NYC PUBLIC SCHOOLS: INFLATED GRADUATION RATES, BUT A LOW COLLEGE READINESS INDEX

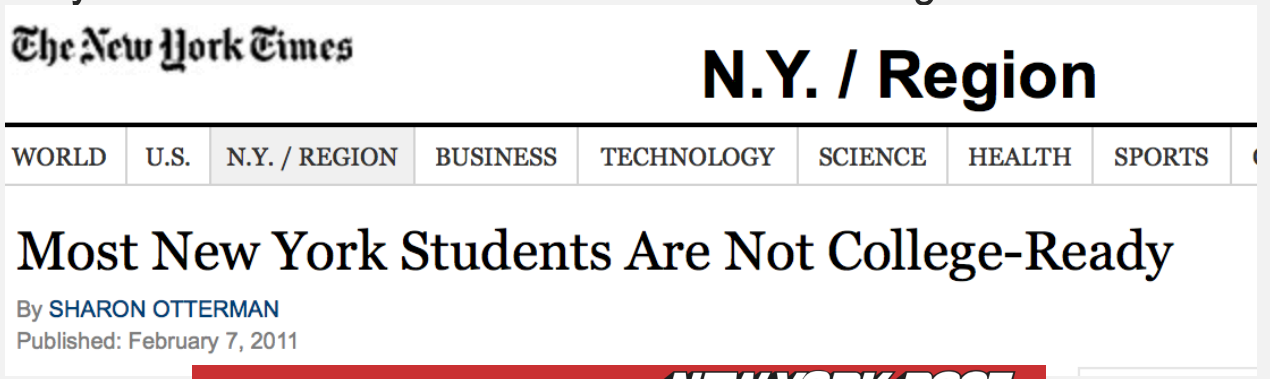
Michelle Cronin

GA - DAT30

Quick Draft Presentation – March 2, 2016

THE ISSUE

- Several articles have pointed out that although graduation rates in NYC public schools have risen over the years, the rate of students prepared for college has remained low
- Thus, NYC public schools are graduating many students each year who are not considered college-ready
- Can we predict which schools are graduating college-ready students at a rate near-consistent with its graduation rate?



WHAT DATA HAVE I GATHERED, AND HOW DID I GATHER IT?

- Mostly measurable characteristics of NYC public high schools (performance, demographics, location, etc.) from NYC Open Data and the Department of Education:
  - 2013_2014_HS_SQR_Results_2015_03_02.xlsx
  - 2014_2015_HS_SQR_Results_2016_01_07.xlsx
  - DemographicSnapshot201011to201415Public_FINAL-2.xlsx
  - 2015 Graduation_Rates_Public_School-2.xlsx- DOE_High_School_Directory_2013-2014.csv
  - DOE_High_School_Directory_2014-2015.csv- 2014 Public Data File SUPPRESSED.xlsx
  - 2015 Public Data File.xlsx- Location_Information_Report.csv
  - Zip_MedianValuePerSqft_AllHomes.csv

```
data.shape
(975, 46)
```

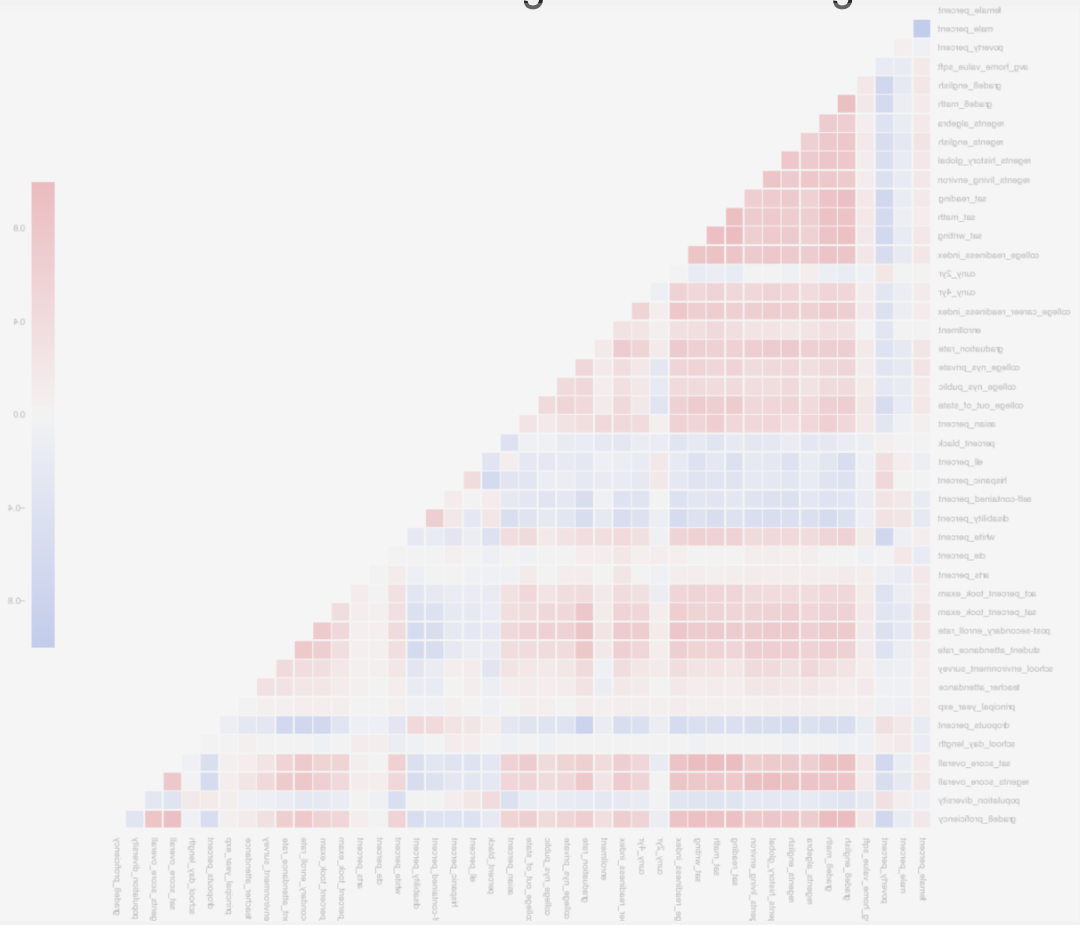
male_percent	poverty_percent	avg_home_value_sqft	district_admin_code	grade8_english	grade8_math	regents_algebra	regents_english	regent
0.623529	0.866667	1321.166667	1	2.18	2.06	64	66	53
0.621711	0.891447	1321.166667	1	2.27	2.37	64	69	67
0.530030	0.735736	1324.500000	1	2.66	2.63	65	75	64
0.432507	0.845730	1321.166667	1	2.28	2.09	61	69	63
0.484726	0.273199	1321.166667	1	3.50	3.53	80	91	87

WHICH AREAS OF THE DATA HAVE I CLEANED, AND WHICH AREAS STILL NEED CLEANING?

- Done:
  - Dropped and imputed missing values
  - Feature Selection – Necessary due to overlapping features in sources as well as presence of irrelevant features
  - Some Feature Engineering:
    - Length of School Day (End of day – Start of day)
    - Diversity Score (Sum of the squared reported race/ethnicity percents [black, white, Hispanic, Asian])
    - Overall SAT score (Reading SAT + Writing SAT + Math SAT average scores)
    - Overall Regents score (Algebra + English + Living Environment + Global History Regents average scores)
    - Grade 8 Proficiency score (Grade 8 Math + Grade 8 English scores)
  - Tidied the names
- To Do:
  - Dummy categorization (Zip codes and/or Administrative districts)
  - Possibly more feature selection

WHAT STEPS HAVE I TAKEN TO EXPLORE THE DATA?

- Created visuals to look at correlation (heatmap) and missing values
- Very unclean data → so most EDA thus far has been targeted at cleaning it
- Explored feature variance
- Looked for outliers



WHAT INSIGHTS HAVE I GAINED FROM MY EXPLORATION?

- High school graduation rate and college readiness index share high correlation with the following features (in varying strengths):
  - Post-Secondary enrollment rate
  - Student Attendance Rate
  - Percentage of students who take the SAT
  - Overall Regents score
  - Grade 8 Proficiency Scores
  - Poverty and Disability population percentages (as negative correlations)
- Average graduation rate for 2014 and 2015 combined: 73.34%
  - Standard Deviation: 0.160871
- Average college readiness index for 2014 and 2015 combined: 29.05%
  - Standard Deviation: 0.232938

HOW MIGHT I USE MODELING TO ANSWER MY QUESTION?

- Random Forest
  - Protect against variance (great because I have a considerable amount of features, and they're still growing)
  - Will tell me most important features
- Logistic Regression
  - Lasso/ridge will drop/let me know unimportant features
  - Will allow me to view feature coefficients
- k-means Clustering:
  - I may be able to discover distinguishable groups of schools to find some counterintuitive combinations of characteristics as well as obvious ones

WILL I BE ABLE TO ANSWER MY QUESTION WITH THIS DATA, OR DO I NEED TO GATHER MORE DATA (OR ADJUST MY QUESTION)?

- Yes, I am fairly confident that I will be able to answer my question with this data
  - Potential problem: very unbalanced class