How to Get Your Questions Answered Quickly

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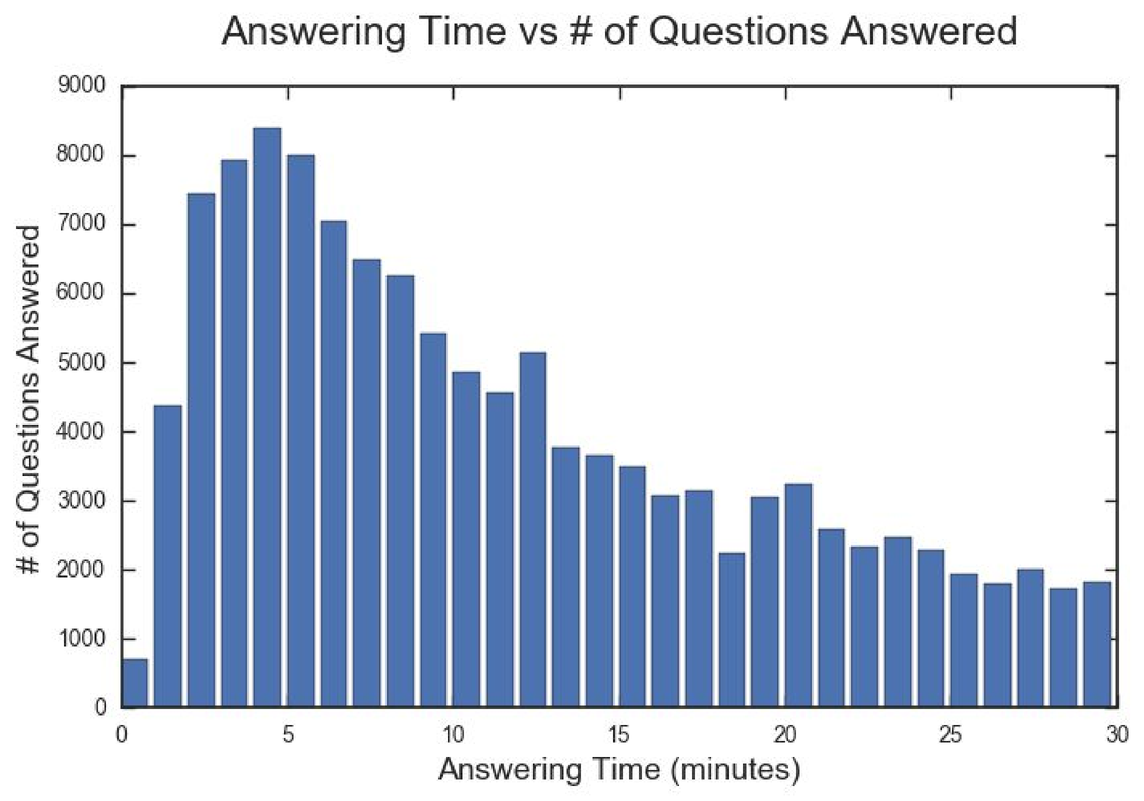
Paul Lim
05/17/2017

Objective

We all have questions...

1. What features are important in getting quality answers?
2. Optimize the complexity of models and prediction time of new observations.

Target Selection

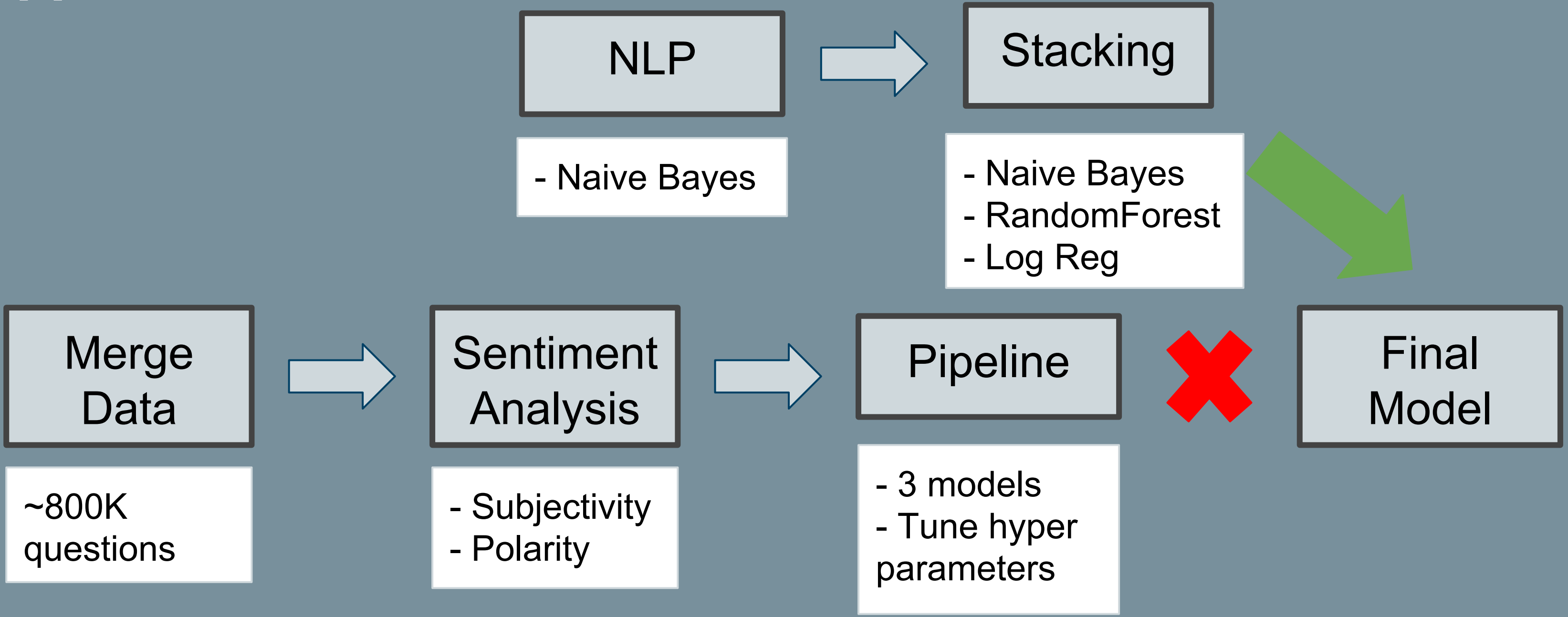


- Pos. Label: < 30 minutes

- Neg. Label: >= 30 minutes

Modeling

Approach



NLP

- Naive Bayes

Stacking

- Naive Bayes
- RandomForest
- Log Reg

Merge Data

~800K questions

Sentiment Analysis

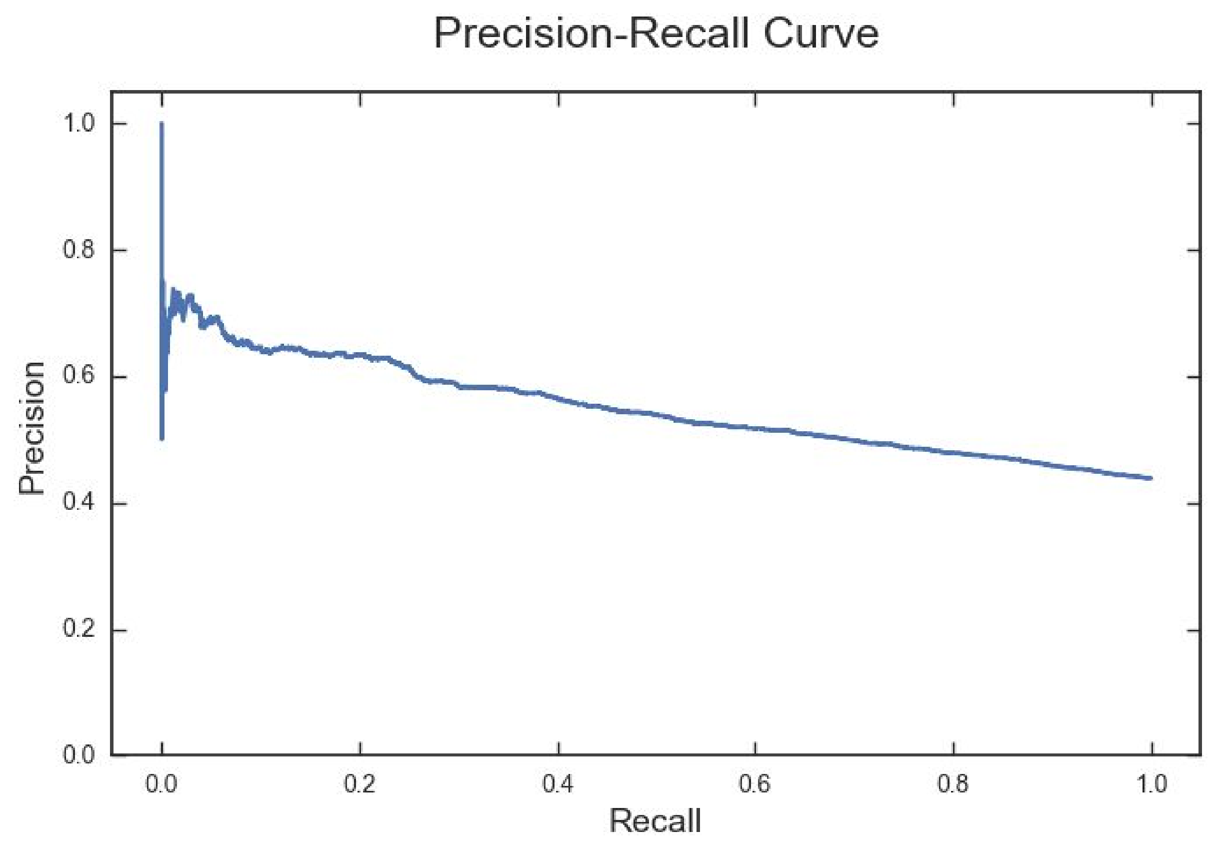
- Subjectivity
- Polarity

Pipeline

- 3 models
- Tune hyper parameters

Final Model

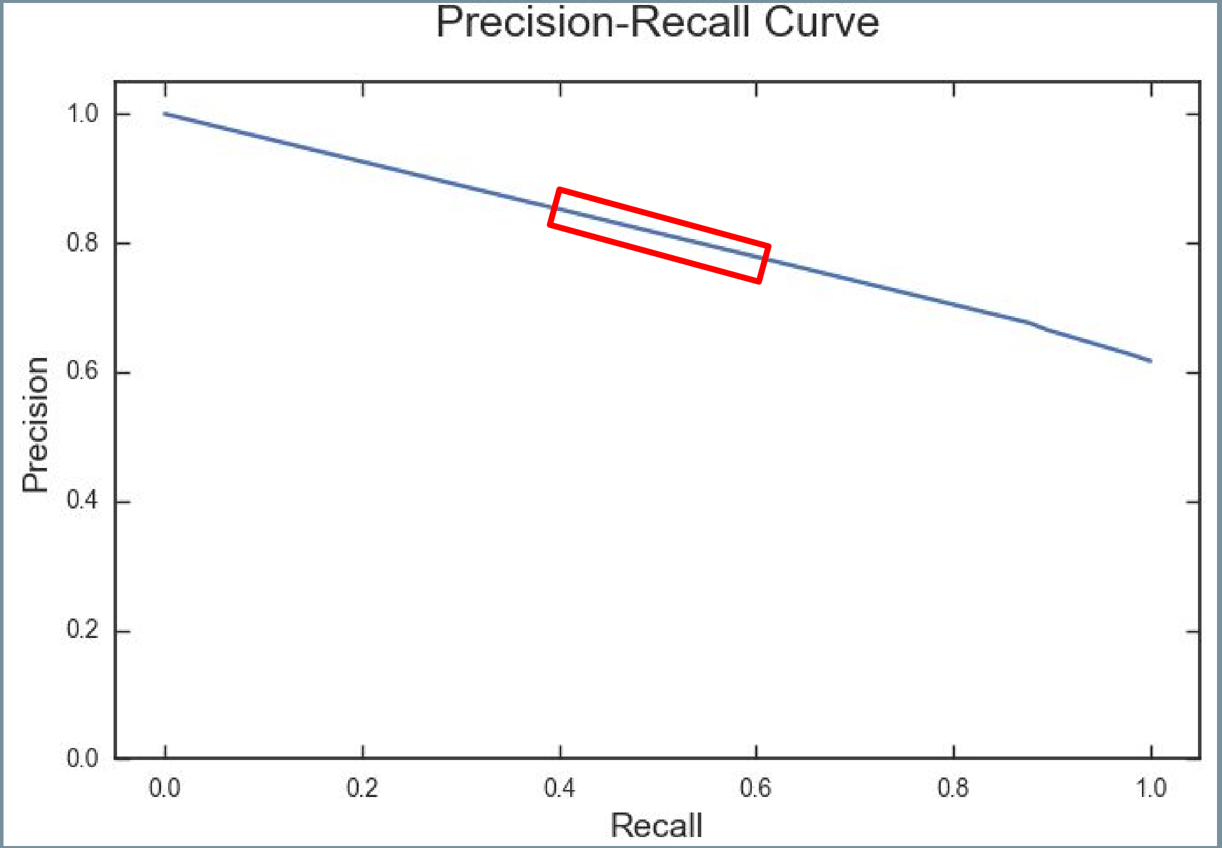
What went wrong?



- Small precision increases

- Logistic Regression model was always predicting the positive label

NLP → Multinomial NB → Stacking



- Find the balance between precision and recall

- No more guessing only the positive label

- Limited to ~10,000 obs.

Scores

- FBeta with a beta of 0.5 places a higher weight on precision.

- **Stacking** = Multinomial NB + RandomForest → Logistic Regression

Model:	**FBeta:**
Logistic Regression	0.487
Multinomial NB	0.693
Stacking	0.698

Visualization

Conclusions

Takeaways

- According to the model, ~70% FBeta is possible.
- When something goes wrong.. try again!

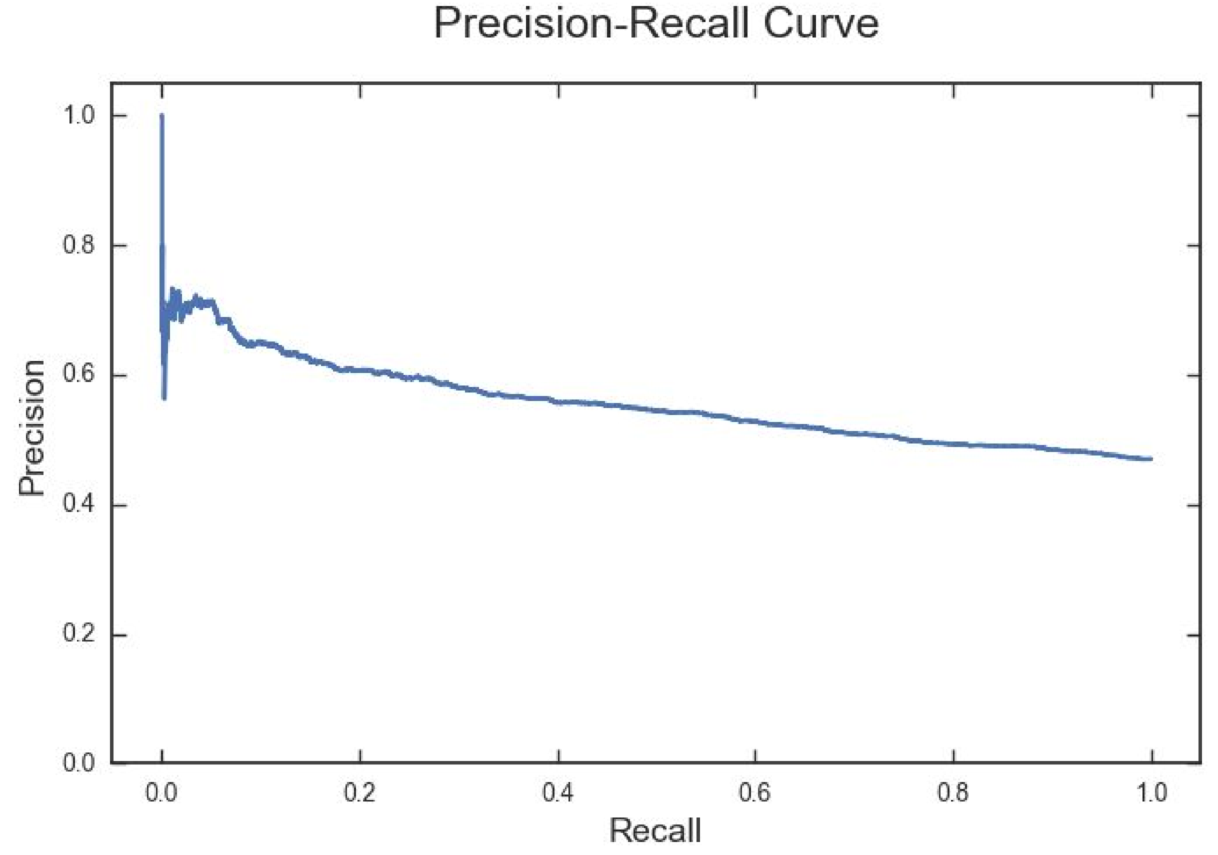
Future Works

Next steps

- Different combinations of stacking or boosting for better scores
- Find a way to use all of the available data rather than a subset of it.

Appendix

Logistic Regression



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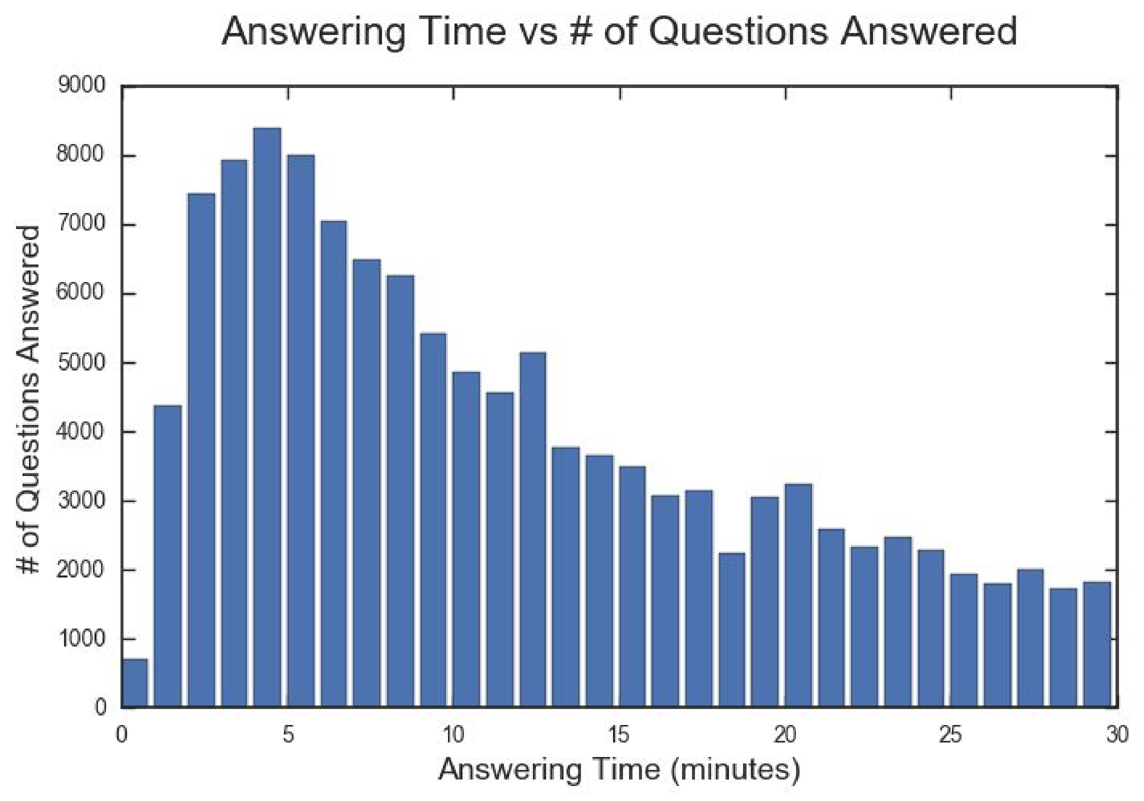

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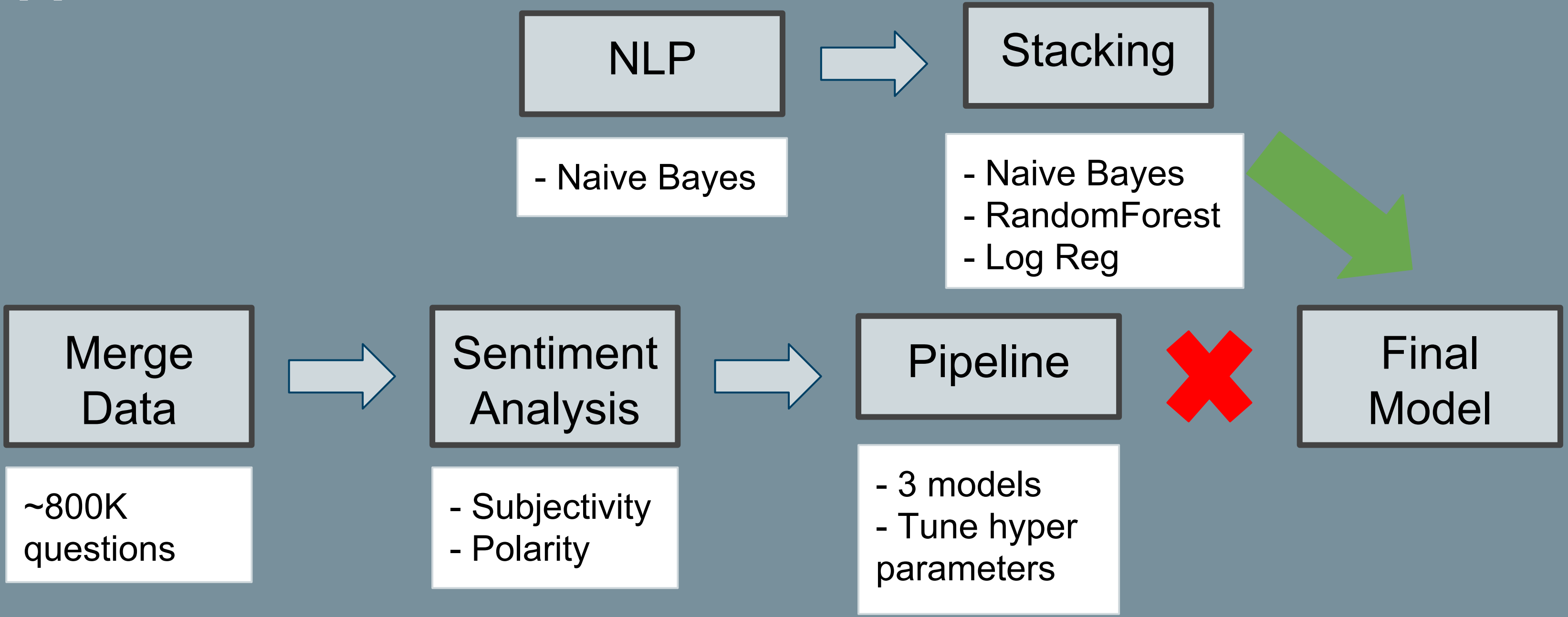

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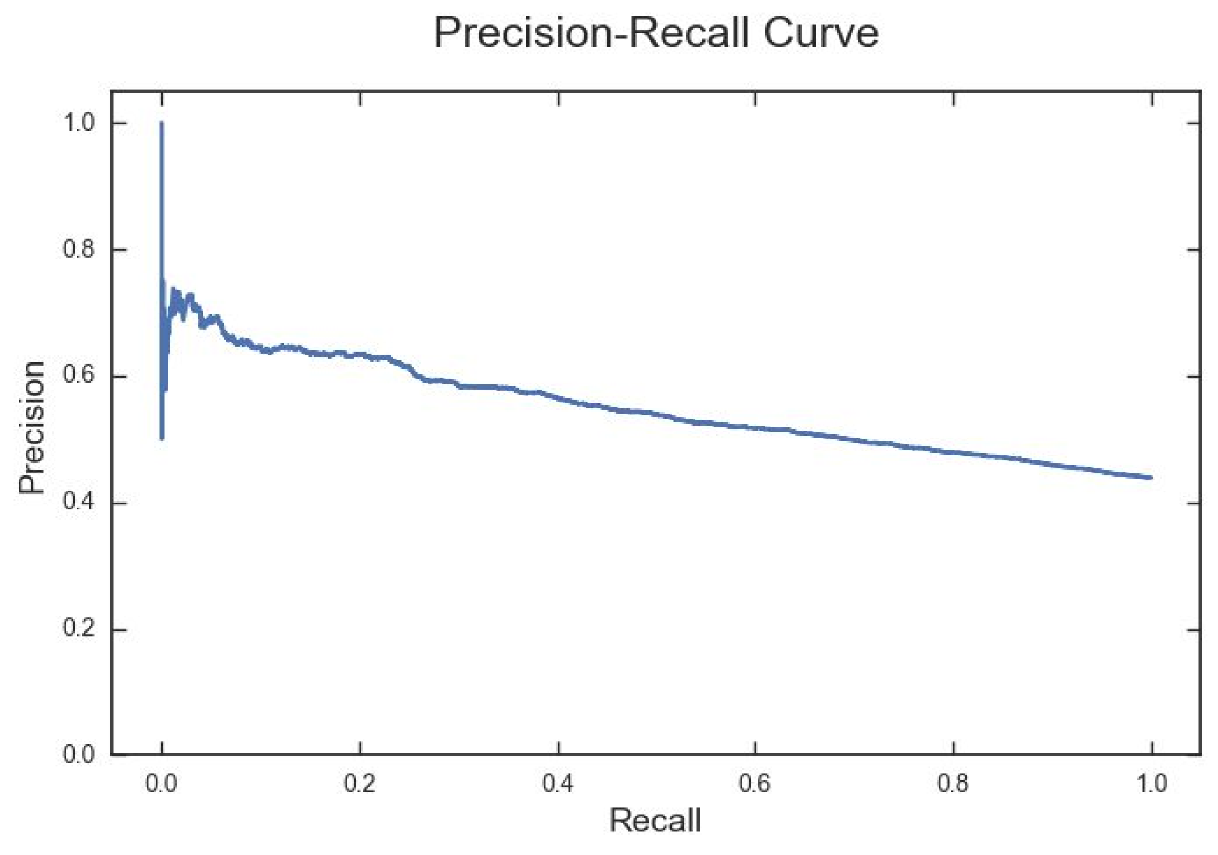

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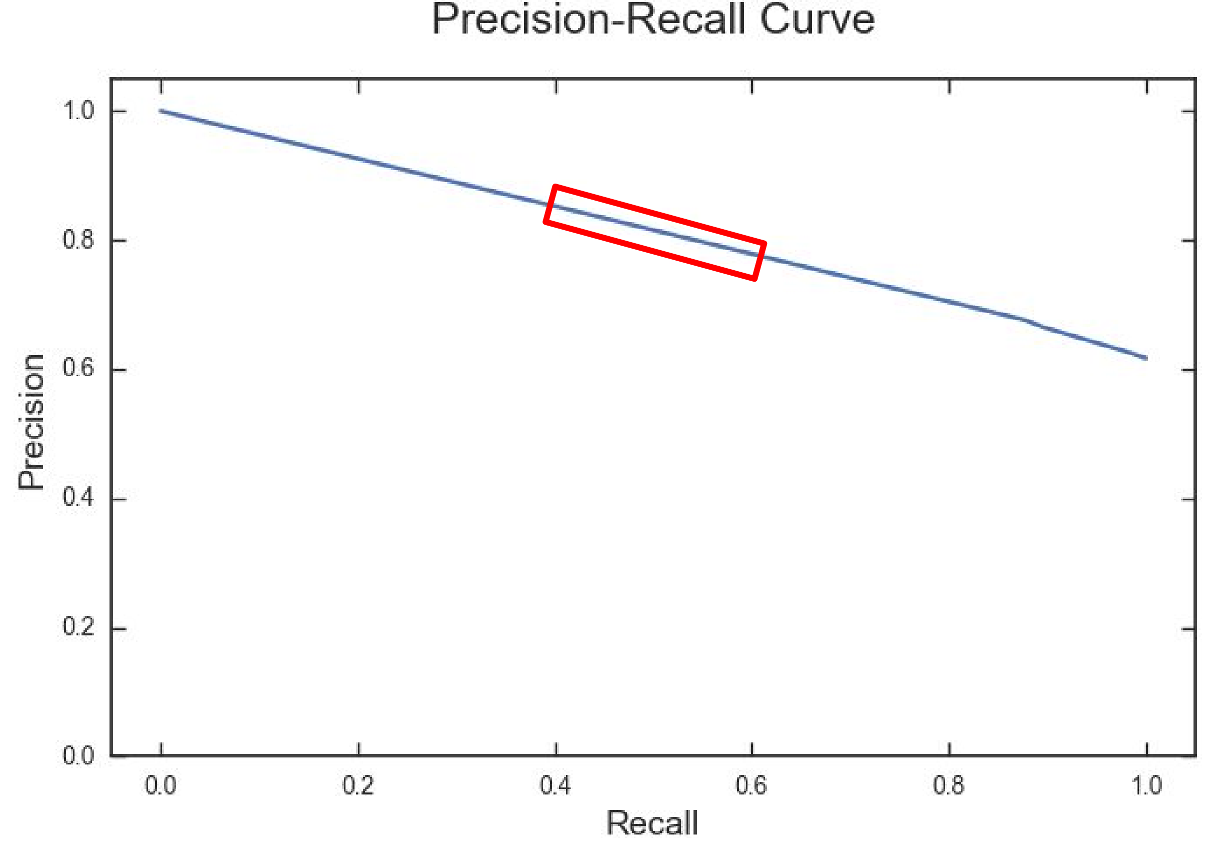

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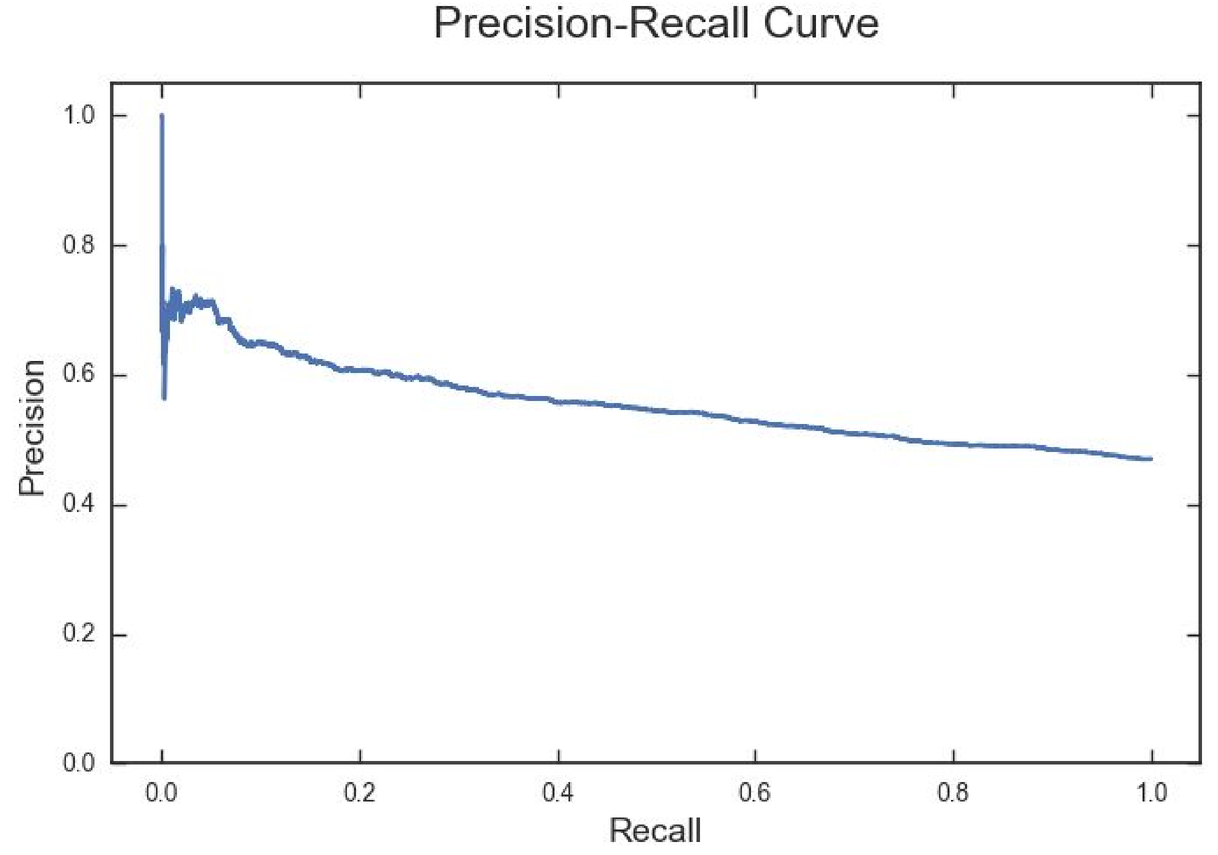
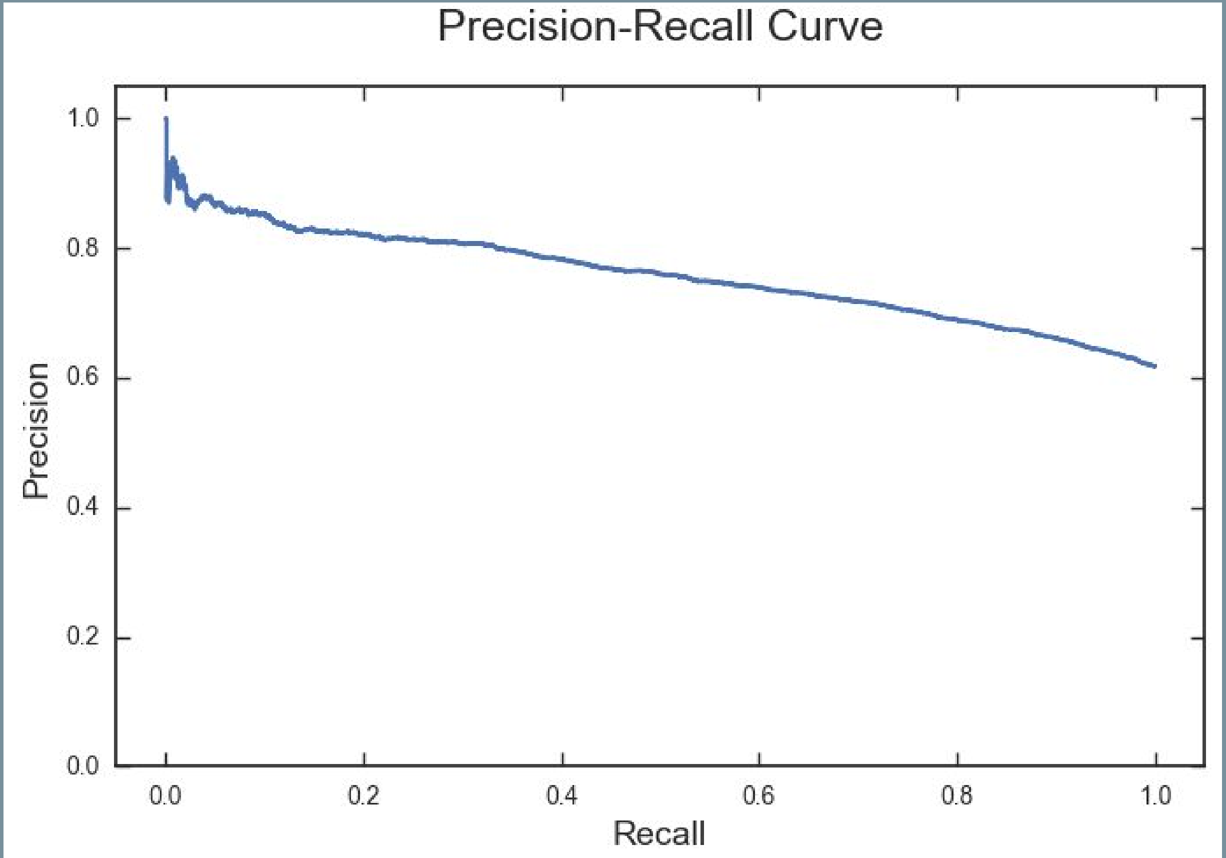
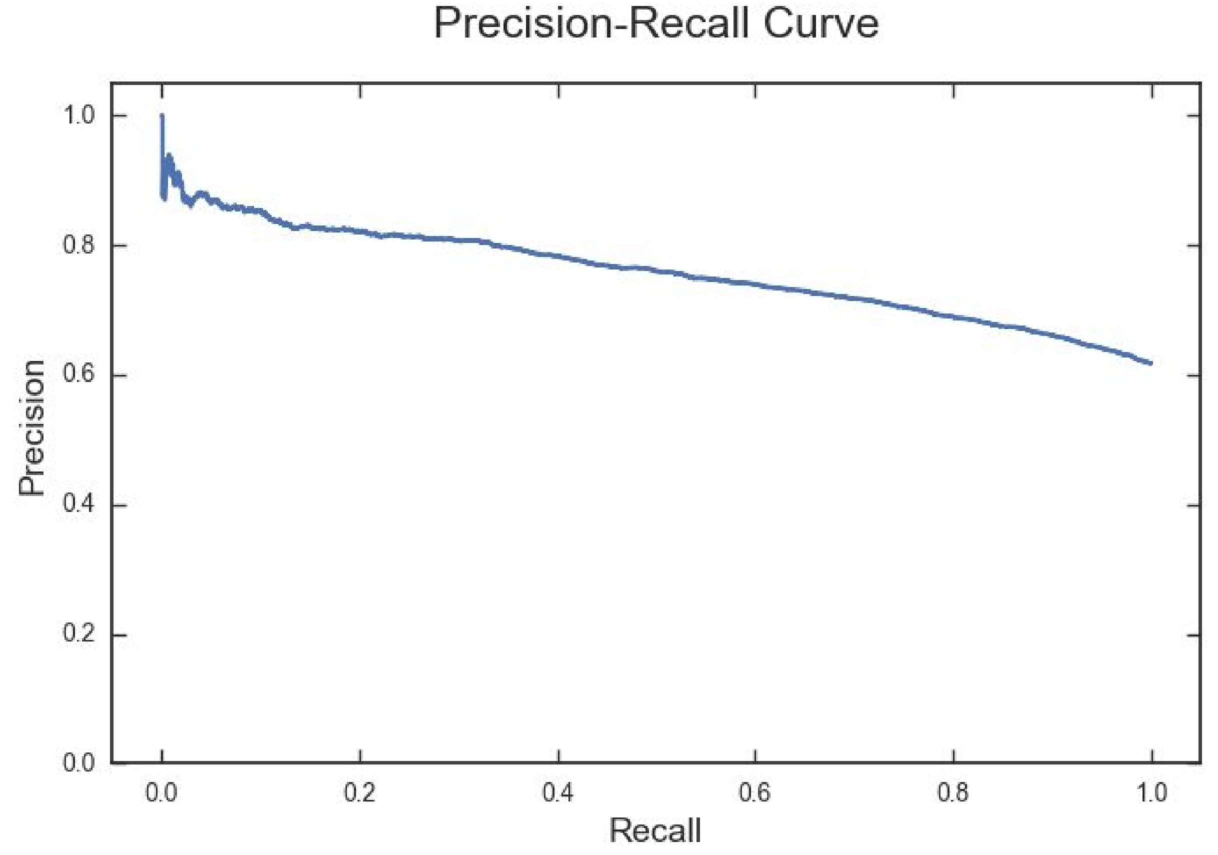


Multinomial NB



Multinomial NB


Precision-Recall Curve
Precision
Recall