# Ancient Texts NLP & Classification Project

## Insights from Balance and Preparation

*All code at https://github.com/izsolnay/Ancient_NLP*

## OVERVIEW

### Objective

Develop a reliable machine learning model which can classify ancient texts into genres to reveal insights

### Problem

Target variable 'is_hymn' was unbalanced

- 'is_hymn=0' had on average over twice as many words per text (718/266)
- 'is_hymn=1' had almost twice as many texts (250/131)

| is_hymn | count | mean | std | min | 25% | 50% | 75% | max |
|---|---|---|---|---|---|---|---|---|
| 0 | 131.0 | 718.0 | 854.0 | 8.0 | 151.0 | 359.0 | 1052.0 | 5304.0 |
| 1 | 250.0 | 266.0 | 326.0 | 4.0 | 108.0 | 175.0 | 305.0 | 2836.0 |

## PROJECT STATUS

### Steps taken

- Merged columns from 'all_texts_sentiment.csv' and 'top_word_df.csv' into a new DataFrame
- Introduced new feature 'sentence_count' and binary target variable 'is_hymn'
- Balanced target variable creating 'summary' and 'lemmatized_summaries' features
- Generated visuals

### Result: a more balanced data set

| is_hymn | count | mean | std | min | 25% | 50% | 75% | max |
|---|---|---|---|---|---|---|---|---|
| 0 | 154.0 | 396.0 | 294.0 | 37.0 | 152.0 | 310.0 | 630.0 | 1192.0 |
| 1 | 210.0 | 257.0 | 217.0 | 31.0 | 114.0 | 185.0 | 337.0 | 1169.0 |

## NEXT STEPS

### Move forward with model building

A binomial logistic model (rather than linear) is selected because it is a statistical technique that models the probability y of an event ('is_hymn') based on one (or more) independent variables.

### Steps

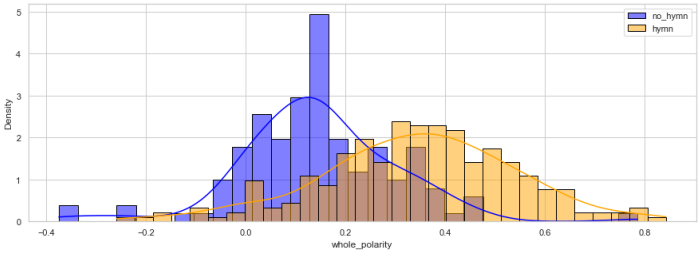
- Consider upscaling 'is_hymn=0' to balance target variable counts
- Check data correlations using VIF and Pearson's
- Build and validate random forest and XGBoost models
- Compare models, test winning model
- Get feature importances
- Create visual evaluations

## KEY INSIGHTS

### Density Histograms

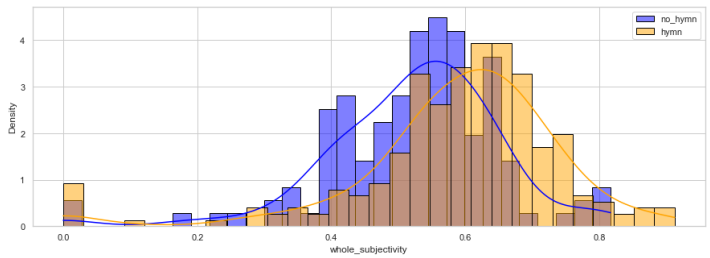
*Density histograms provide visual representations of the relationships between 'is_hymn' variable and text polarity and subjectivity, highlighting trends in positivity and truthfulness based on assigned values.*

#### Whole polarity scores after balancing data set




- The curve for 'hymn=0' shows a concentration of lower polarity scores, indicating a tendency towards less positive texts
- The curve for 'hymn=1' exhibits a higher polarity score predominance, suggesting a greater likelihood of more positivity

#### Whole subjectivity scores after balancing data set




- The curve for 'is_hymn =0' shows a concentration of lower subjectivity scores, indicating a tendency towards more objective (truthful) texts
- The curve for 'is_hymn =1' exhibits a shift towards higher subjectivity scores, reflecting a greater likelihood of subjectivity (less truthfulness)