General Assembly - DAT-19 Predicting NaNoWriMo Winners

NICOLE FRONDA

What is NaNoWriMo?

National Novel Writing Month

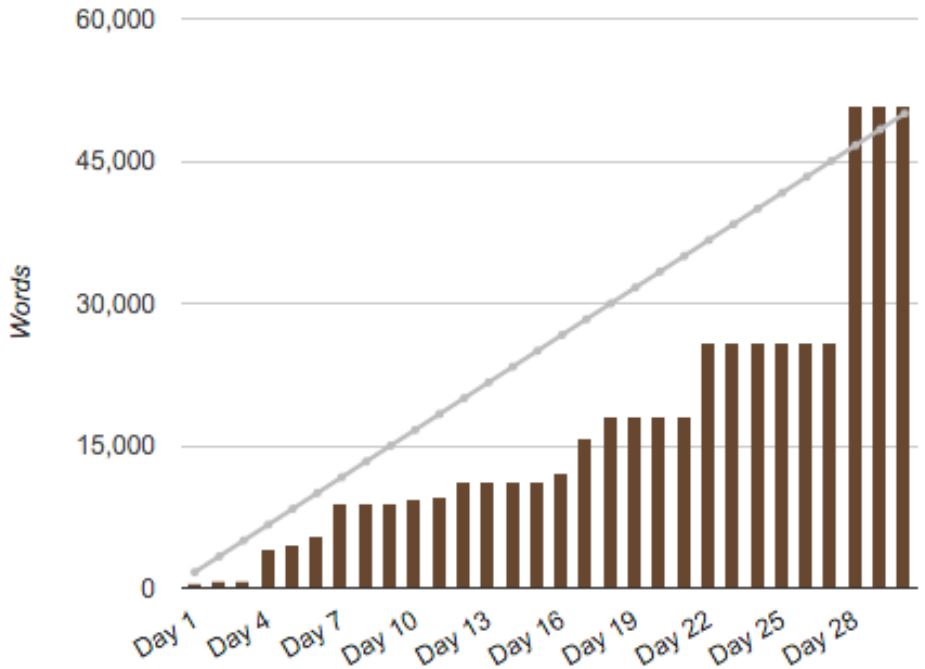
"On November 1, participants begin working towards the goal of writing a **50,000-word** novel by 11:59 PM on November 30.

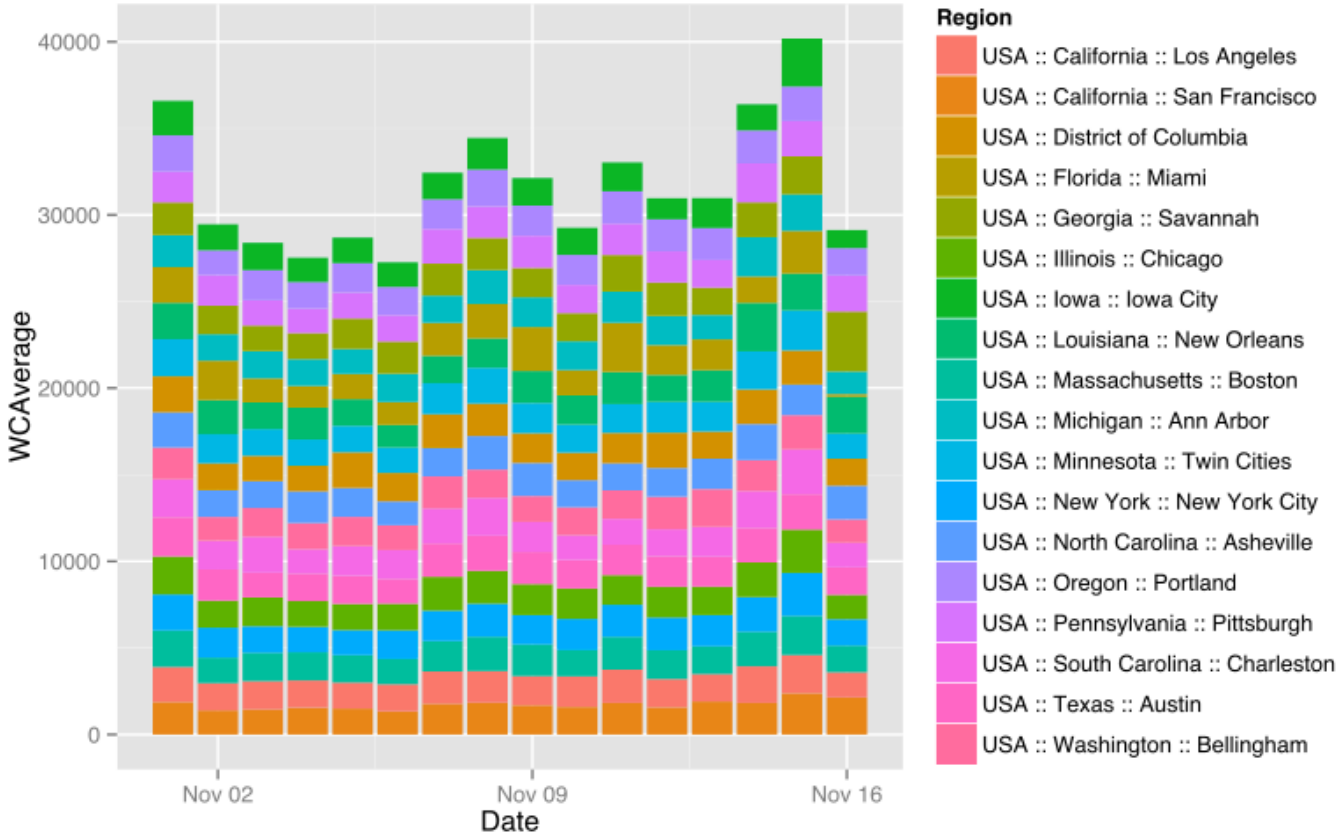
Valuing enthusiasm, determination, and a deadline, NaNoWriMo is for *anyone* who has ever thought about writing a novel."

- http://nanowrimo.org/about

Motivation:

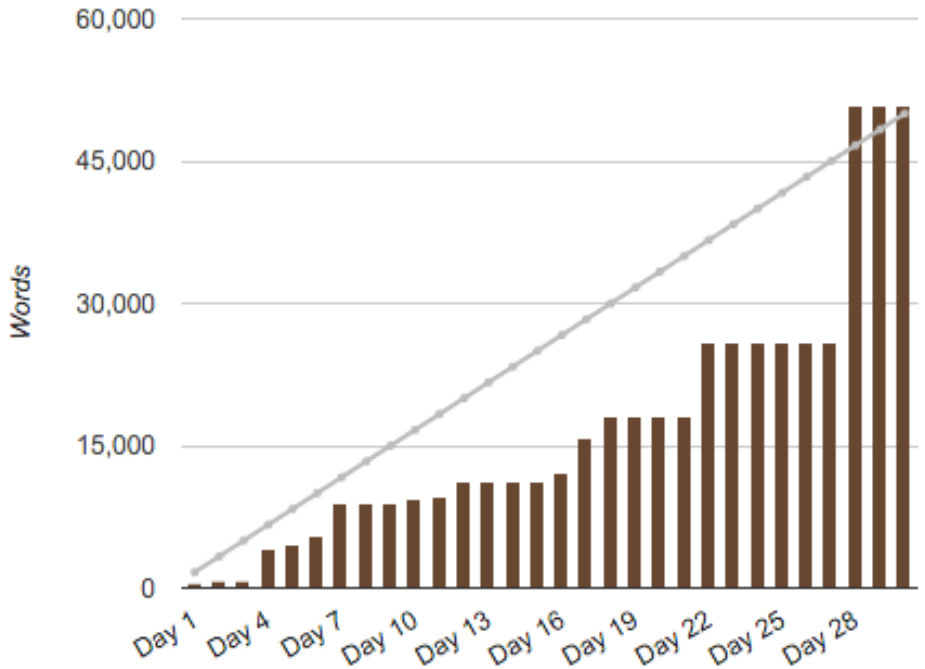
Tracking my Writing Progress

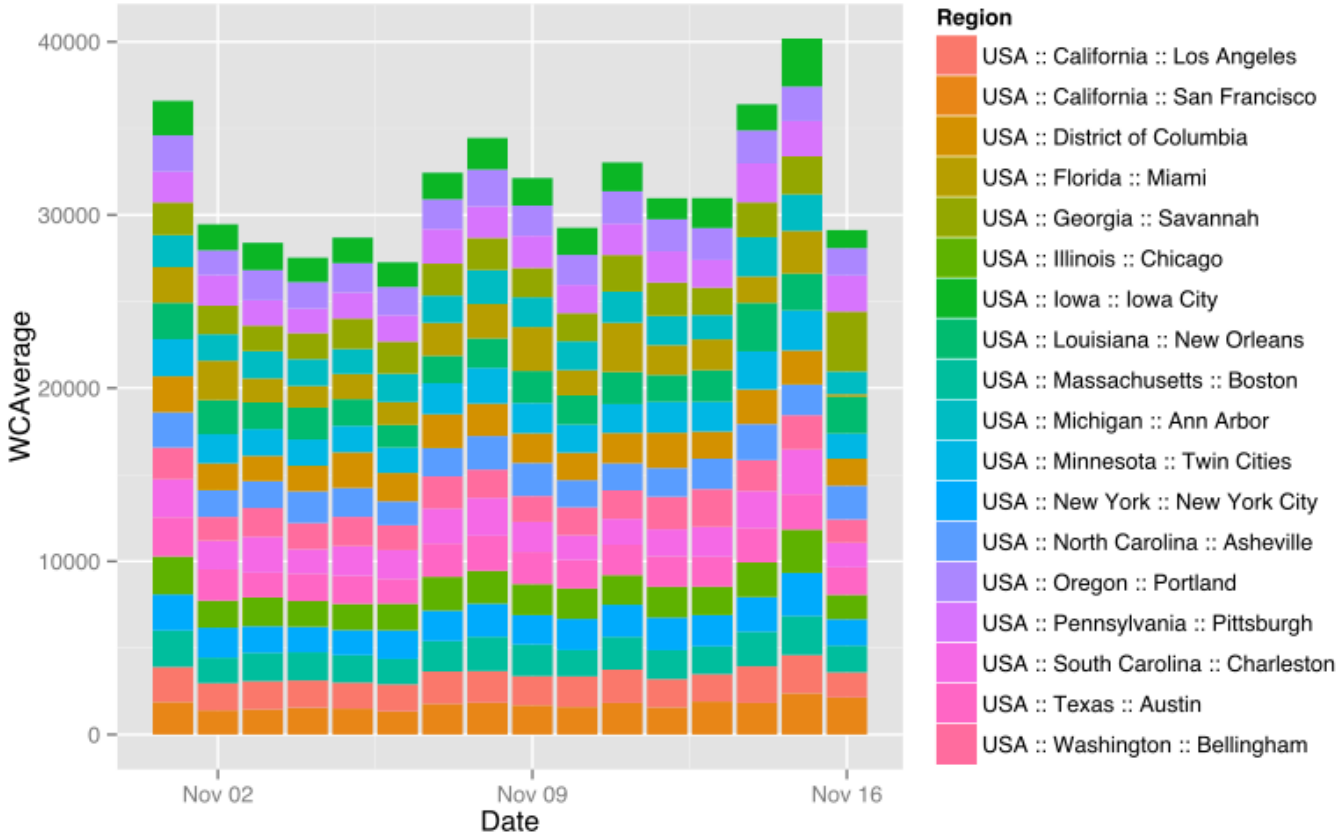




Motivation:

Tracking my Writing Progress





Goal: Predict if a writer or novel will win the next contest

Writer Data

Past NaNoWriMos

Numerical

Member Length

Lifetime Word Count

Number of Novels

Count Wins

Count Donations

Average Submission

Daily Average

Num Consecutive Years Participated

Num Consecutive Winning Years

Binary

Municipal Liaison

Sponsorship

Ongoing NaNoWriMo

Numerical

First Week Word Count

First Week Num Submissions

Second Week Word Count

Second Week Num Submissions

Binary

Donor

Novel Data

Genre

Num Words in Synopsis/Excerpt

Num Unique Words in Synopsis/Excerpt

Num Sentences in Synopsis/Excerpt

Num Paragraph Synopsis/Excerpt

Reading Score of Synopsis/Excerpt

Getting the Data

Stats from Most Recent Contest – Word Count API

http://nanowrimo.org/modules/wordcount_api/wchistory/ ***nicaless***

```
<wchistory>
  <uid>30837</uid>
  <uname>NewMexicoKid</uname>
  <user_wordcount>25001</user_wordcount>
  <winner>false</winner>
  <wordcounts>
    <wcentry>
      <wc>2699</wc>
      <wcdate>2005-11-01</wcdate>
    </wcentry>
    <wcentry>
      <wc>2315</wc>
      <wcdate>2005-11-02</wcdate>
    </wcentry>
```

	Writer	Word Count	Winner	1	2	3	4	5	6	7	...
0	Nicaless	24229	false	3497	1132	677	296	456	631	0	...
1	Rachel B. Moore	50603	true	5885	1760	1771	592	1050	706	4958	...
2	abookishbabe	29299	false	28632	0	0	0	0	0	0	...
3	alexabexis	78800	true	3052	4242	3296	4554	3065	2011	5140	...
4	AllYellowFlowers	11000	false	0	520	455	170	204	451	0	...

Getting the Data

Web pages – Kimono Labs

Getting the Data
Web pages – Beautiful Soup

Author Info | Novels | Badges | Writing Buddies | Buddy Of

A Mystery in the Kingdom of Aermon

Author: Nicaless
Genre: Fantasy

Synopsis

Hitoshi is appointed the youngest Judge and master of the Veris Saber in the history of Aermon. His new responsibilities may prove to be a bit more challenging than he first anticipated. It certainly does not help that he's standing trial for murder...

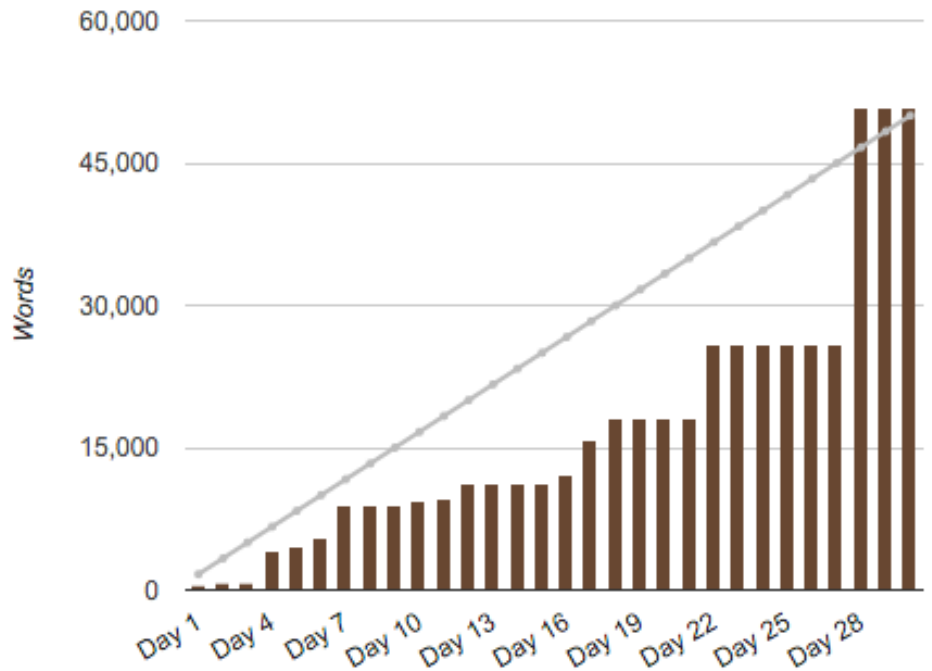
Excerpt

This story, funnily enough, started out as a history textbook. An academic at heart, I always knew I wanted to leave something behind for future students of the world. However, while trying to engross myself in the process of writing history, I was swept away in the process of making it.

The events described in the following collection of newspaper article, letters, diary entries, etc., that I have procured over the years and arranged like so for this book/website(?), tell a story of magic and mystery, of science and disbelief, of treachery and thievery, of love and war.

```
# open the url
page = urllib.urlopen(i).read()
# parse the page
soup = BeautifulSoup(page, 'html.parser')
# find the novel_synopsis tag
synopsis = soup.find(id='novel_synopsis').encode_contents()
```

```
page =  urllib.urlopen(u).readlines()
for line in page:
    # find the line that starts with rawCamperData
    if line[10:23] == "rawCamperData":
        # split the string to get the wc submission values
        mystr =  line[27:len(line)-3]
        mystr = mystr.split(",")
        mystr = list(mystr)
        mystr = map(int, mystr)
```

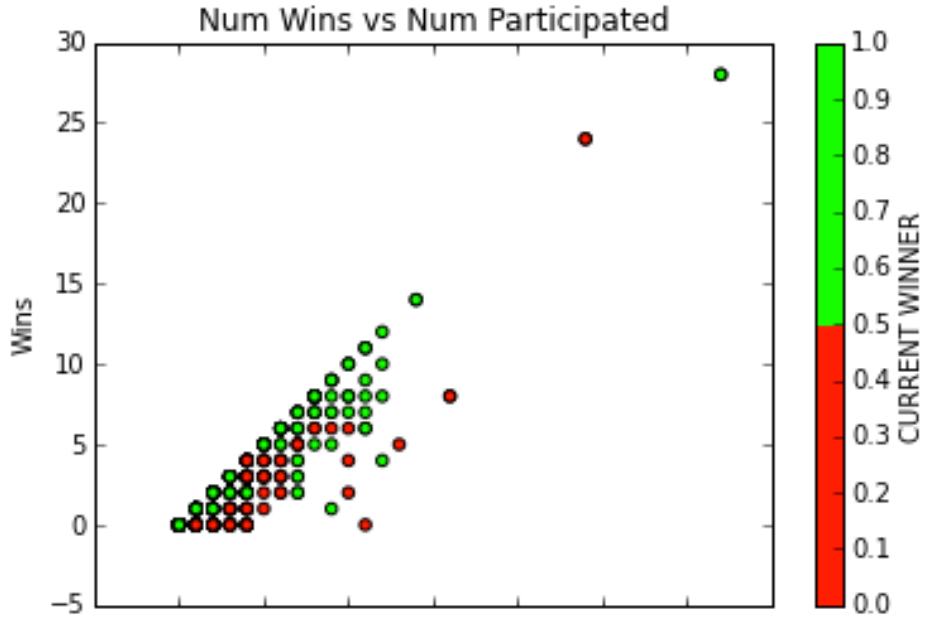


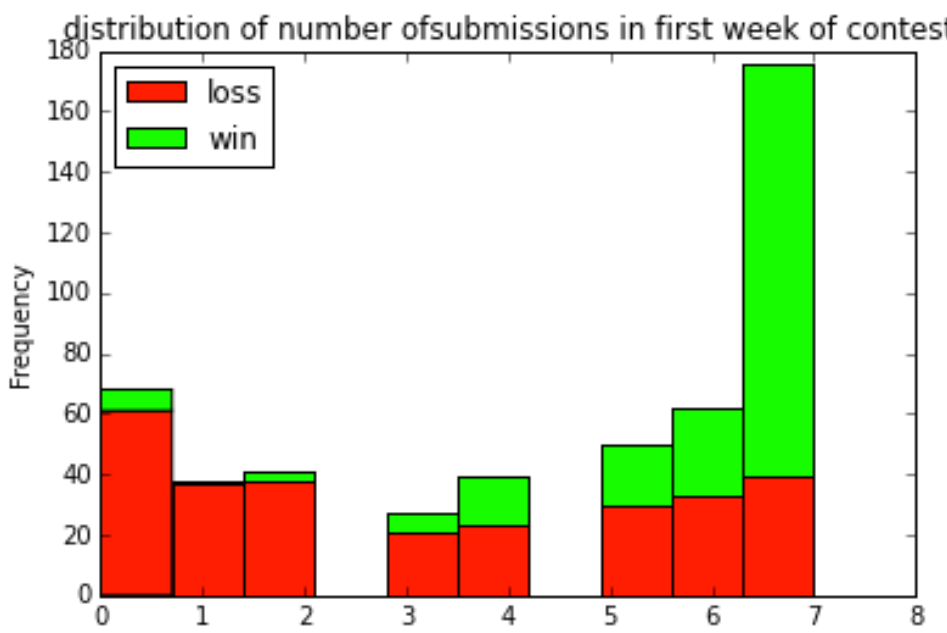
Exploring the Data

501 Writers
219 won last contest
282 lost last contest

Writers with Sponsors
2x likely to Win

Municipal Liaisons
6x likely to Win





Writer Data

Past NaNoWriMos

Numerical	Binary
Member Length	Municipal Liaison
Lifetime Word Count	Sponsorship
Number of Novels	
Count Wins	
Count Donations	
Average Submission	
Daily Average	
Num Consecutive Years Participated	
Num Consecutive Winning Years	

2123 Novels
1333 winners
790 non-winners

Ongoing NaNoWriMo

Numerical	Binary
First Week Word Count	Donor
First Week Num Submissions	
Second Week Word Count	
Second Week Num Submissions	

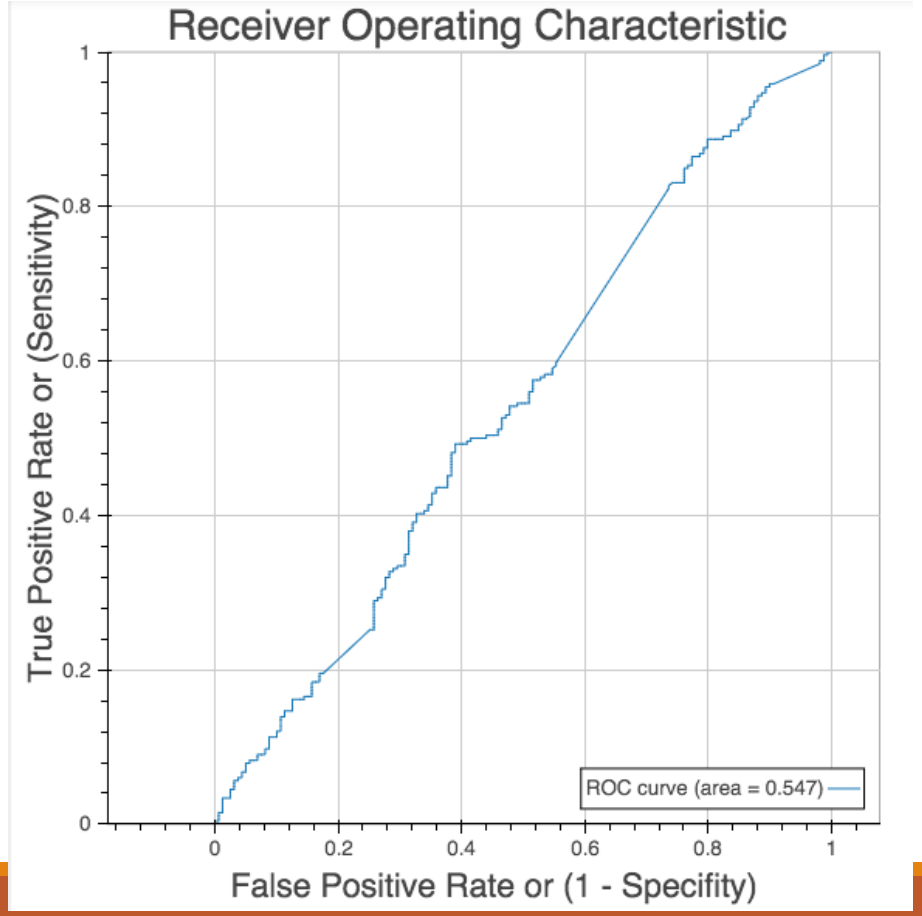
Novel Data

- Genre
- Num Words in Synopsis/Excerpt
- Num Unique Words in Synopsis/Excerpt
- Num Sentences in Synopsis/Excerpt
- Num Paragraph Synopsis/Excerpt
- Reading Score of Synopsis/Excerpt

Predicting Winning Novels from Text Features

Could not create an effective model with text features

Logistic Regression – 63%
K Neighbors – 63%
Naïve Bayes – 59%
Support Vector Machine – 63%
Decision Tree – 63%
Random Forest – 63%



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Writer Data

Past NaNoWriMos

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Ongoing NaNoWriMo

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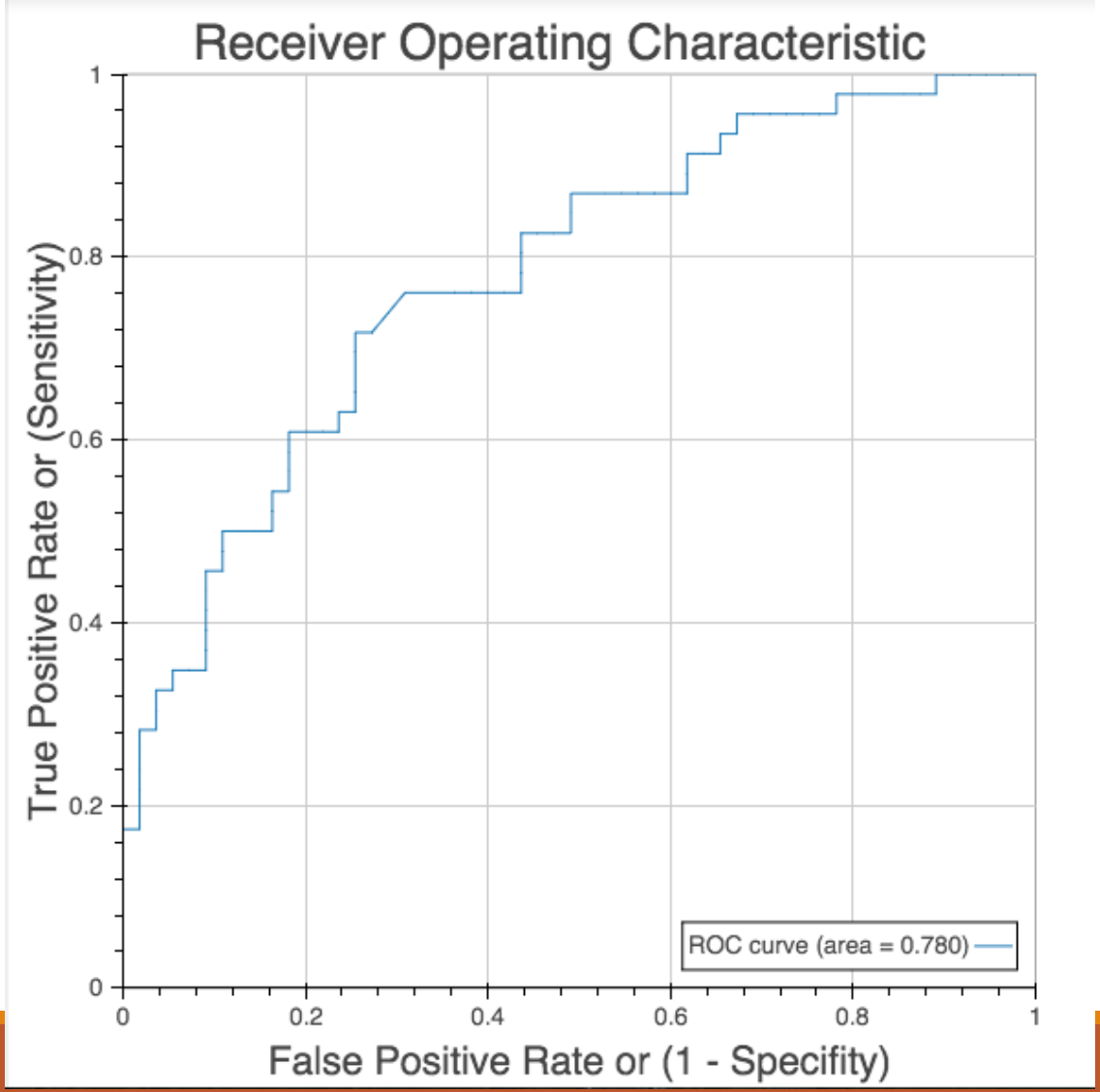
Second Week Word Count	
Second Week Num Submissions	

Logistic Regression – Predicting Winning Writers

	Actual 0	Actual 1
Predicted 0	46	7
Predicted 1	22	34

	Precision	Recall	F1-Score	Support
0	0.69	0.87	0.77	55
1	0.77	0.52	0.62	46
avg/total	0.73	0.71	0.70	101

Other Models:
Naïve Bayes – 67%
Support Vector Machine – 72%
Decision Tree – 65%
Random Forest – 74%



Writer Data

Past NaNoWriMos		Ongoing NaNoWriMo	
Numerical	Binary	Numerical	Binary
Member Length	Municipal Liaison	First Week Word Count	Donor
Lifetime Word Count	Sponsorship	First Week Num Submissions	
Number of Novels		Second Week Word Count	
Count Wins		Second Week Num Submissions	
Count Donations			
Average Submission			
Daily Average			
Num Consecutive Years Participated			
Num Consecutive Winning Years			

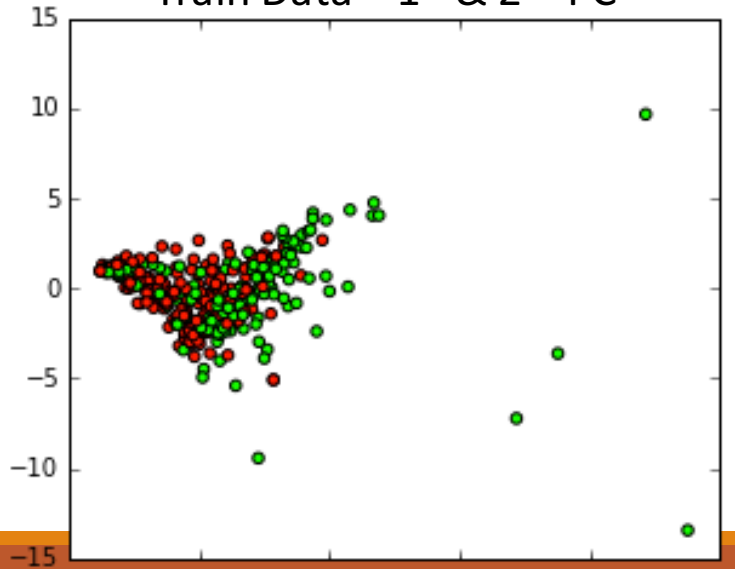
Logistic Regression – Predicting Winning Writers

Include Word Count from current contest

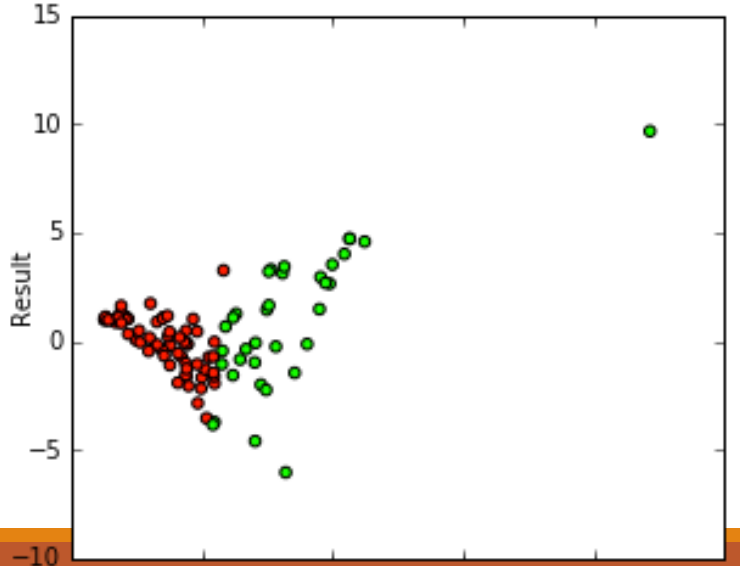
	Actual 0	Actual 1
Predicted 0	46	9
Predicted 1	8	38

	Precision	Recall	F1-Score	Support
0	0.85	0.84	0.84	55
1	0.81	0.83	0.82	46
avg/total	0.83	0.83	0.83	101

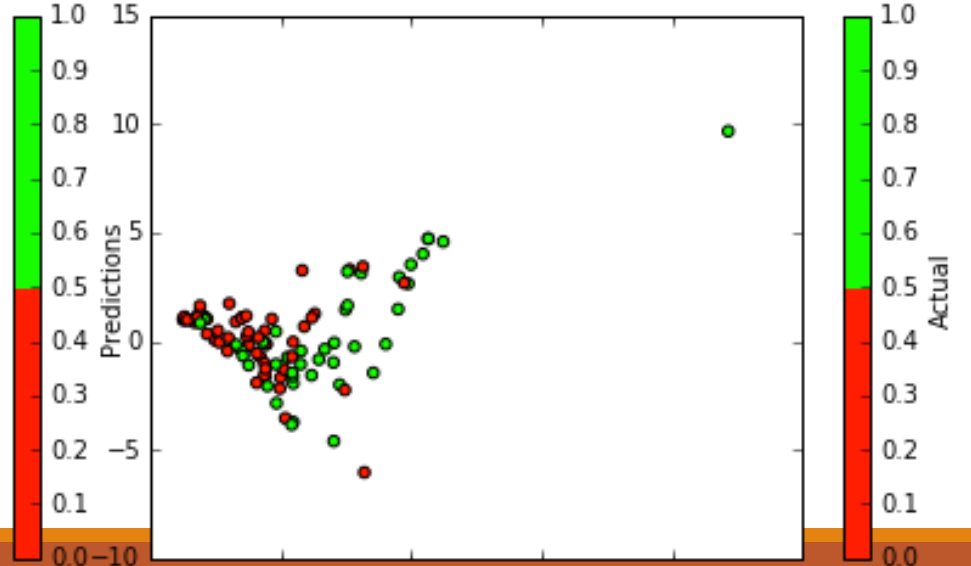
Train Data – 1st & 2nd PC



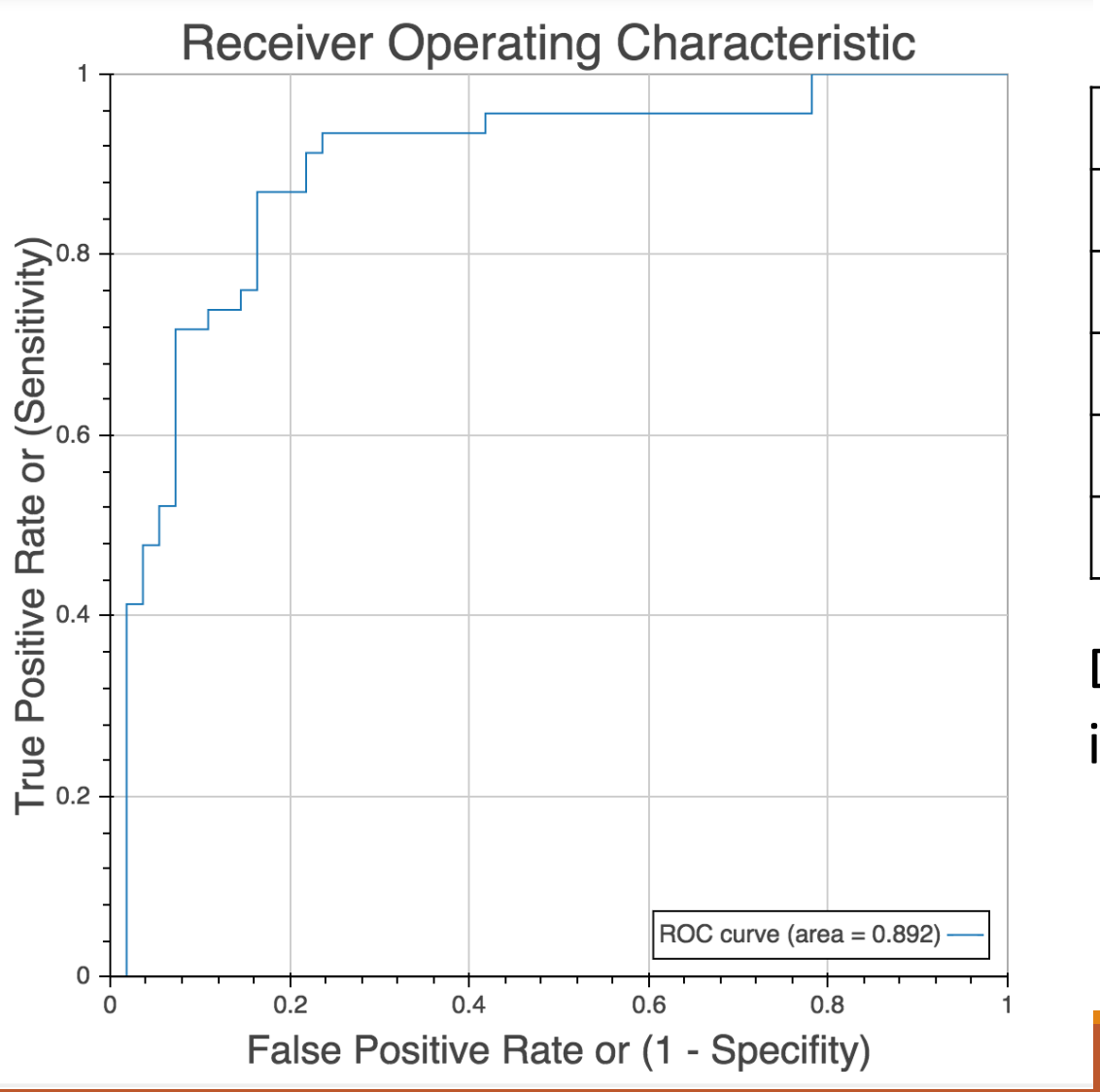
Test Data Predictions – 1st & 2nd PC



Test Data Actual Outcomes – 1st & 2nd PC



Logistic Regression – Predicting Winning Writers



Feature	Measured Importance
Second Week Word Count	0.712847
LifetimeWordCount	0.057194
Second Week Num Submissions	0.045414
Expected Avg Submission	0.039117
Consecutive Part	0.036241

Data of progress in first few weeks helps improve predictions

Next Steps

Improving the model

- Collect more data
- Feature Engineering

Predicting Final Word Count

Discovering clusters of writers

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Improving the model

- Collect more data
- Feature Engineering

Predicting Final Word Count

Discovering clusters of writers

Win the Next NaNoWriMo ☺

Questions?