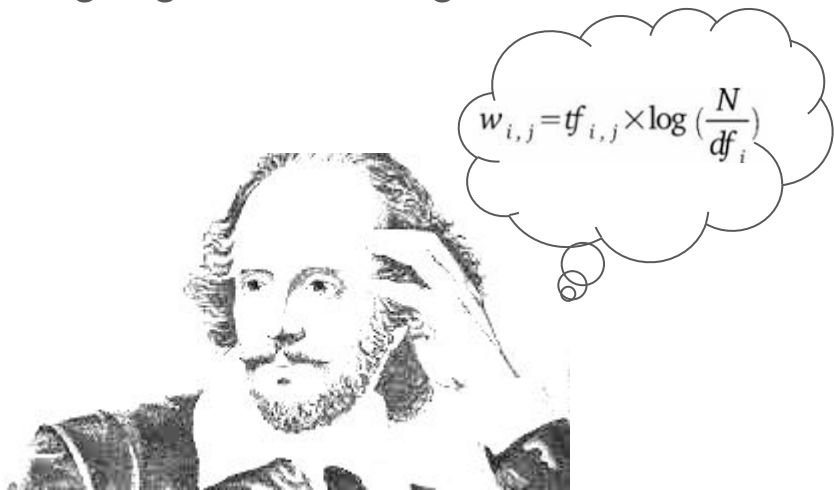


# NLP in Five Acts

Analysis of Selected Shakespearean Comedies and Tragedies...and Tragi-Comedies; Using Natural Language Processing



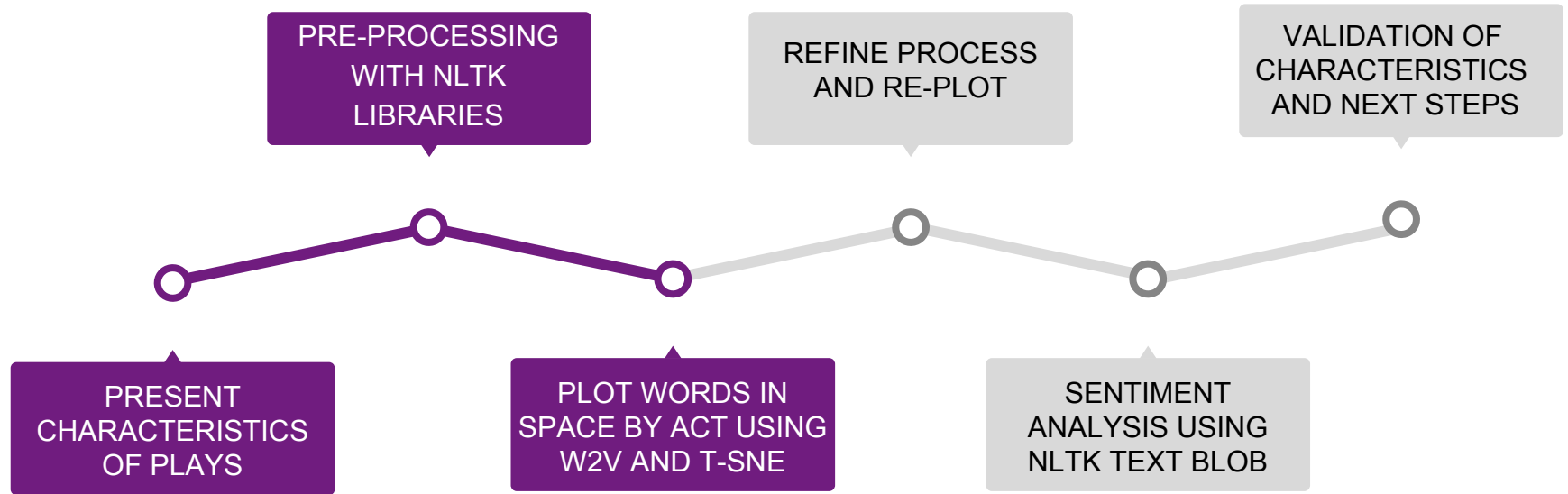
## **COMEDIES**

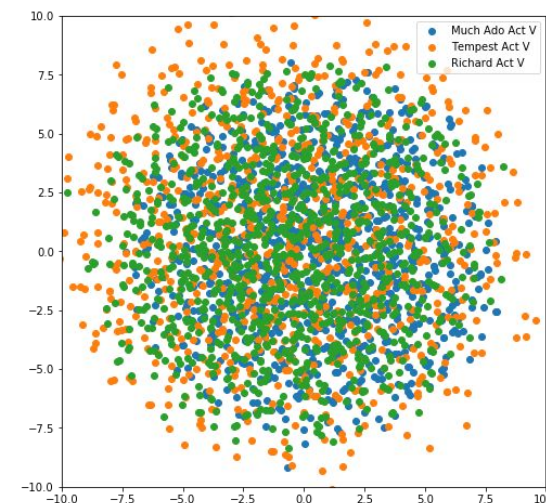
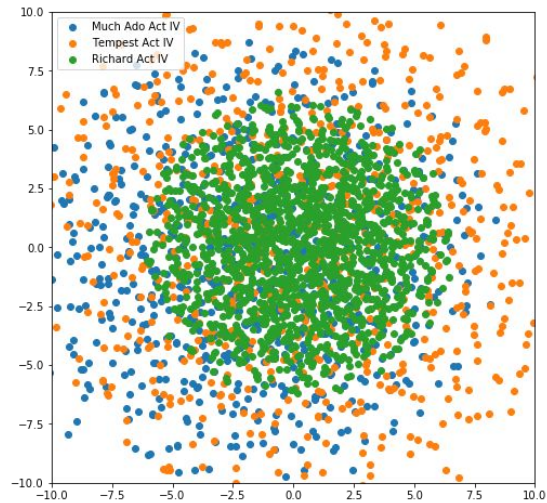
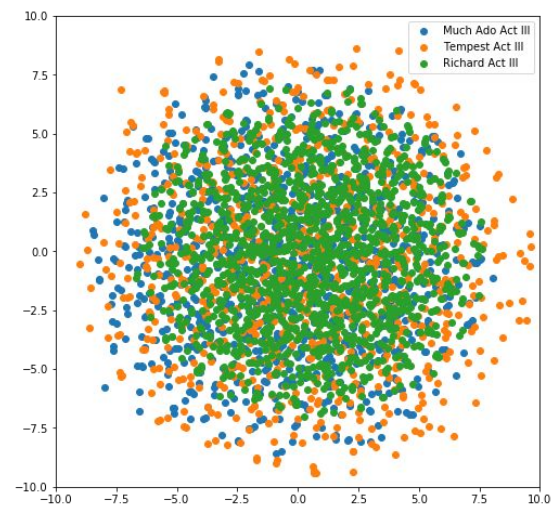
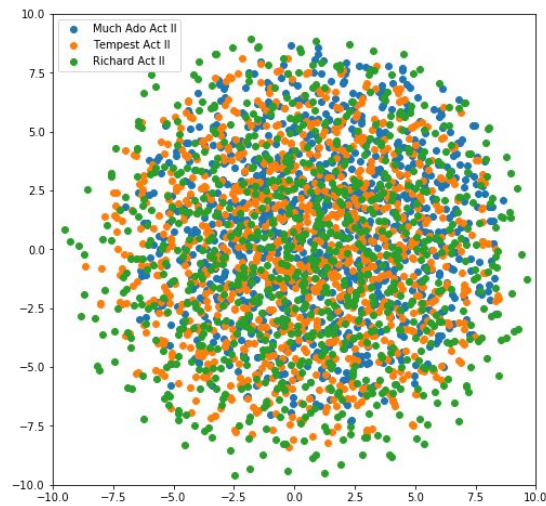
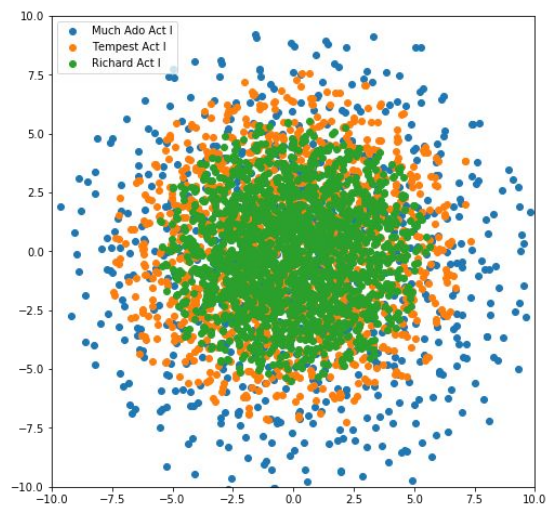
- A struggle of young lovers: Element of separation and reunification
- Mistaken identities, often involving disguise
- The intelligent servant/clown
- Family tensions
- Complex, interwoven plot-lines

## **TRAGEDIES**

- Social breakdown and isolation of characters
- Death
- Inevitability
- Central flawed figure

# Process





% of Text Spoken by RICHARD III

ACT I 0.145

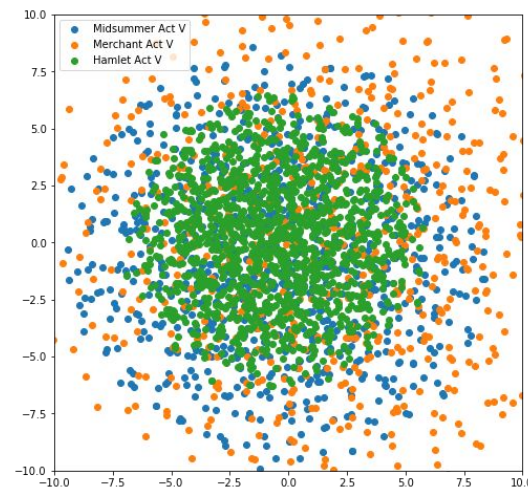
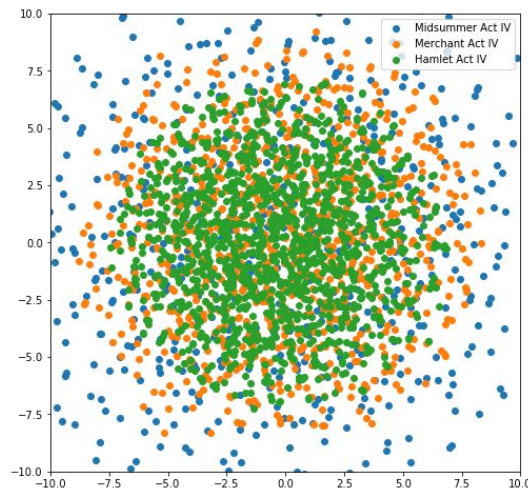
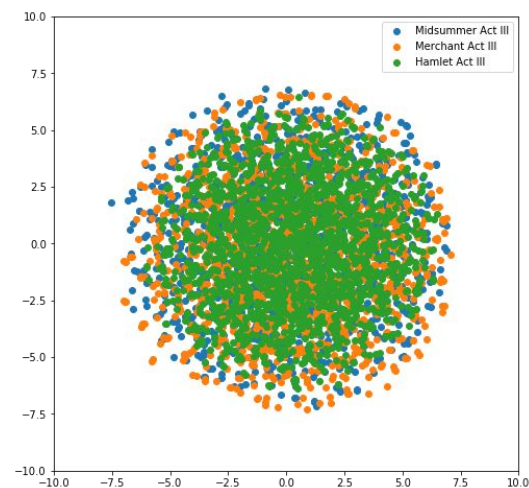
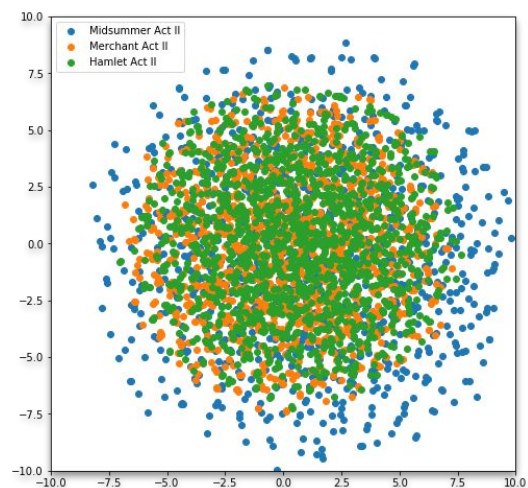
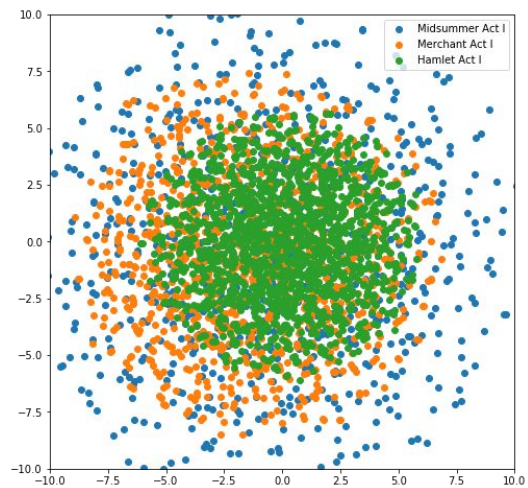
ACT II 0.064

ACT III 0.150

ACT IV 0.180

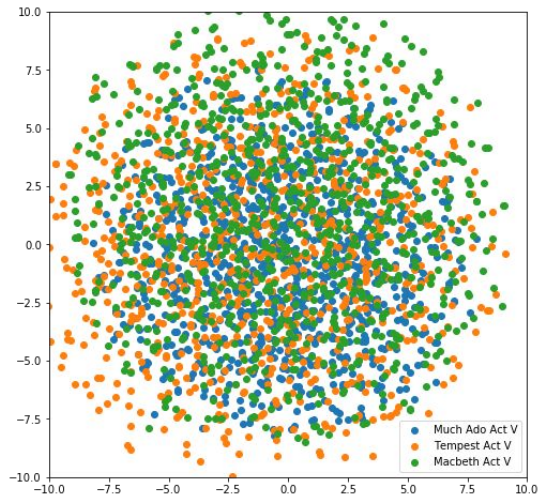
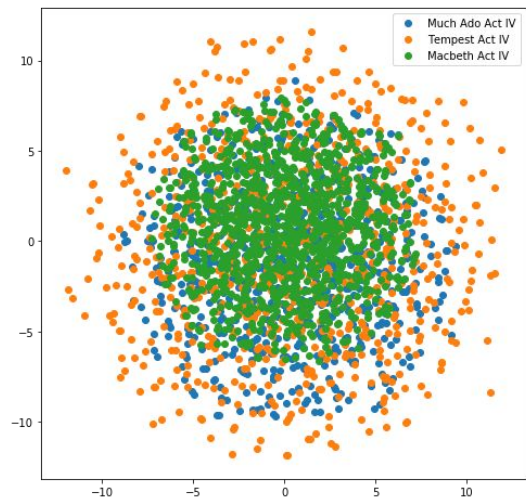
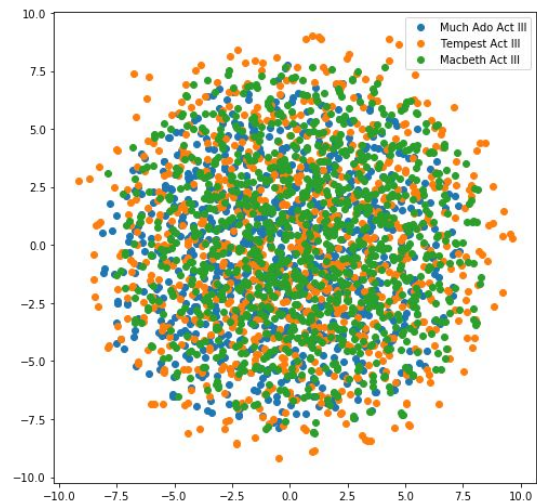
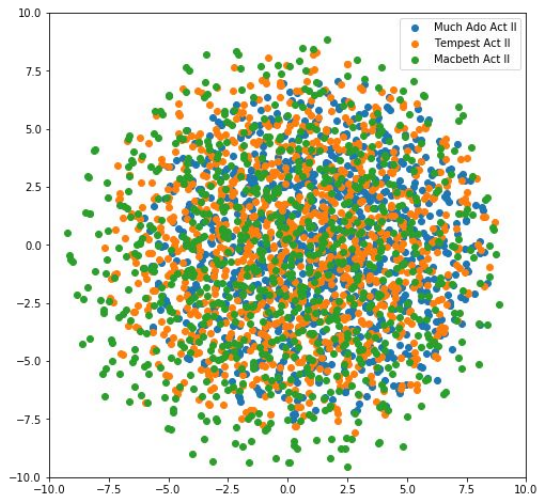
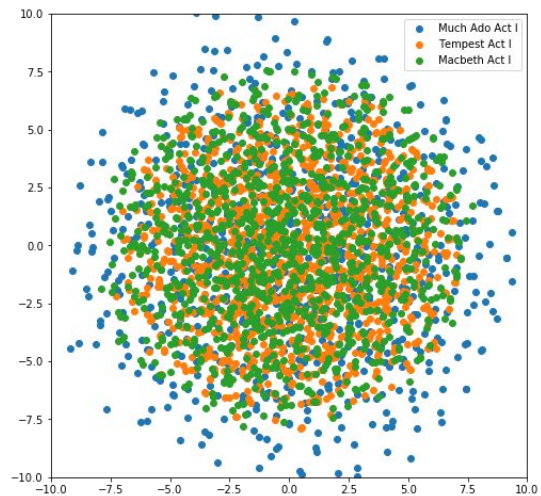
ACT V 0.107

W2V → T-SNE



W2V  $\rightarrow$  T-SNE

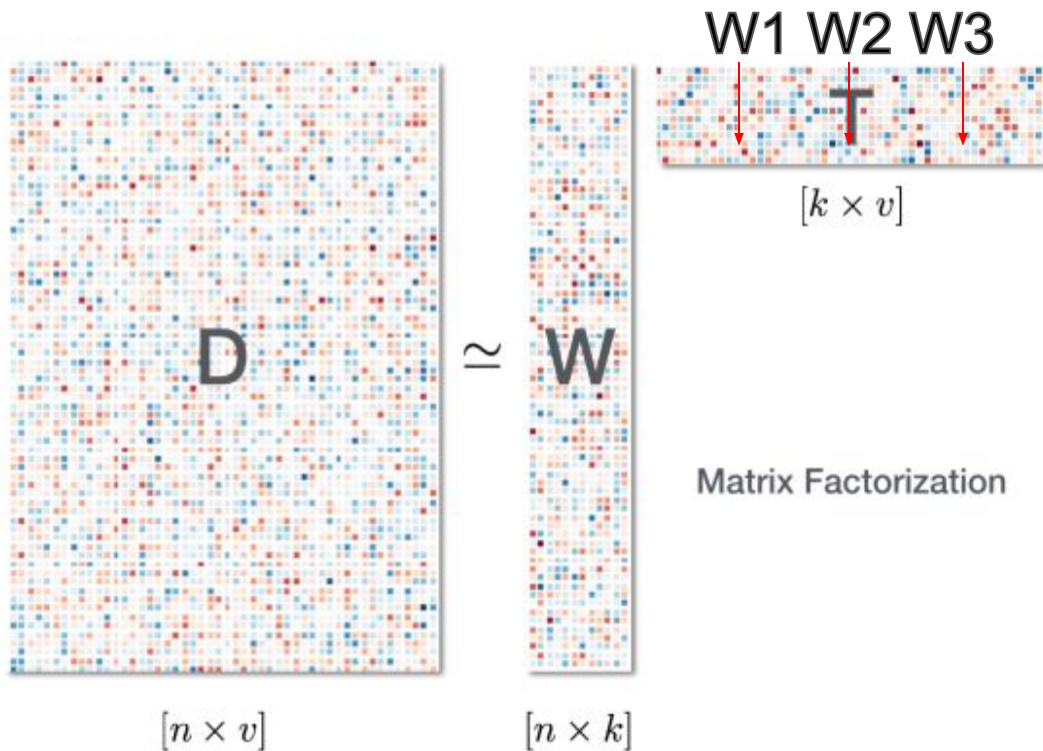




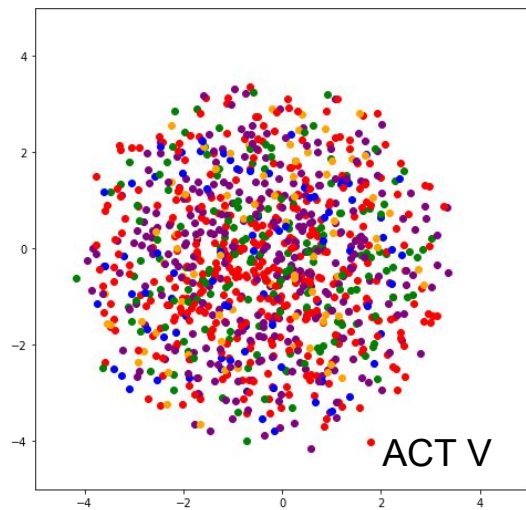
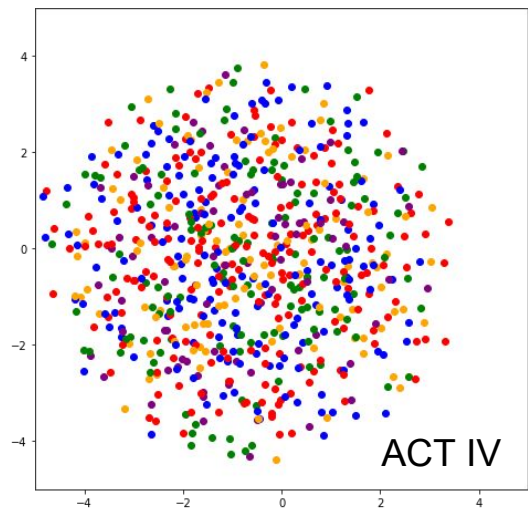
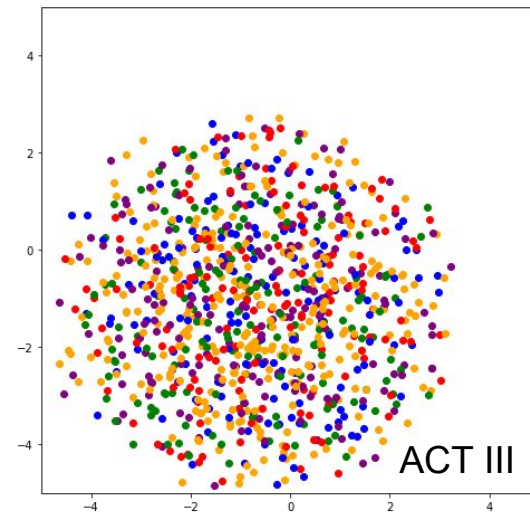
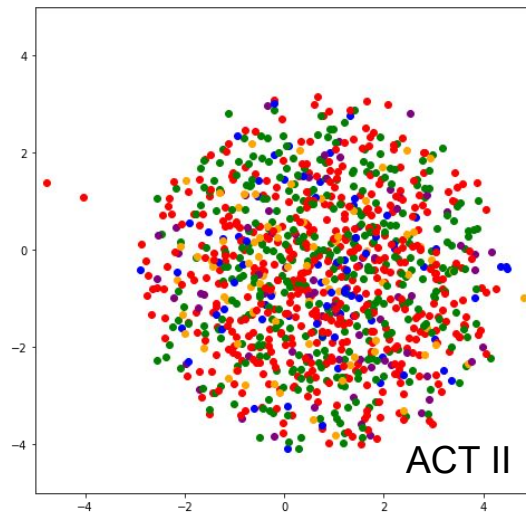
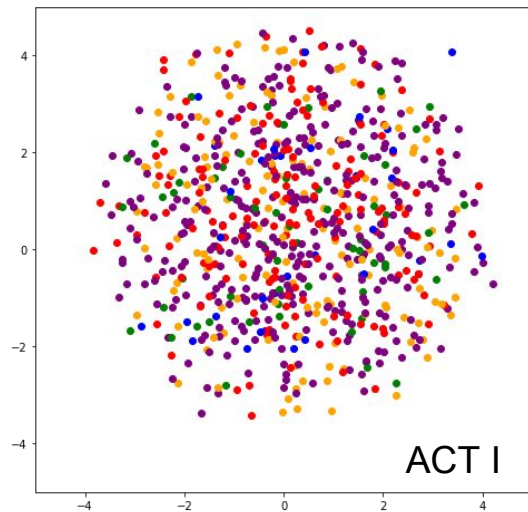
W2V  $\rightarrow$  T-SNE

TFIDF  $\rightarrow$  NMF  $\rightarrow$  T - SNE

W2V  $\nearrow$



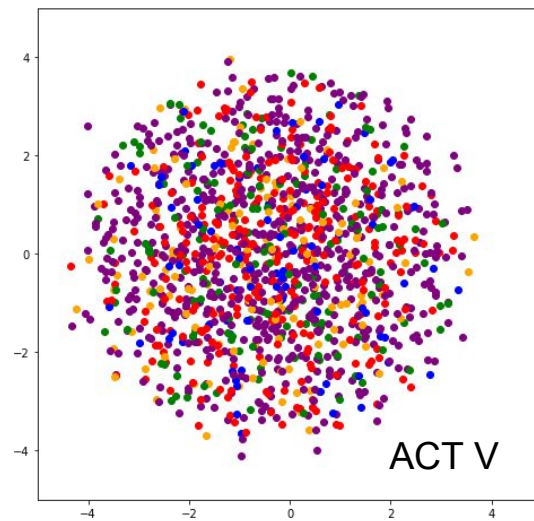
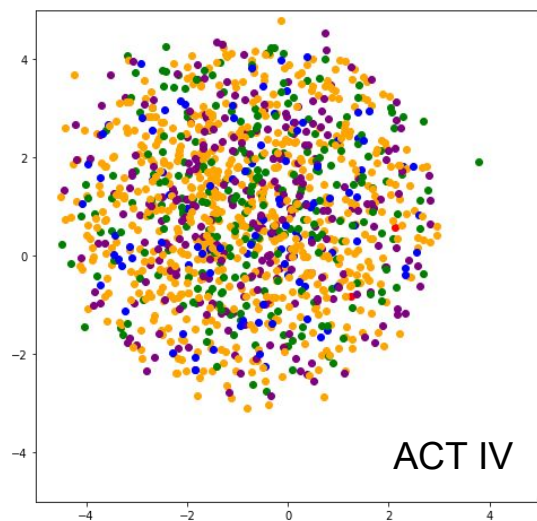
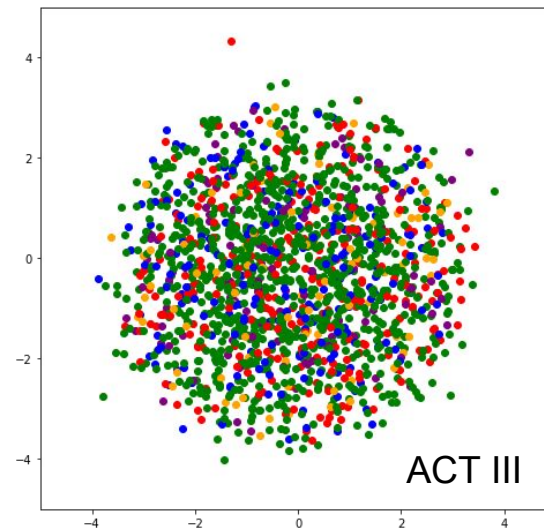
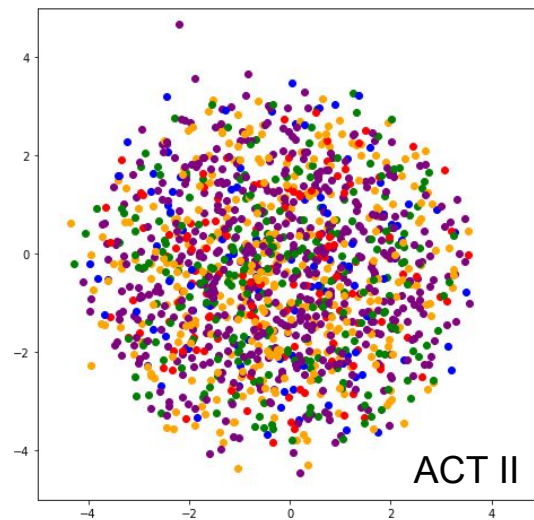
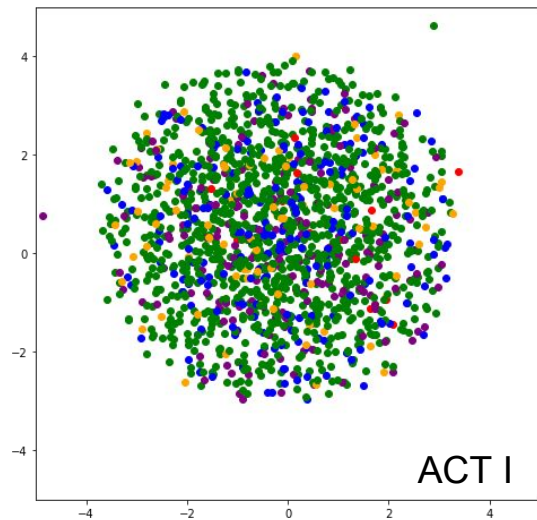
Assign words to  
highest probability  
topic



***Much Ado About  
Nothing*** by Act  
(Colors represented by  
topics:0-4)

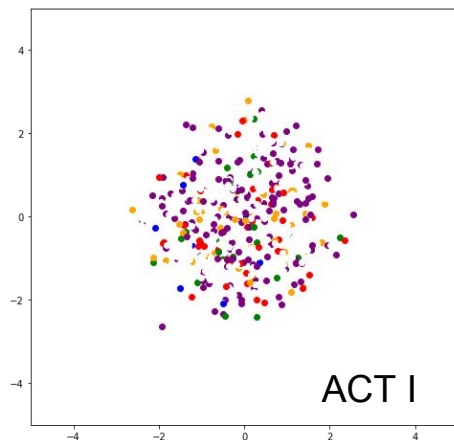
Topic 0 ●  
Topic 1 ●  
Topic 2 ●  
Topic 3 ●  
Topic 4 ●



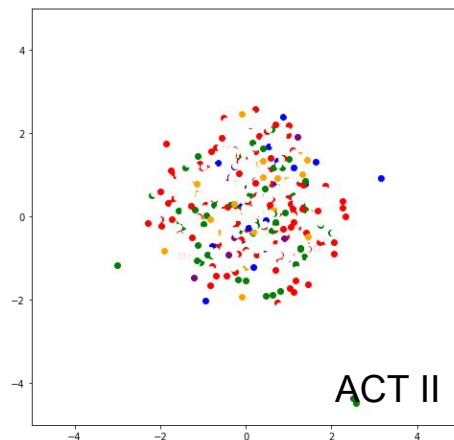


***Hamlet*** by Act  
(Colors represented by  
topics:0-4)

- Topic 0 ●
- Topic 1 ●
- Topic 2 ●
- Topic 3 ●
- Topic 4 ●



***Much Ado About Nothing* by Act**



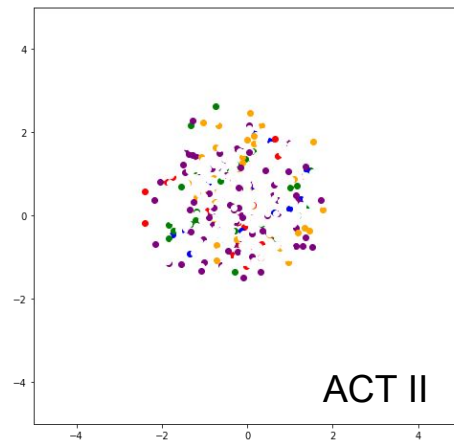
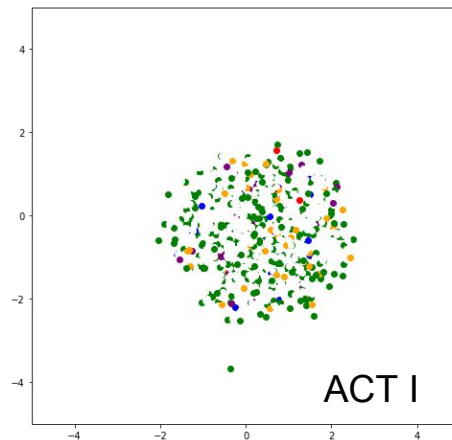
Plot only those words  
with > 97% of being in a  
single topic

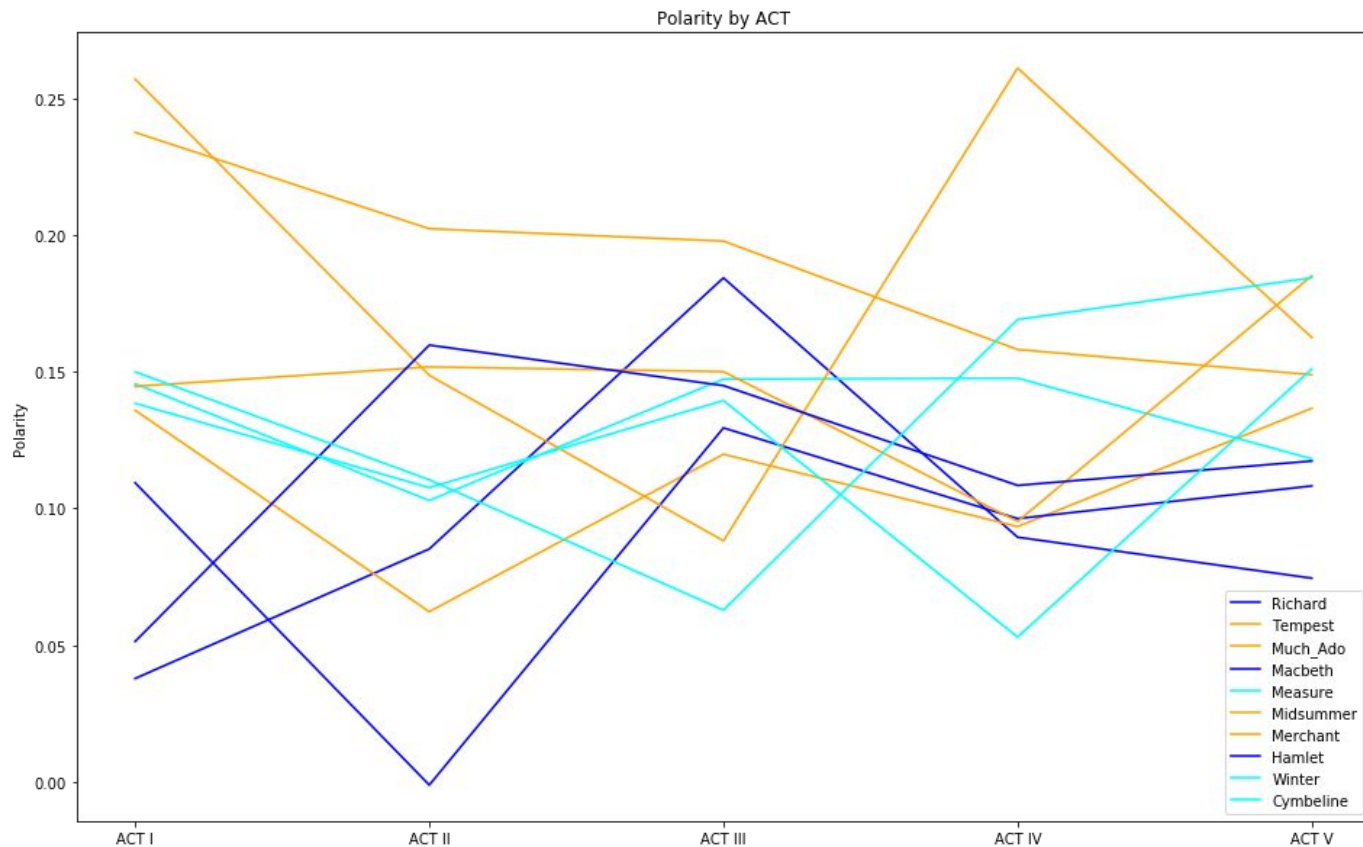


(Colors represented by  
topics:0-4)

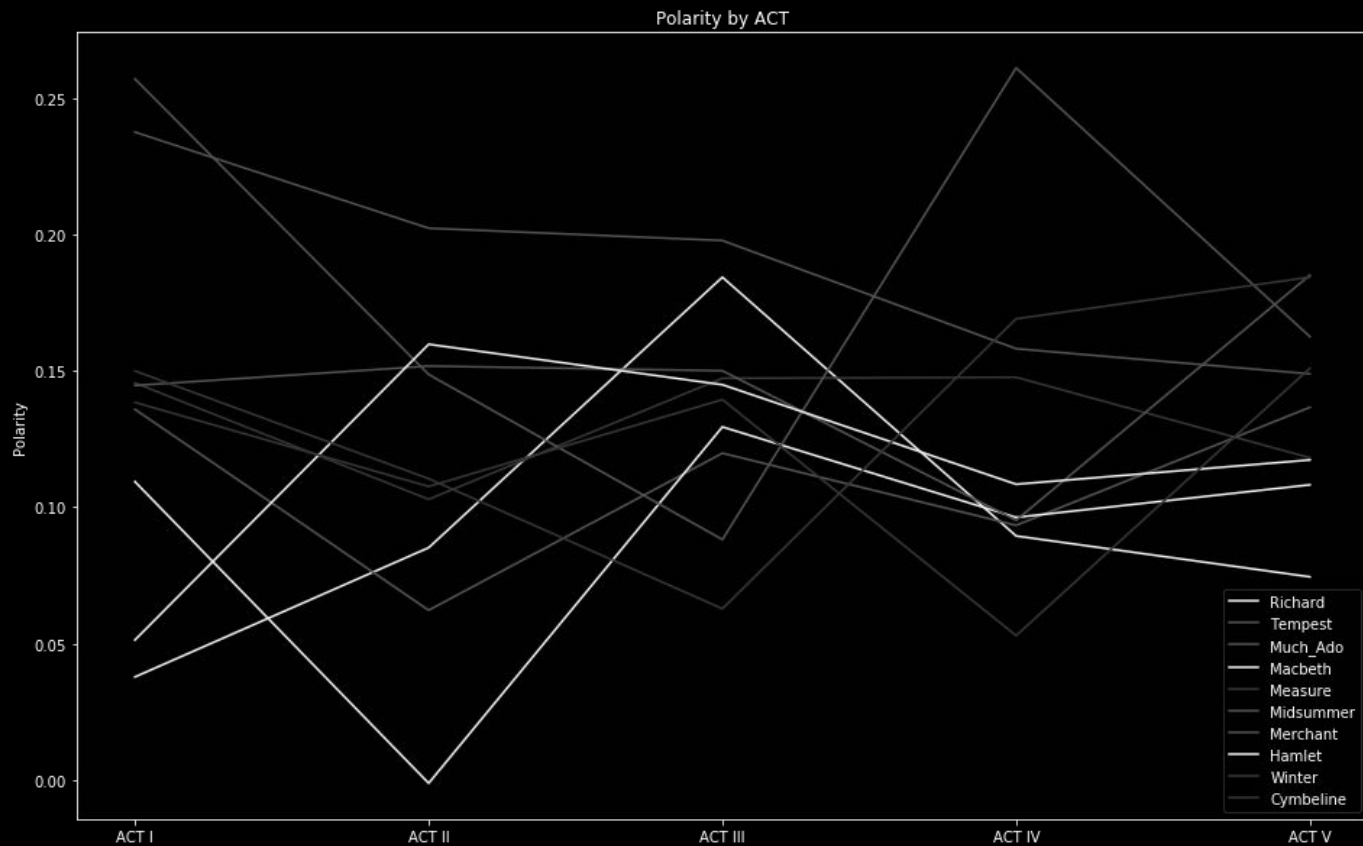
- Topic 0 ●
- Topic 1 ●
- Topic 2 ●
- Topic 3 ●
- Topic 4 ●

***Hamlet* by Act**



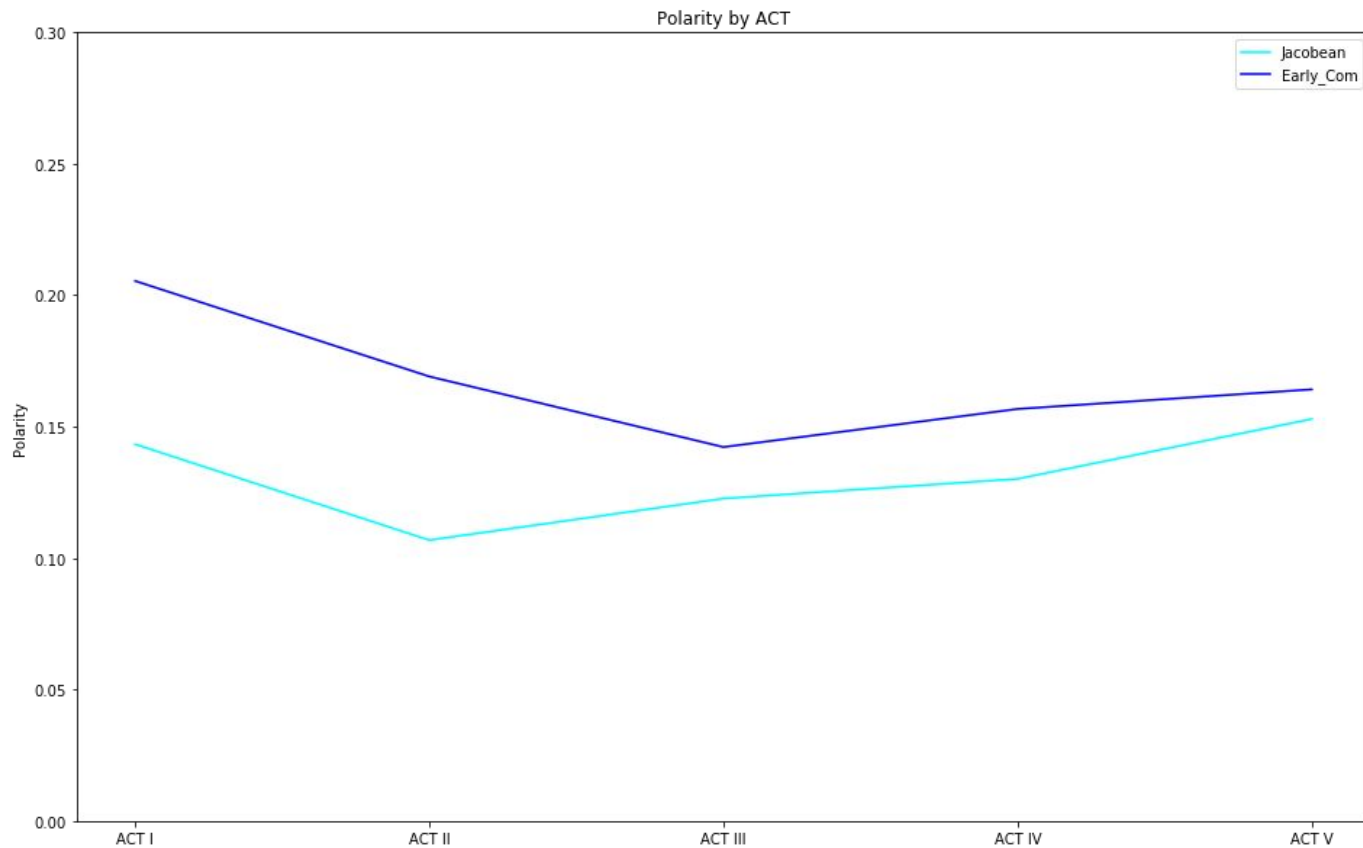


Polarity of Tragedies,  
Early Comedies and  
Tragi-Comedies by Act

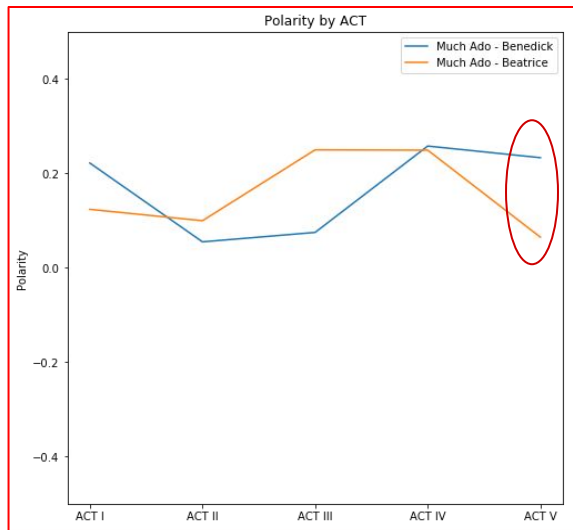
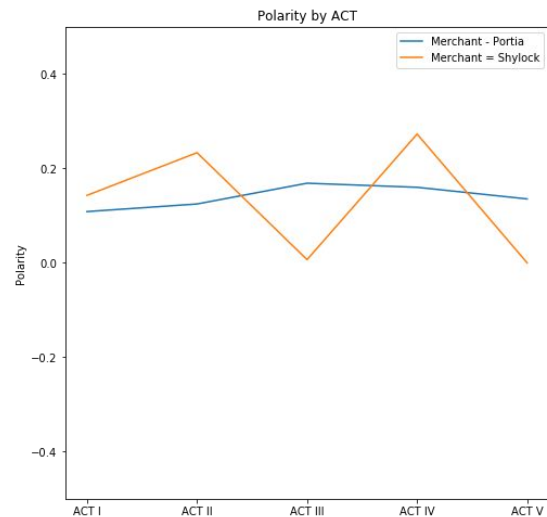
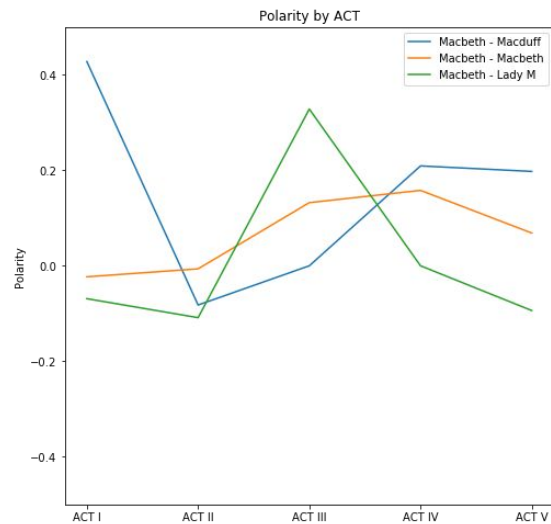
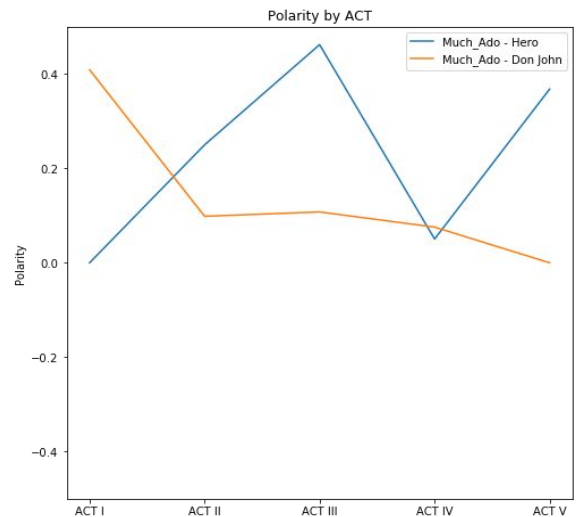


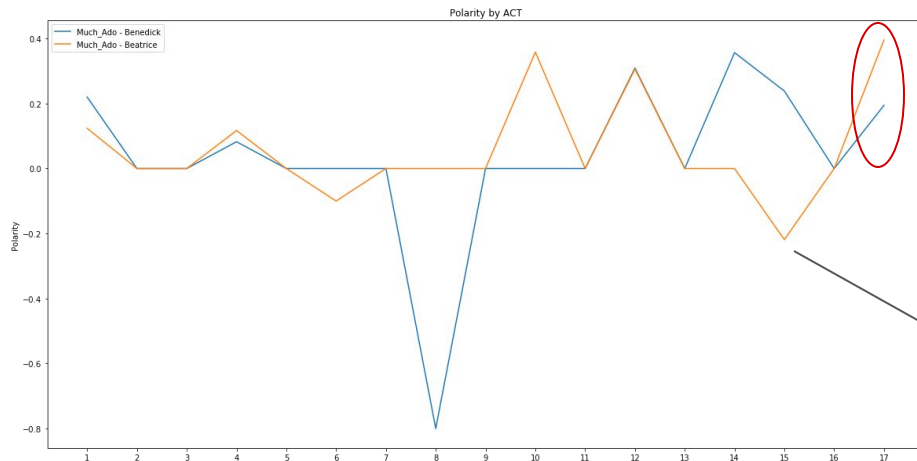
Polarity of Tragedies vs  
Comedies by Act





Polarity of Jacobean  
Comedies vs Early vs  
Comedies by Act





BEATRICE 'Then' is spoken; fare you well now: and yet, ere I go, let me go with that I came; which is, with knowing what hath passed between you and Claudio.

BENEDICK Only foul words; and thereupon I will kiss thee.

BEATRICE Foul words is but foul wind, and foul wind is but foul breath, and foul breath is noisome; therefore I will depart unkissed.

BENEDICK Thou hast frightened the word out of his right sense, so forcible is thy wit. But I must tell thee plainly, Claudio undergoes my challenge; and either I must shortly hear from him, or I will subscribe him a coward. And, I pray thee now, tell me for which of my bad parts didst thou first fall in love with me?

BEATRICE For them all together; which maintained so politic a state of evil that they will not admit any good part to intermingle with them. But for which of my good parts did you first suffer love for me?

## Conclusions:

- Model follows protagonist and antagonist arcs very broadly
- Model understands focused topicality of Tragedies
- Confused by word play

## Next Steps

- Build training corpus of Shakespearean text
- Classify Shakespeare vs. Marlowe (without reference to characters and location)



## TOPIC MODELING

### ***NMF***

Topic 0:

sir please welcome fidele poor

Topic 1:

good ay provost father friar

Topic 2:

well are done said madam

Topic 3:

say speak let know ill

Topic 4:

come away us done go

### ***LDA***

Topic 0:

sir say come well good

Topic 1:

good hear fear life heaven

Topic 2:

king son father daughter heavens

Topic 3:

away give think honour make

Topic 4:

one may know yet us

## EARLY COMEDIES

## JACOBEOAN PLAYS

### ***NMF***

Topic 0:

love suffer say sweet hand

Topic 1:

man say go speak one

Topic 2:

come let go away neighbour

Topic 3:

good morrow day think desire

Topic 4:

well know fare may leave

### ***LDA***

Topic 0:

good let come ill one

Topic 1:

well god sir know old

Topic 2:

fair comes master life look

Topic 3:

say see may true yet

Topic 4:

love man upon mine hear