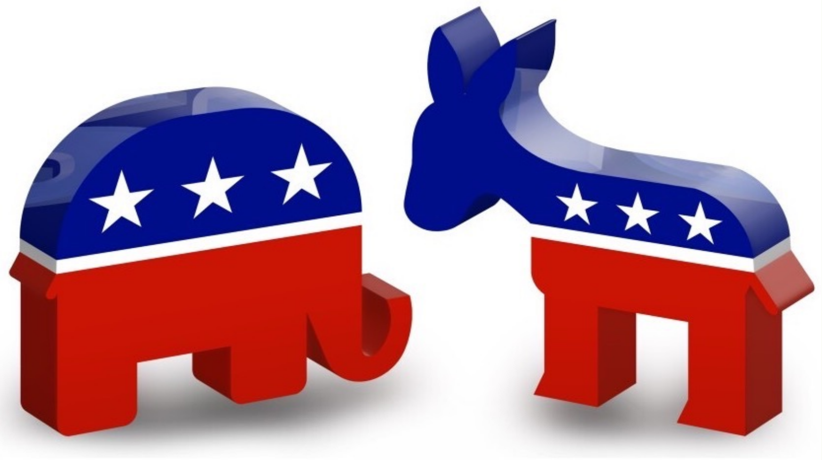
Differentiating Between Political Party Subreddits



Ben Moss

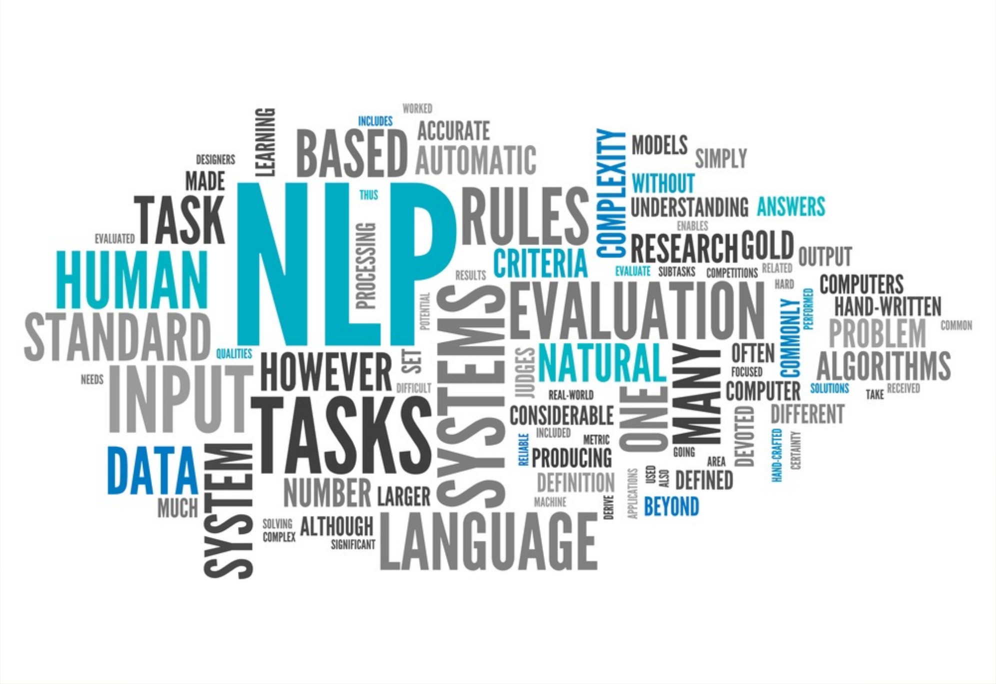
Data Science Immersive Program

General Assembly

January, 2024

Goals

- Create Natural Language Processing Models the predict subreddit content origin
- Choose the best ones suited for our goal which in this case will be *sensitivity :* The probability our model will correctly predict a title entry to be in the `democrats` subreddit (positive class, denoted `1`)
- ***The lines are more blurred than one may think!***



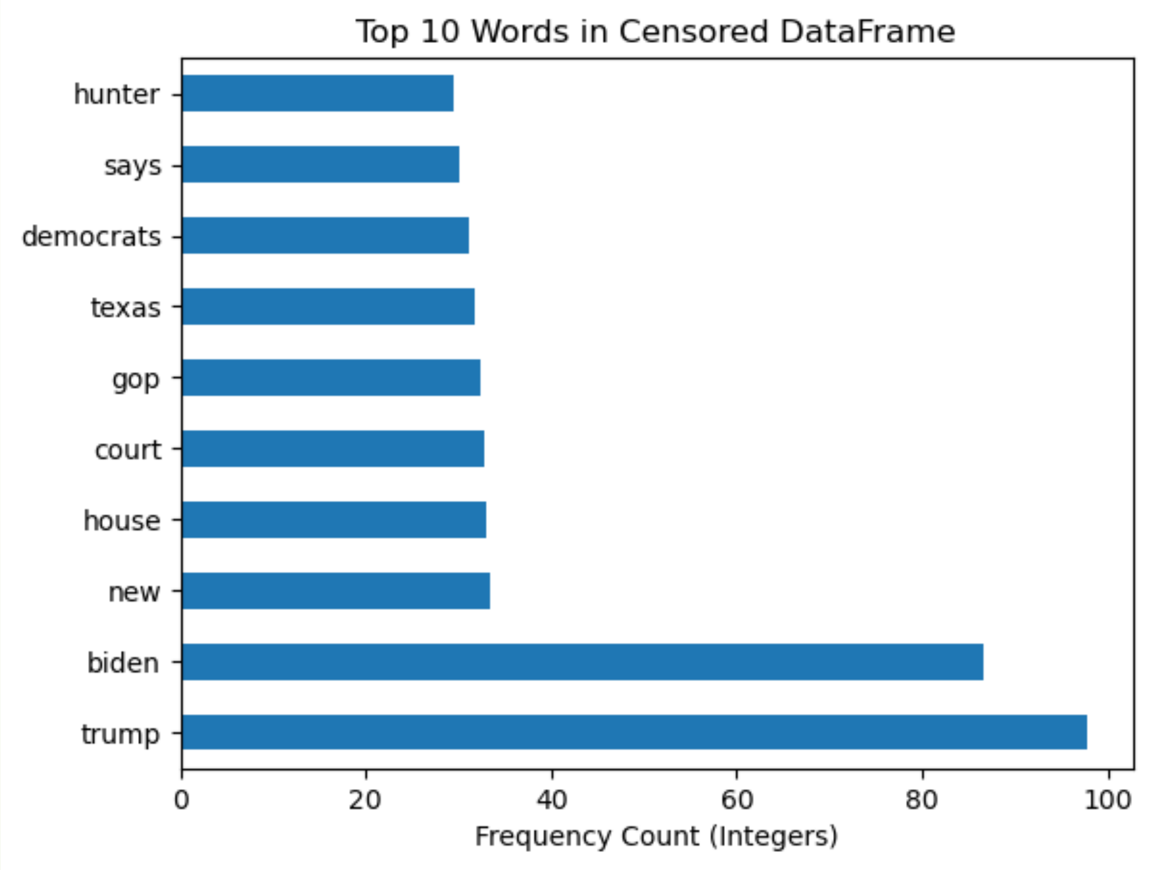
Data Gathering

- Worked with PRAW retrieving posts over several days
- Loaded data and performed EDA

subreddit
Dem: 1 0.528996
Rep: 0 0.471004

Modeling Pipeline

- First and foremost, Regex and censor functions utilized to clean data, literally!
- Several models were compared for efficacy (optimality along with standard classification metrics). The two top performing models were selected



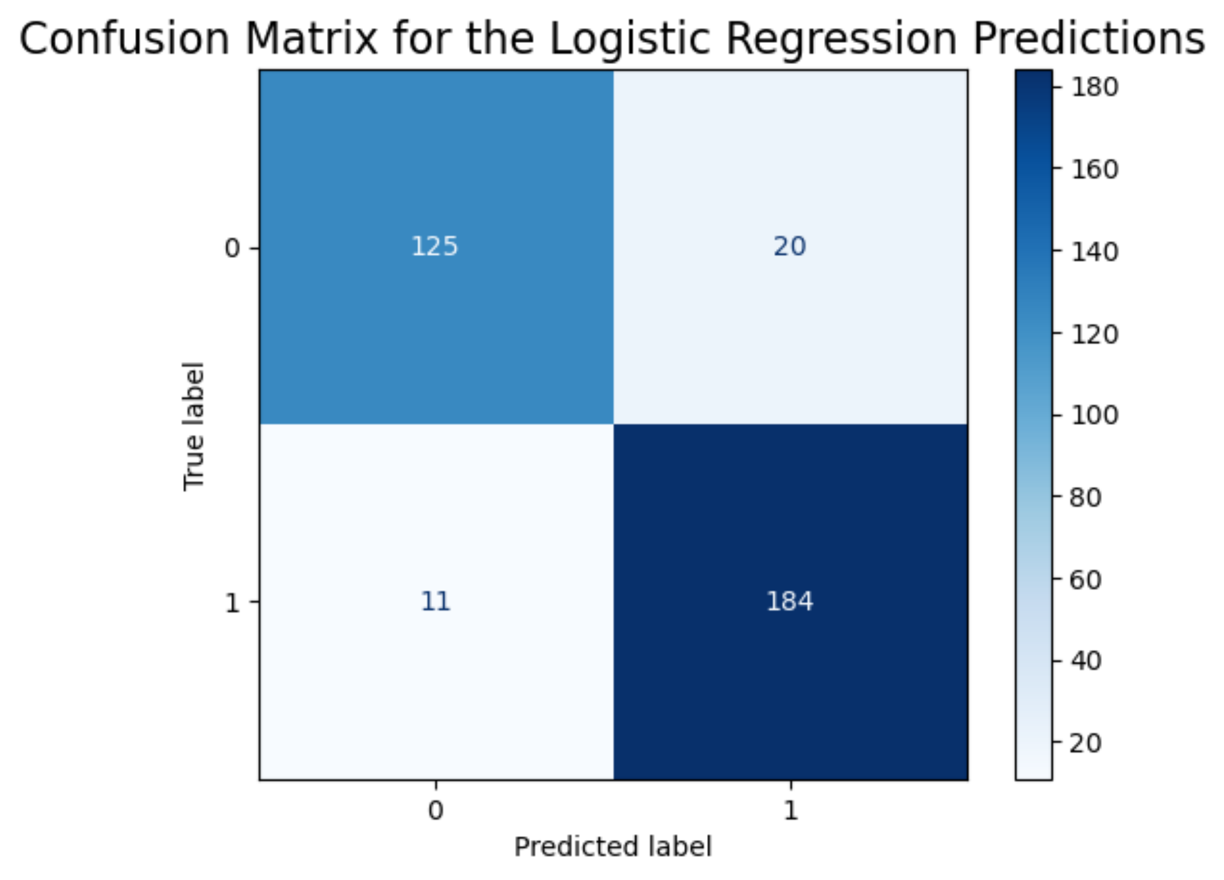
Deciding Upon NLP Models

- Best accuracy – optimal fit between test and train
- Classification Metrics

Model	CVEC Logistic Regression	*TVEC SVM*
Train Accuracy	**0.986**	***0.995***
Test Accuracy	**0.909**	***0.921***

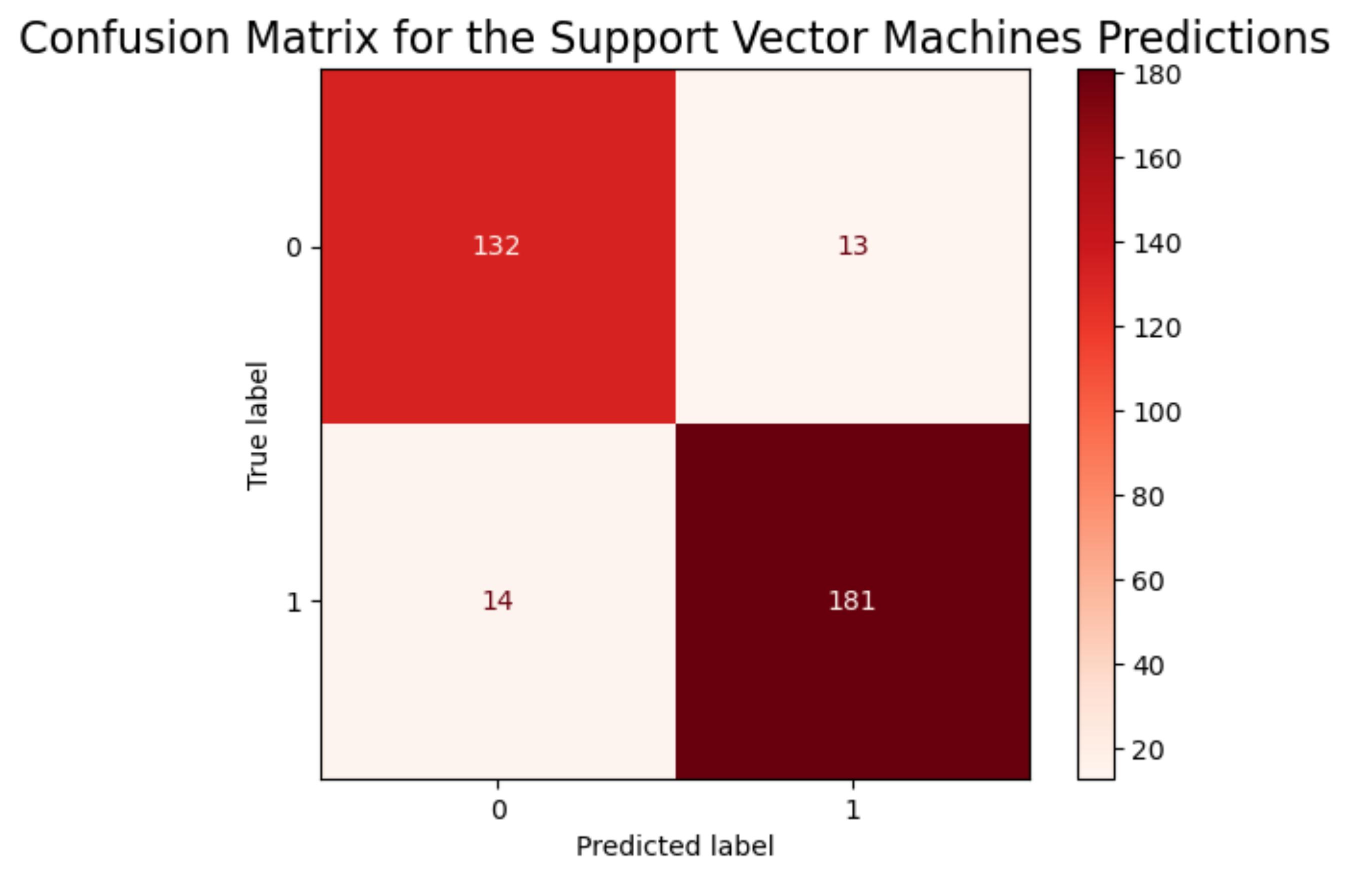
Classification Metrics

- LR (CVEC):
- Sensitivity | 0.944
- Specificity | 0.862
- Accuracy | 0.909
- Precision | 0.902
- Miscalculation Rate | 0.091



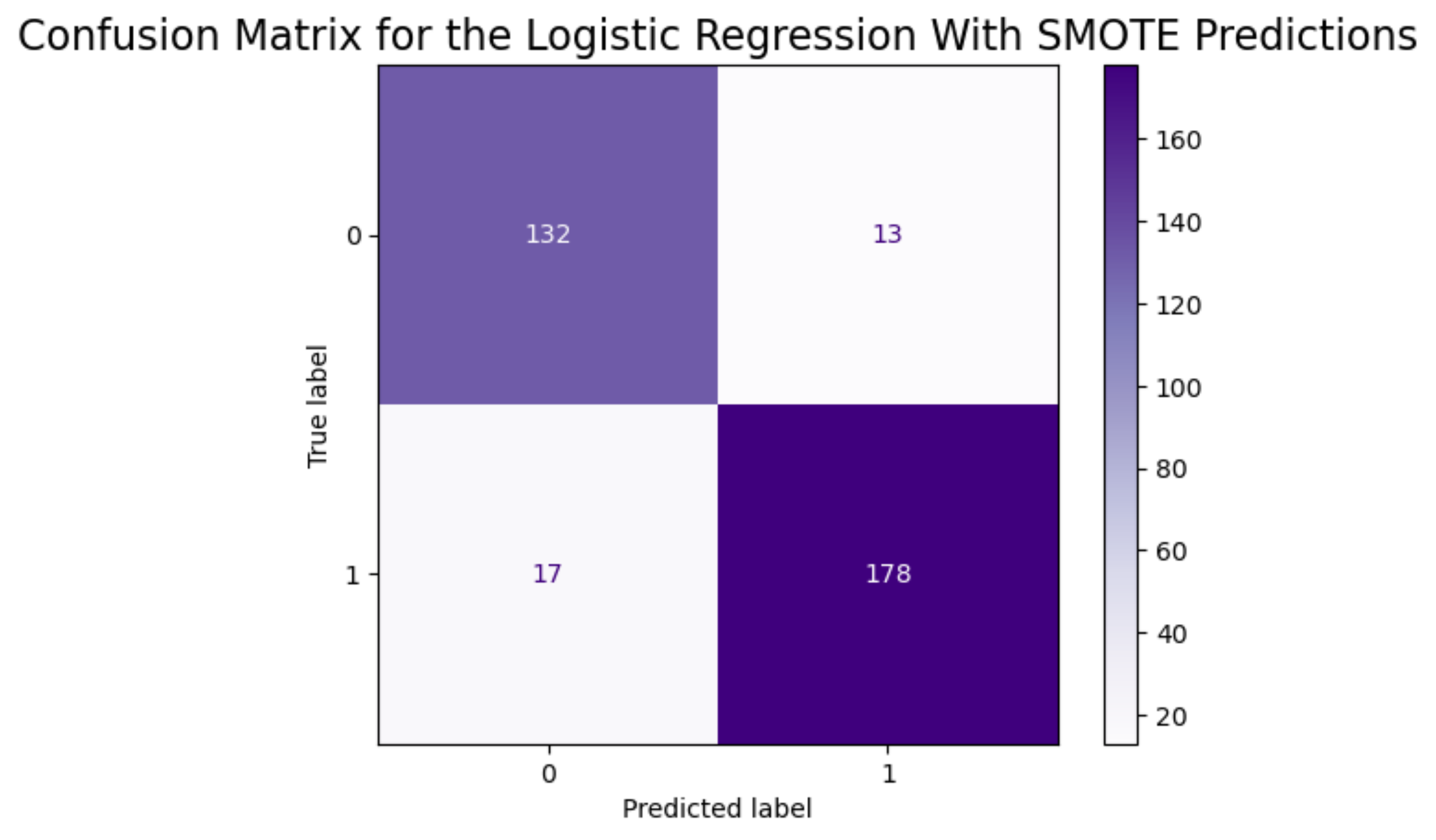
Classification Metrics (Continued)

- SVM (TVEC):
- Sensitivity | 0.928
- Specificity | 0.91
- Accuracy | 0.921
- Precision | 0.933
- Miscalculation Rate | 0.079



BONUS: Logistic Regression with SMOTE

- LR (CVEC) SMOTE:
- Sensitivity | 0.913
- Specificity | 0.91
- Accuracy | 0.912
- Precision | 0.932
- Miscalculation Rate | 0.088



Side-by-Side Classification Metric Comparison

Model	LR (CVEC)	*SVM (TVEC)*	LR (CVEC) SMOTE
Sensitivity	*0.944*	0.928	0.913
Specificity	0.862	*0.91*	*0.91*
Accuracy	0.909	*0.921*	0.912
Precision	0.902	*0.933*	0.932
Miscalculation Rate	0.091	*0.079*	0.088

Recommendations

- Exclude comments (formatting issue)
- Import more of one set to form an even split (when one is more active)
- Use not only optimal model but ones that return the desired classification metrics for intended purposes (sensitivity in this case)
- In this case, avoid random sampling, utilize selective sampling (best subset)

Conclusion

- Optimal Model: SVM (TVEC)
- Goal of our model: prioritize sensitivity, this result was achieved
- In this study, *SVM* outperformed *logistic regression.*
- Successfully able to differentiate between political supporters of two distinct parties.

Sources

- Course work, lessons, Reddit, PRAW, .sklearn documentation centers