall graduation rate

Variations in graduation rates across 1300 colleges

- Ivy league schools showed better graduation rates
- Only considered precollege characteristics like SAT & ACT scores

Data

Merged education data & census data to universities

❖ Top 200 Universities (US World News ranking - 15 indicator of

academic excellence)

❖ Education data from IPEDS (Integrated Postsecondary

Education Data Systems)
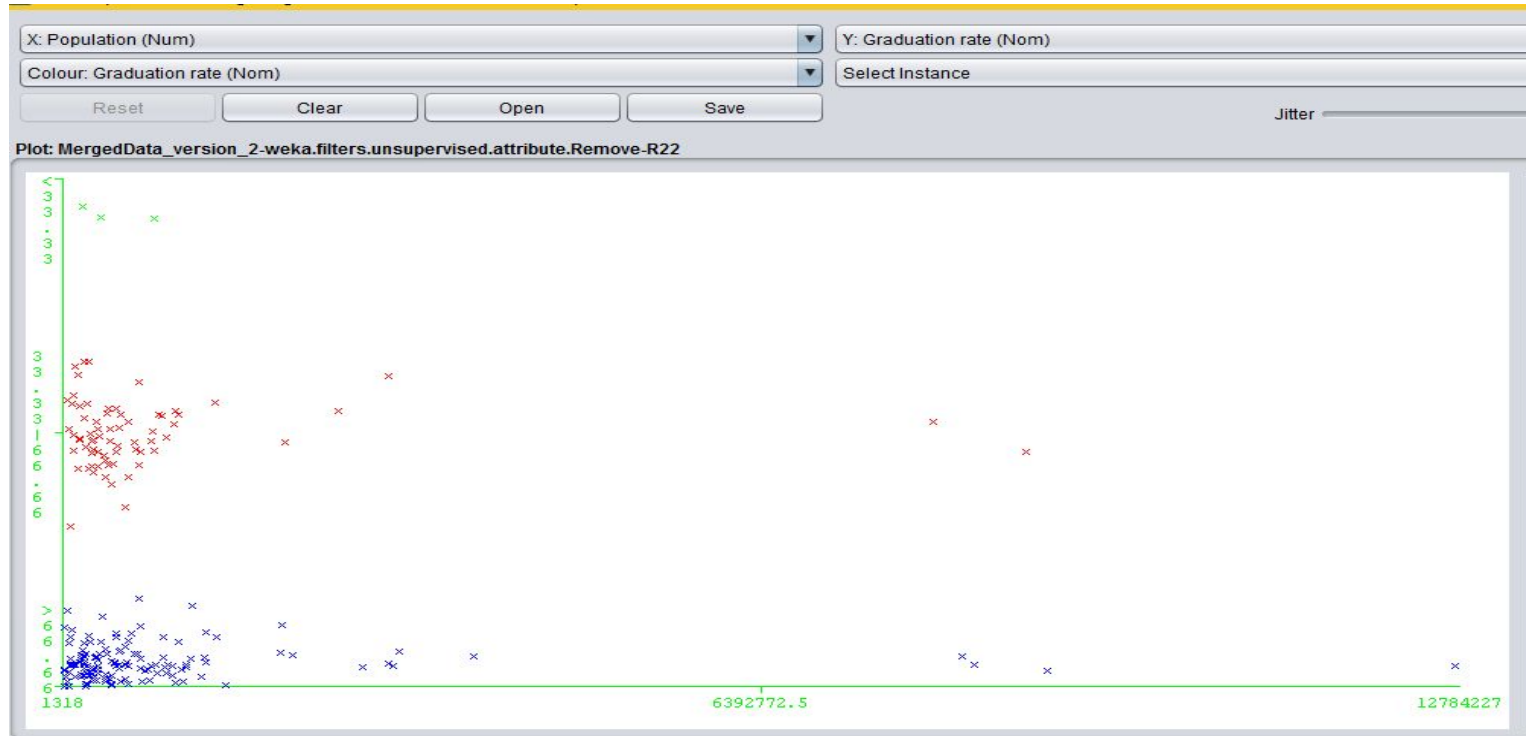
❖ Census 2016 data

Census Data Attributes :

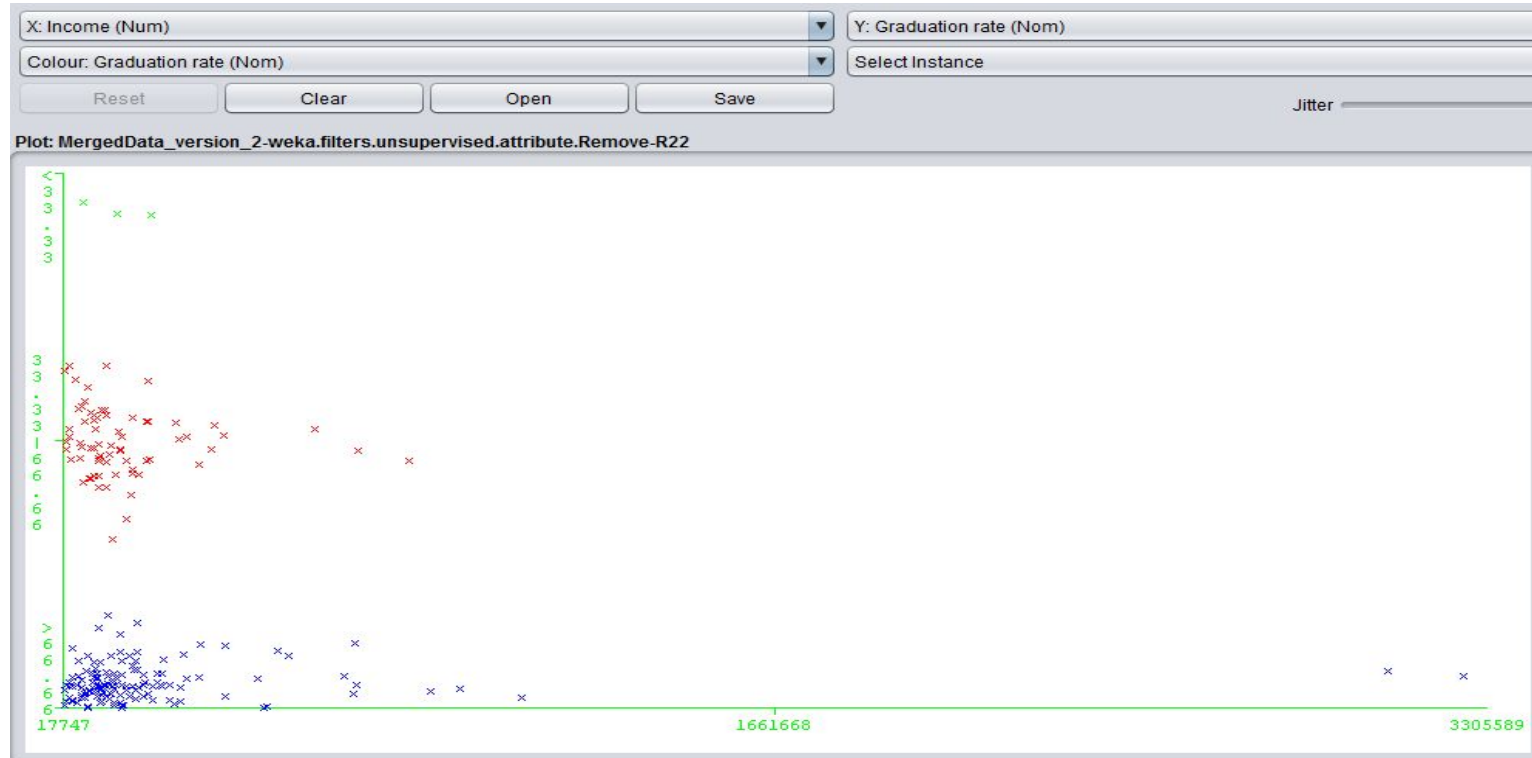| Population	Income	Total 1 or less occupants per room	Total 1.01 or more occupants per room	Age	Education Attainment
22575	137788	18285	2593	42.6	1251
681170	281241	123111	2573	33.9	81506
1318	50161	286	13	37.7	52
182499	41771	49170	1513	29.8	45005
75968	50185	20179	398	36.5	9003

Education Data Attributes :

Graduation rate (%)	Adjusted cohort	ACT English 25th Percentile	ACT English 75th Percentile	ACT Math 25th Percentile	ACT Math 75th Percentile	SAT I Verbal 25th Percentile	SAT I Verbal 75th Percentile
67	985	21	27	22	28	500	600
81.2	1527	25	32	24	28	590	690
54	374	20	28	18	27	480	620
65.5	6747	21	29	23	28	510	630
72.9	3911	25	32	23	28	530	630
68.4	1013	21	28	20	27	480	590

SAT I Math 25th Percentile	SAT I Math 75th Percentile	Number of completers	On campus expenses	Off campus Expenses	In state tuition and fees	Books and supplies	Out of state tuition and fees
510	620	660	16928	16928	35740	1020	35740
560	650	1240	16619	16619	44853	800	44853
480	620	202	9842	14864	27684	1100	27684
520	640	4421	14790	13924	10370	1103	26470
540	650	2852	18562	18562	10696	1200	28840

Visualizing Population

Visualizing Income

Attributes Selection Evaluator

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Ranked attributes:
 0.3247      14 SAT I Math 25th Percentile
 0.2943      12 SAT I Verbal 25th Percentile
 0.2589      13 SAT I Verbal 75th Percentile
 0.2552      15 SAT I Math 75th Percentile
 0.2377       8 ACT English 25th Percentile
 0.215       10 ACT Math 25th Percentile
 0.2013       9 ACT English 75th Percentile
 0.1843      11 ACT Math 75th Percentile
 0.1339      21 Out of state tuition and fees
 0.099       16 Number of completers
 0.0882      19 In state tuition and fees
 0            5 Age
 0            3 Total  1 or less occupants per room
 0            2 Income
 0            4 Total 1.01 or more occupants per room
 0            6 Education Attainment
 0           20 Books and supplies
 0           17 On campus expenses
 0           18 Off campus Expenses
 0            7 Adjusted cohort
 0            1 Population
```

Results

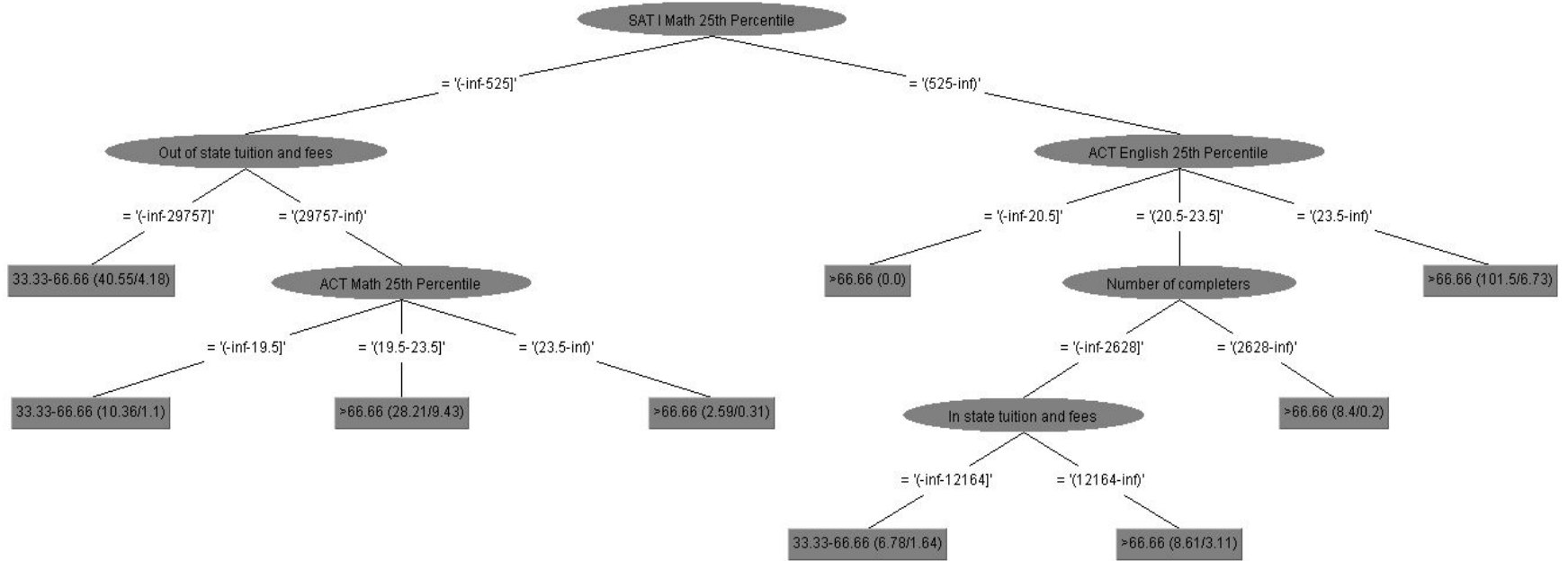| Algorithm	Correctly Classified	Incorrectly Classified
Naïve Bayes	82.12%	17.87%
Decision Tree	83.09%	19.90%
KNN -2	85.02%	14.97%
KNN -3	85.02%	14.97%

Apriori

- **MinSupport (0.4)and MinConfidence(0.5)**
- **Rules**

1. SAT I Verbal 25th Percentile='(525-inf)' SAT I Math 25th Percentile='(525-inf)' 98 ==> Graduation rate=>66.66 93 **conf:(0.95)**

2. In state tuition and fees='(12164-inf)' Out of state tuition and fees='(29757-inf)' 114 ==> Graduation rate=>66.66 93 **conf:(0.82)**

3. Number of completers='(-inf-2628]' 150 ==> Graduation rate=>66.66 84   **conf:(0.56)**

Sudhir Jagtap, Kodge B. G., Shinde G. N., Devshette P. M (2012), Role of Association Rule Mining in Numerical Data Analysis, International Journal of Computer, Electrical, Automation, Control and Information Engineering, 6(1), 122-125

Decision Tree

Conclusion

Factors affecting graduation rate

- SAT and ACT 25th Percentile
- Number of completers,In state tuition fees,Out of state tuition fees

Thank you!!!