Constructing character profiles and networks in Gladiator using an unsupervised approach

Group No. 3
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Objectives

1. Identifying important characters
2. Building the relation network (based on interaction)
3. Finding temporal character-character relation buildup
4. Identifying character profile of a character
5. Identifying character-character relationship profile

Input Data: After parsing the movie script

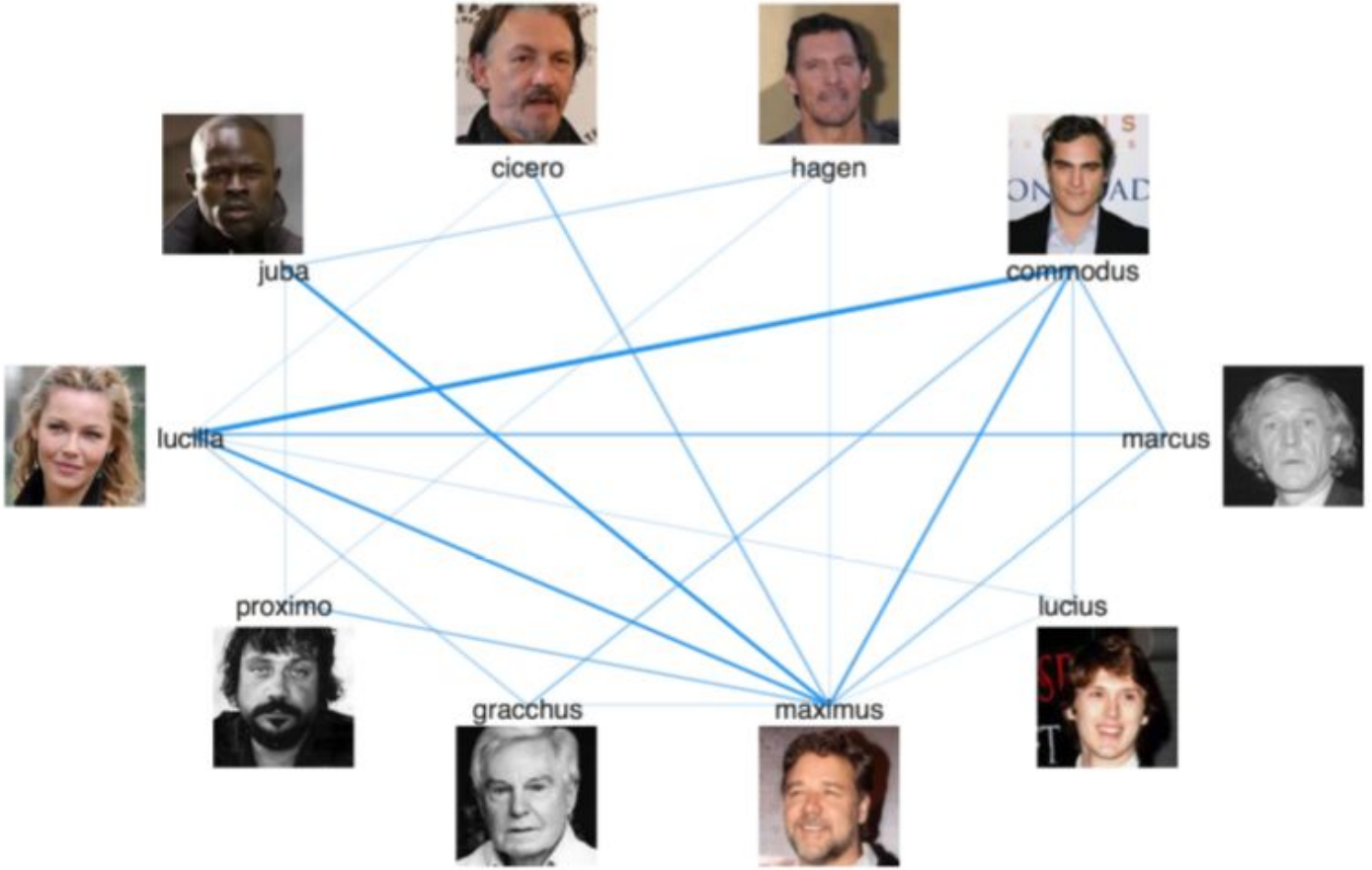
typ	speaker	content	scenenum	inde	time
dialogue	commodus	Senator Gaius, Senator Falco. Beware of Gaius, he will pour honeyed potion in y...	5	111	00:18:33
dialogue	gaius	Well, Rome WAS founded as a Republic.	5	112	00:18:36
dialogue	commodus	Yes and in a republic, the senate has the power. But Senator Gaius is not influenc...	5	113	00:18:39
dialogue	falco	Where do you stand General? Emperor or Senate?	5	114	00:18:44
dialogue	maximus	A soldier has the advantage of being able to look his enemy in the eye, Senator.	5	115	00:18:47
dialogue	gaius	You know, with an army behind you, you could be extremely political.	5	116	00:18:52
dialogue	commodus	I warned you, but I shall save you. Senators.	5	117	00:18:57
sceneInfo	commodus	He pulls Maximus away and they leave the Senators. Commodus continues his co...	5	118	NULL
dialogue	commodus	I m going to need good men like you.	5	119	00:19:12
sceneInfo	maximus	Cautiously asking,	5	120	NULL
dialogue	maximus	How may I be of service, Highness?	5	121	00:19:16
dialogue	commodus	You are a man who knows what it is to command. You give your orders, the order...	5	122	00:19:22
sceneInfo	commodus	Glancing over to Marcus and back to Maximus.	5	123	NULL
dialogue	commodus	Can I count on you, when the time comes?	5	124	00:19:34
sceneInfo	maximus	Following Commodus glance, he looks at Marcus and back to Commodus.	5	125	NULL
dialogue	maximus	Highness, when your father releases me I intend to return home.	5	126	00:19:43
dialogue	commodus	Home, well no one has earned it more. Don t get too comfortable – I may call on...	5	127	00:19:51
sceneInfo	commodus	A look of concern over Commodus remarks about future service, followed with s...	5	128	NULL
dialogue	commodus	She has not forgotten you. And now you are the great man.	5	129	00:20:03
sceneInfo	commodus	SCENE CHANGE – Lucilla and her maid are seen peering out from the tent to wher...	6	130	NULL
dialogue	marcus	If only you had been born a man. What a Caesar you would have made.	6	131	00:20:17
dialogue	lucilla	Father	6	132	00:20:25

Identifying important characters

- The number of dialogues spoken by the character is used.
- The more dialogues he speaks the more important he is.

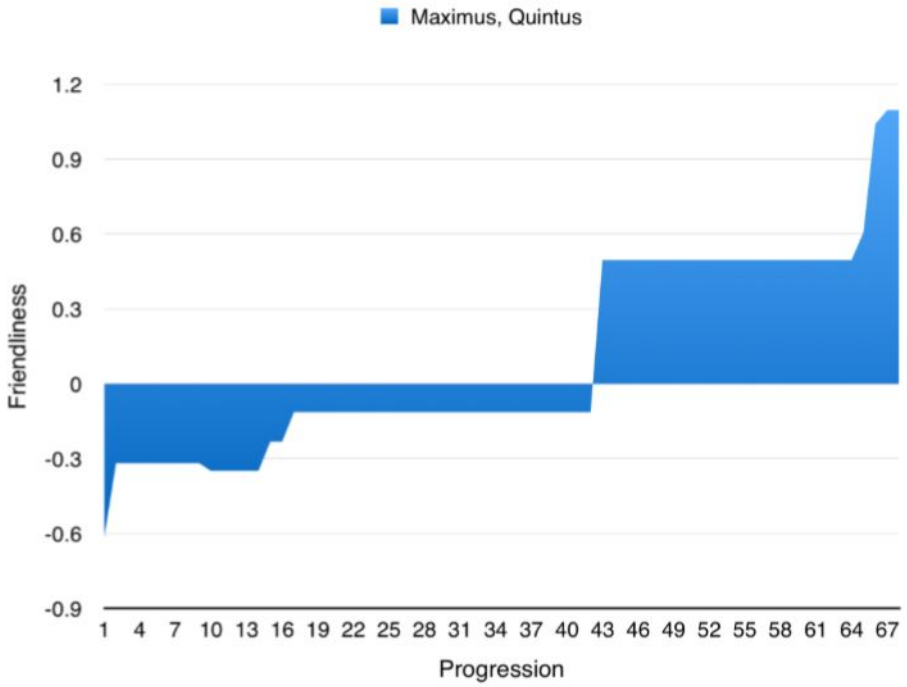
Building the relation network

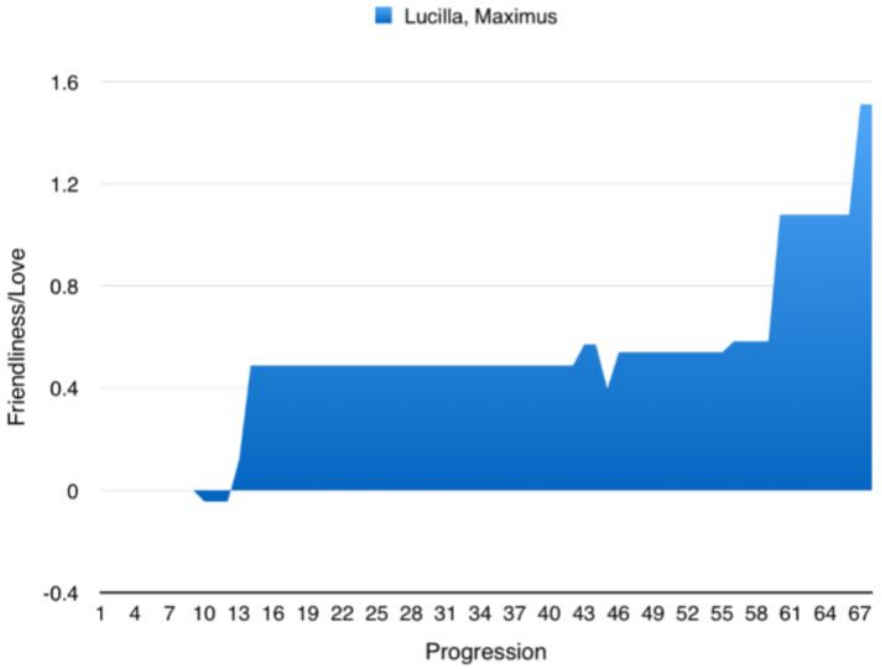
- The interaction network is the number of dialogues exchanges between two characters.
- Approximation -
  - We assume that last speaker is the target for a dialogue speaker in a scene


cicero
hagen
juba
commodus
lucilla
marcus
proximo
lucius
gracchus
maximus

Finding temporal character-character relation buildup

- The scene info is used for this purpose.
- For each sentence in a scene info the last two valid character names observed up to that sentence are taken as the two characters involved in that sentence.
- The UMBC api is used to find out the sense similarity of the sentences to the categories ‘love’ and ‘hate’ using a BOW approach.
- We maintain a count of the score up till the current sentence in the scene info.
- This serves as a temporal ‘love’ - ‘hate’ relationship profile of the characters involved.


Maximus, Quintus
1.2
0.9
0.6
0.3
0
-0.3
-0.6
-0.9
Friendliness
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67
Progression


Lucilla, Maximus
1.6
1.2
0.8
0.4
0
-0.4
Friendliness/Love
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67
Progression

Towards more complex profile and relationship

- Include more categories than just love or hate.
- Use both Dialogues and Scene Info
- For character profiling and inter-character relationship profiling.

Using Dialogue info

- For each dialogue we know the speaker and the words spoken.
- The target of that dialogue is assumed to be the speaker of the previous dialogue.
- We extract two kinds of tuple from the dialogue.
  - <Speaker : [word1, word2, word3, ...] > This will be used for Character profiling.
  - < <Speaker, Object> : [word1, word2, word3 ...] > This will be used for inter-character relationship profiling.

Using the Scene Info

- NLTK library is used for sentence tokenization of the text.
- Stanford Dependency Parser (Based on Neural Networks internally) is used to perform dependency parsing of each sentence.
- “....Finally, a *soldier* strikes *him* from behind, a vicious thrust from above into his neck. Scene cuts to a *centurion* who falls from his horse, then back to *Maximus*. *Maximus* punches a *German* twice, before slashing him across the chest with his sword. *Maximus* hears another German's scream coming from behind. Startled, *he* turns to see a *barbarian*, whose clothes and chain mail are aflame, *charging* towards him with an *axe*.....”

Using Scene Info

- The dependency parser returns a list of tuples like <subject, word> , <word, object> for each sentence.
- For the previous example <*soldier*, strikes>, <strikes, *him*> , etc ...
- The pronouns present in such pairs are resolved to the last valid character found before this sentence.
- Running this on all sentences of Scene Infos for the entire script we generate two kinds of mappings.
    - <Subject : [word1, word2, word3, ...] > This will be used for Character profiling
    - < <Subject, Object> : [word1, word2, word3 ...] > This will be used for inter-Character relationship profiling.

Merging the scene info and dialogues.

- From both the scene info and dialogues we have two types of data.
  - <Subject : [word1, word2, word3, ...] > This will be used for Character profiling
  - < <Subject, Object> : [word1, word2, word3 ...] > This will be used for inter-Character relationship profiling.
- The mapping obtained from the two sources are merged together by concatenating the respective lists.
- The final consolidated mappings are then analysed using LIWC lexicon.

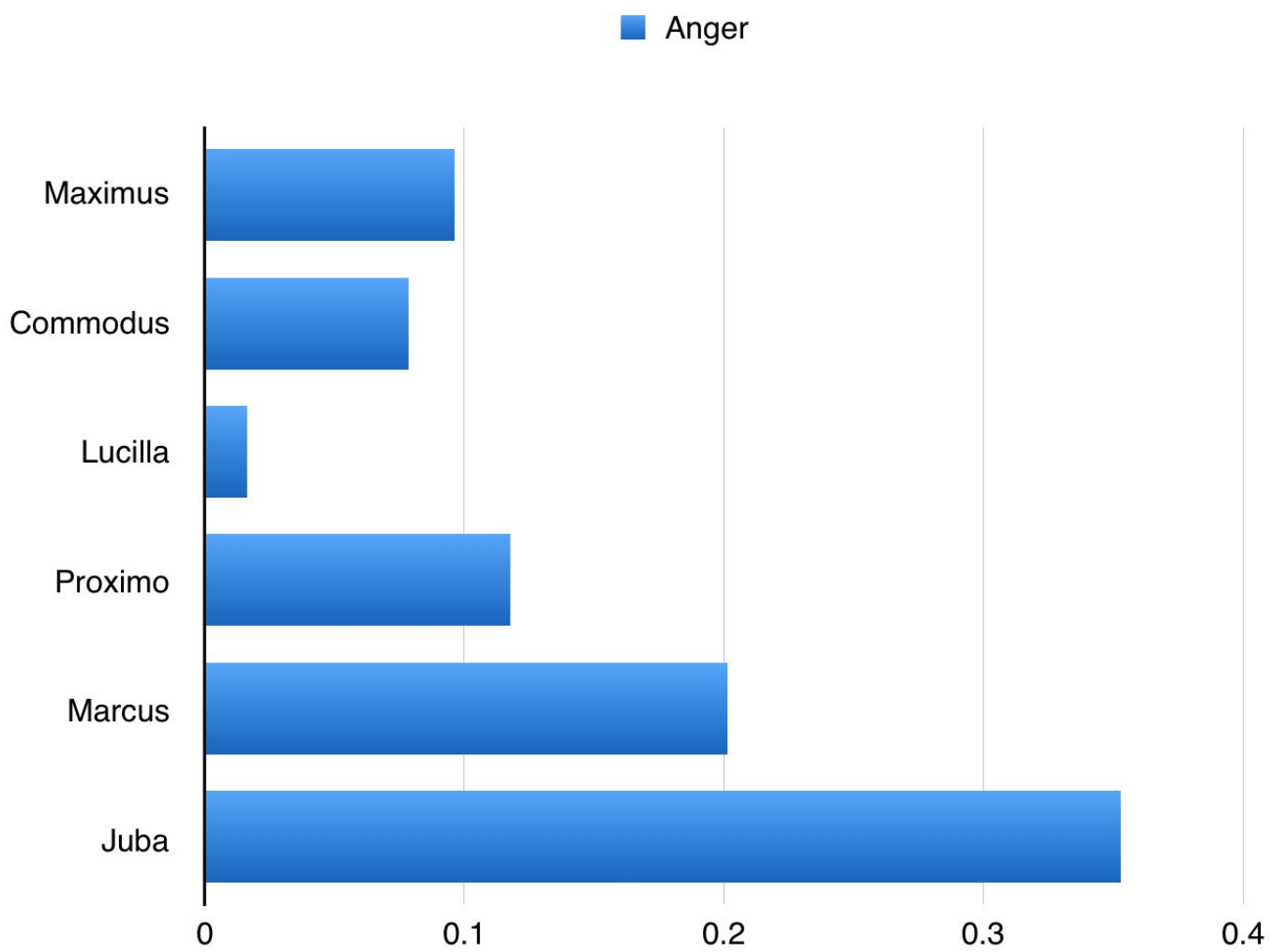
Linguistic Inquiry and Word Count (LIWC)

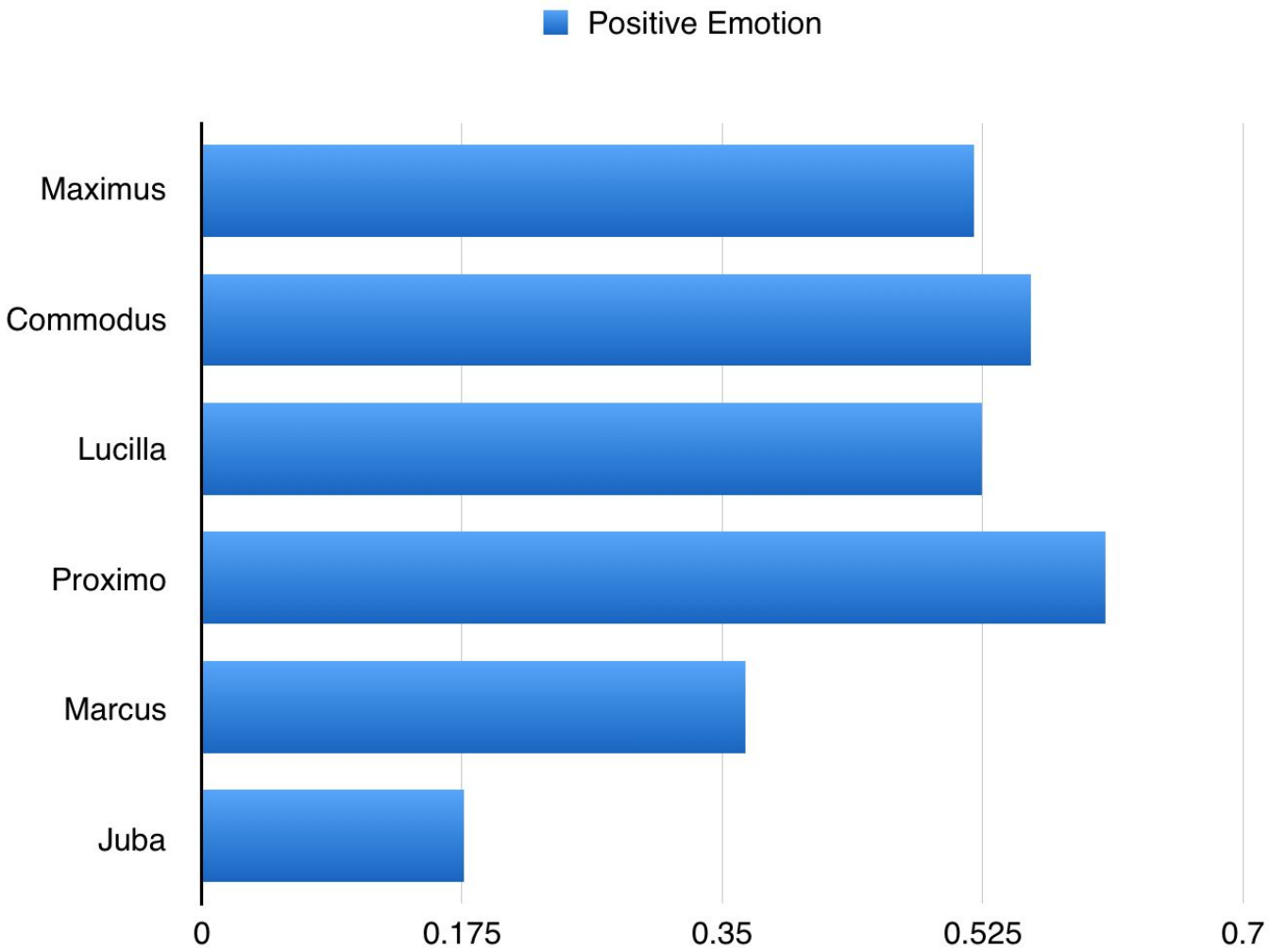
- LIWC categories used for capturing broader senses than love/hate.
- Bag of words are received after merging Scene Infos and Dialogues.
- The scores are calculated for each of the following category using the bag of words
- Words are scored for five categories
  - Positive emotion
  - Negative emotion
  - Anger
  - Sexual
  - Sadness

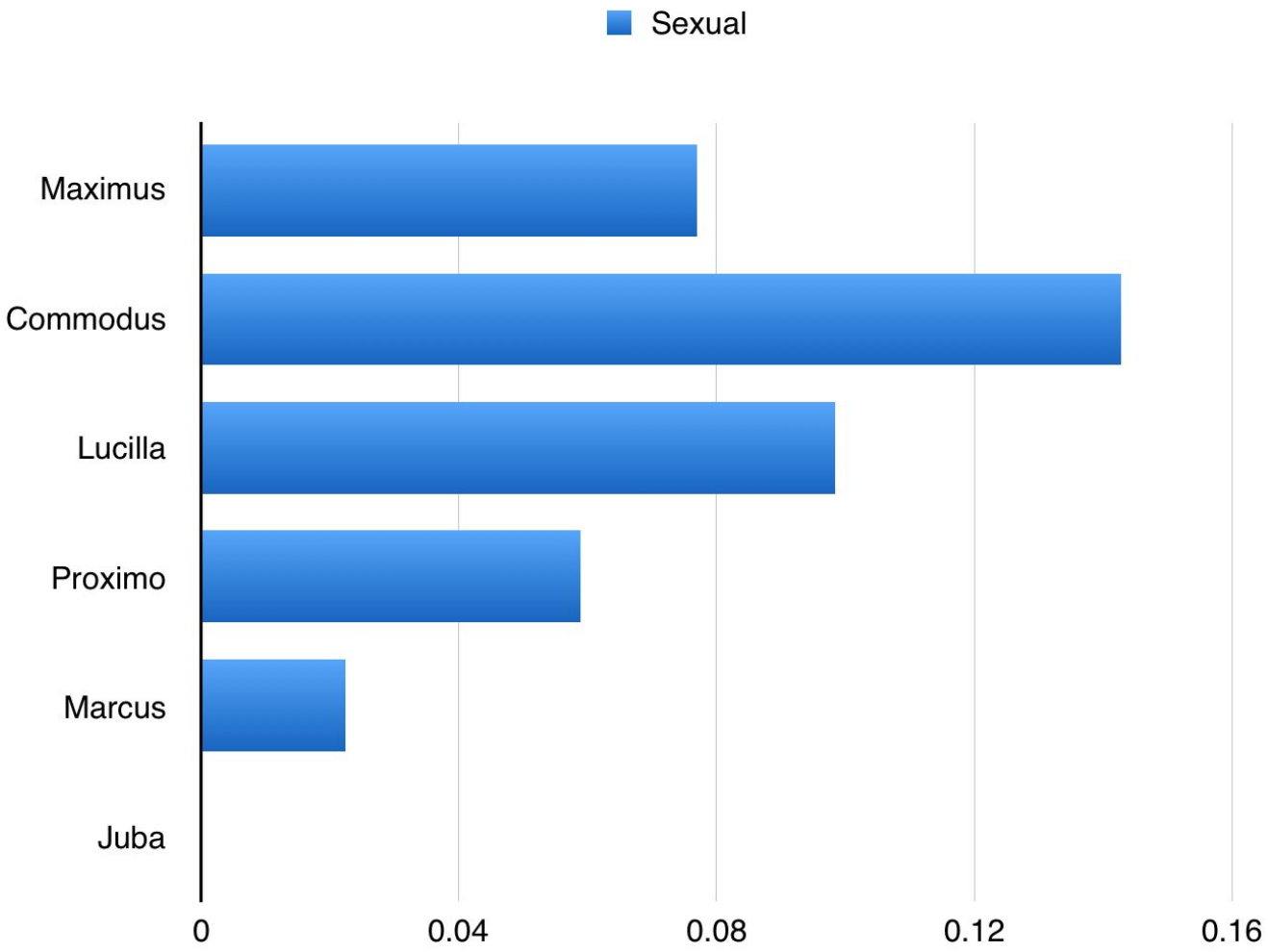
Character Profiling

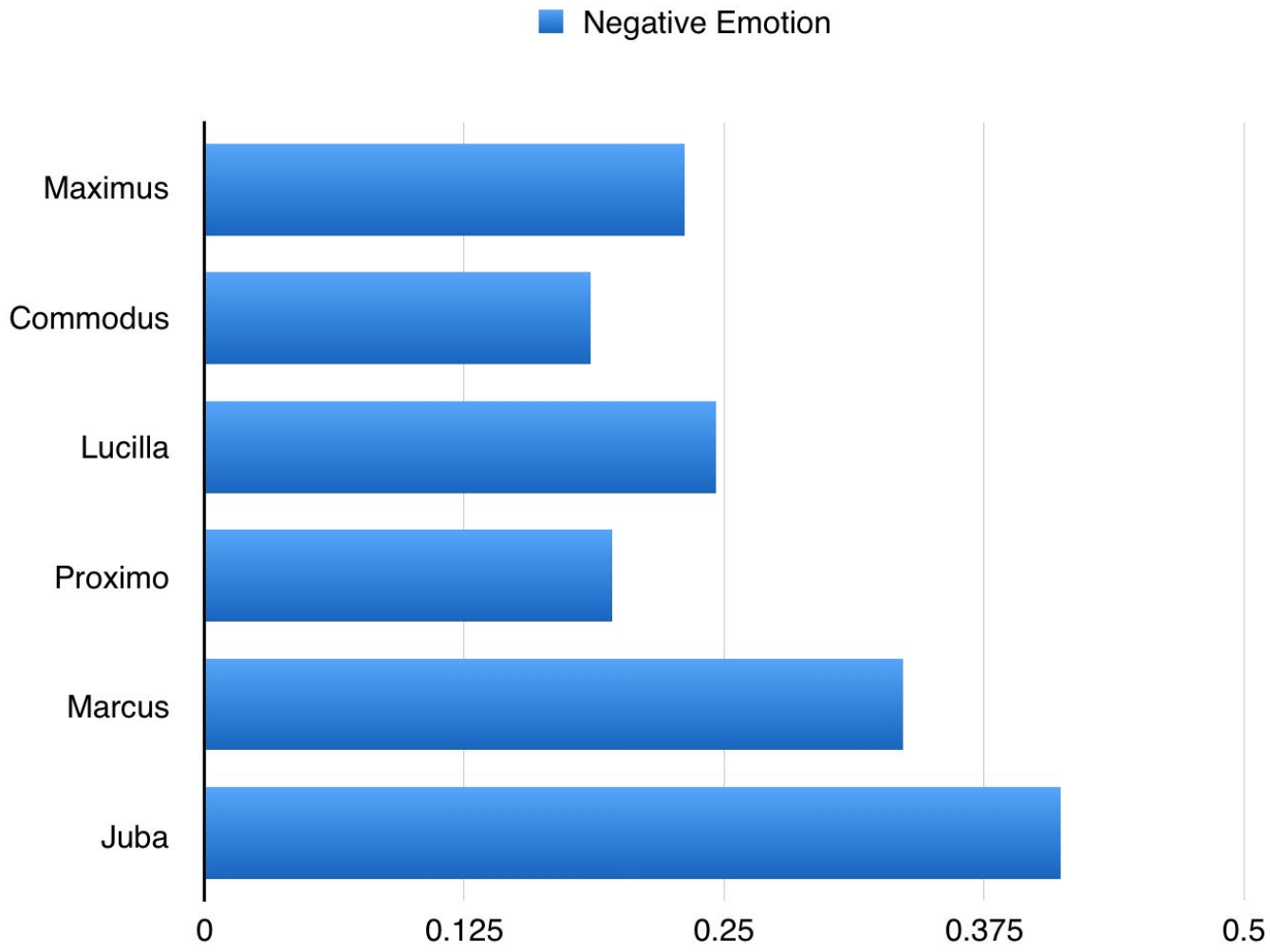
- The cumulative scores in each category for each word spoken by a character are computed.
- The scores are normalised by the total number of word spoken by the character.
- Format:<Character, anger_score, positive_score, sexual_score, negative_score, sad_score>

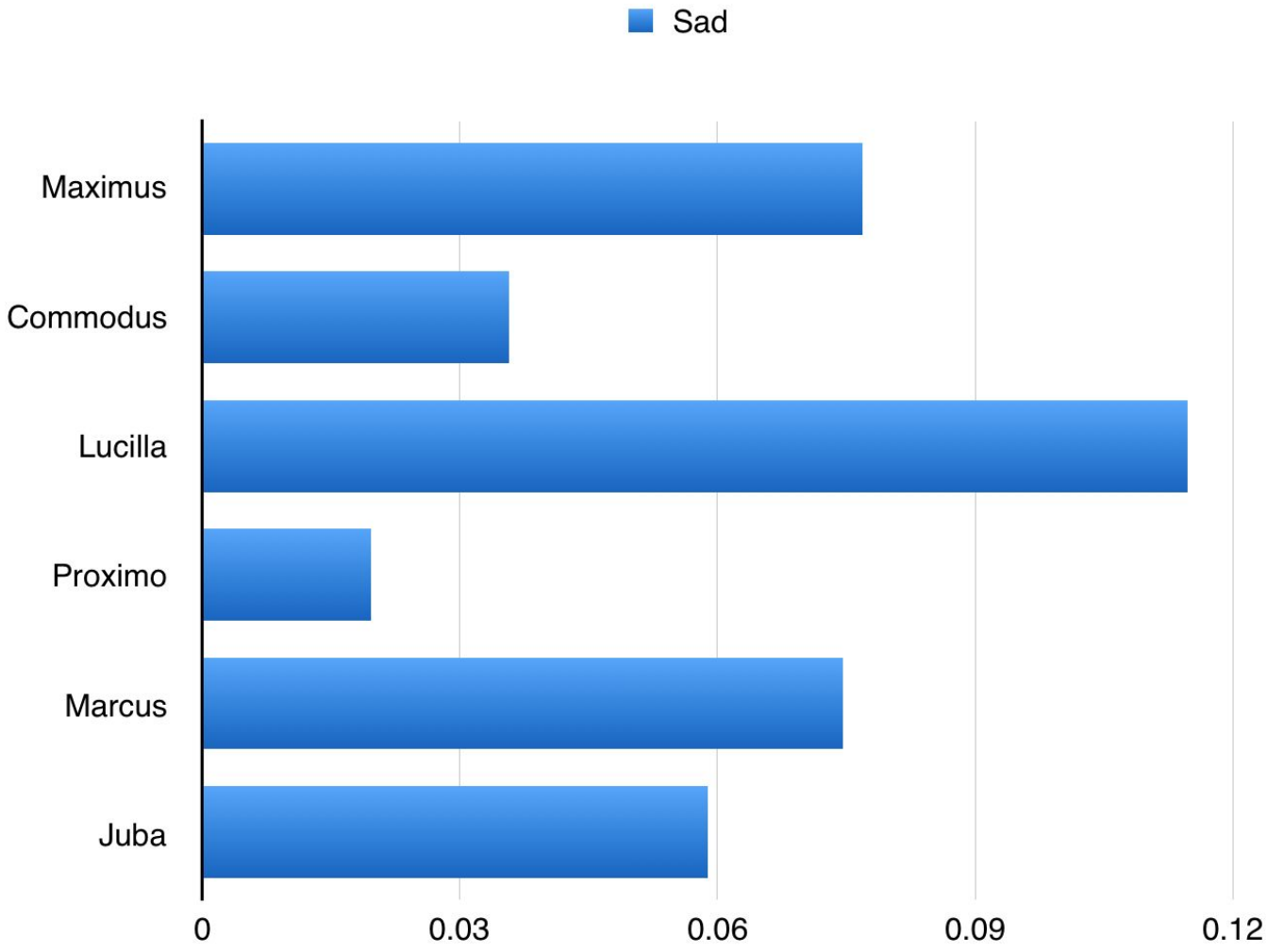
Evaluation

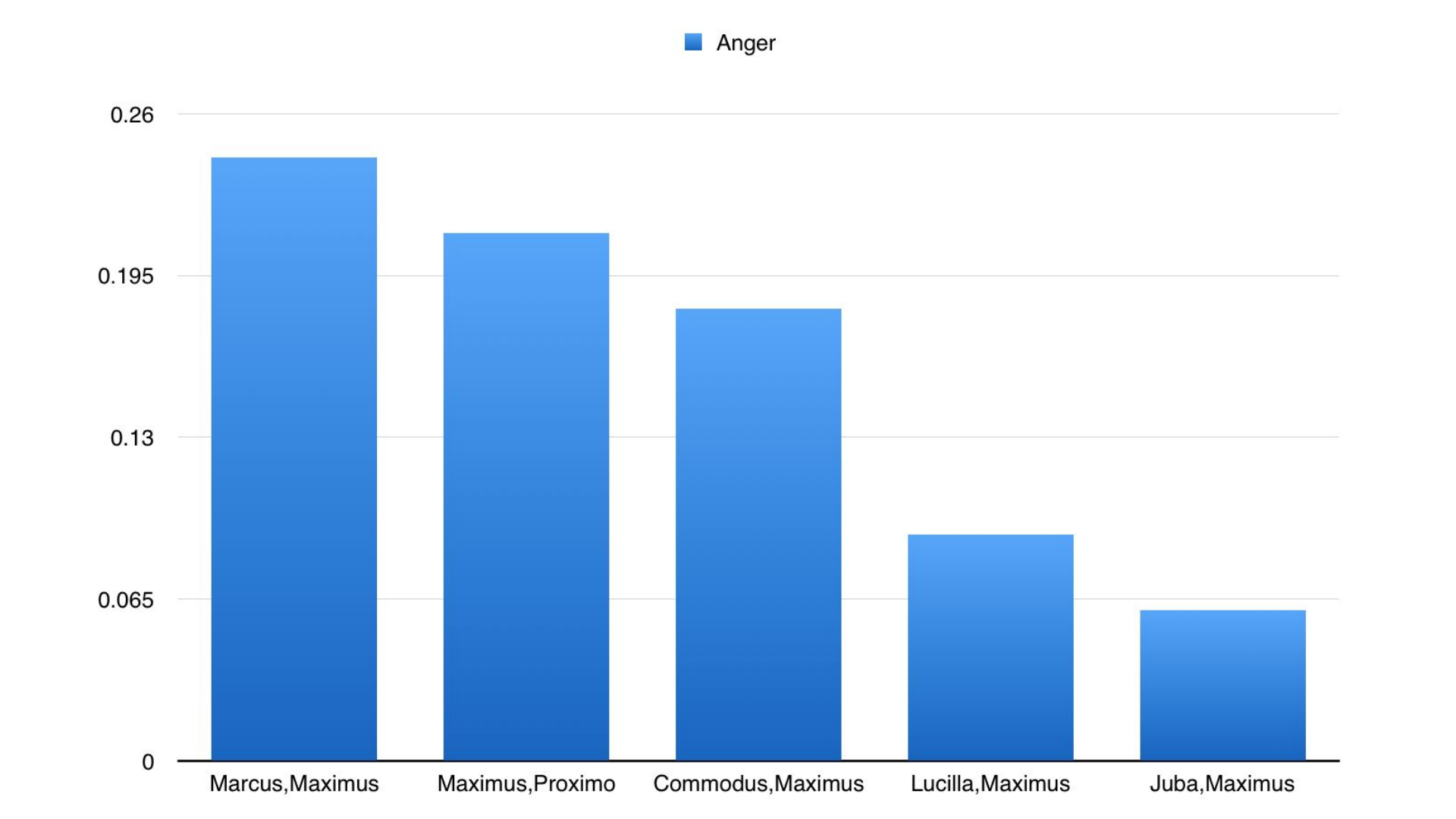

Anger
Maximus
Commodus
Lucilla
Proximo
Marcus
Juba
0
0.1
0.2
0.3
0.4

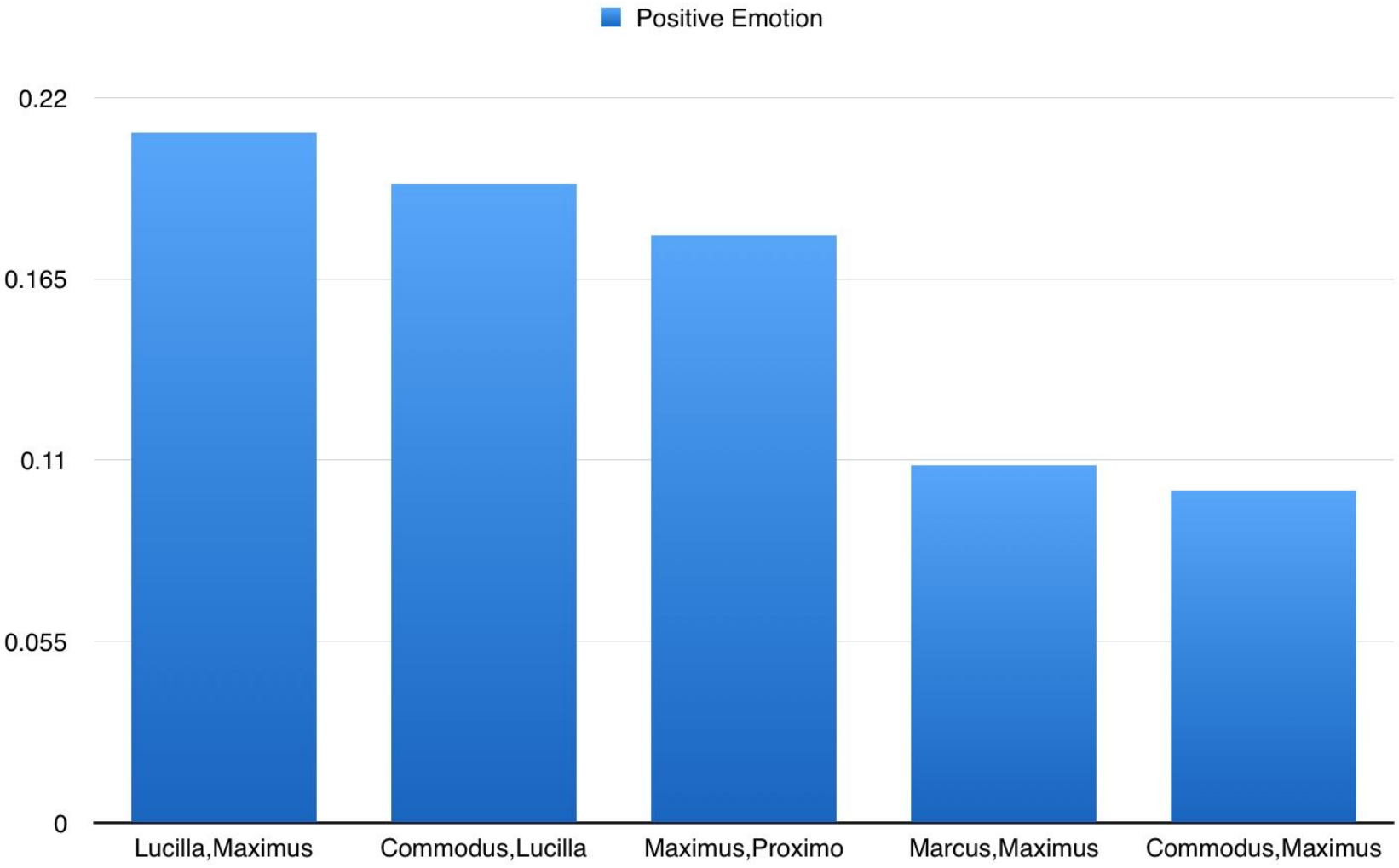

Positive Emotion
Maximus
Commodus
Lucilla
Proximo
Marcus
Juba
0
0.175
0.35
0.525
0.7

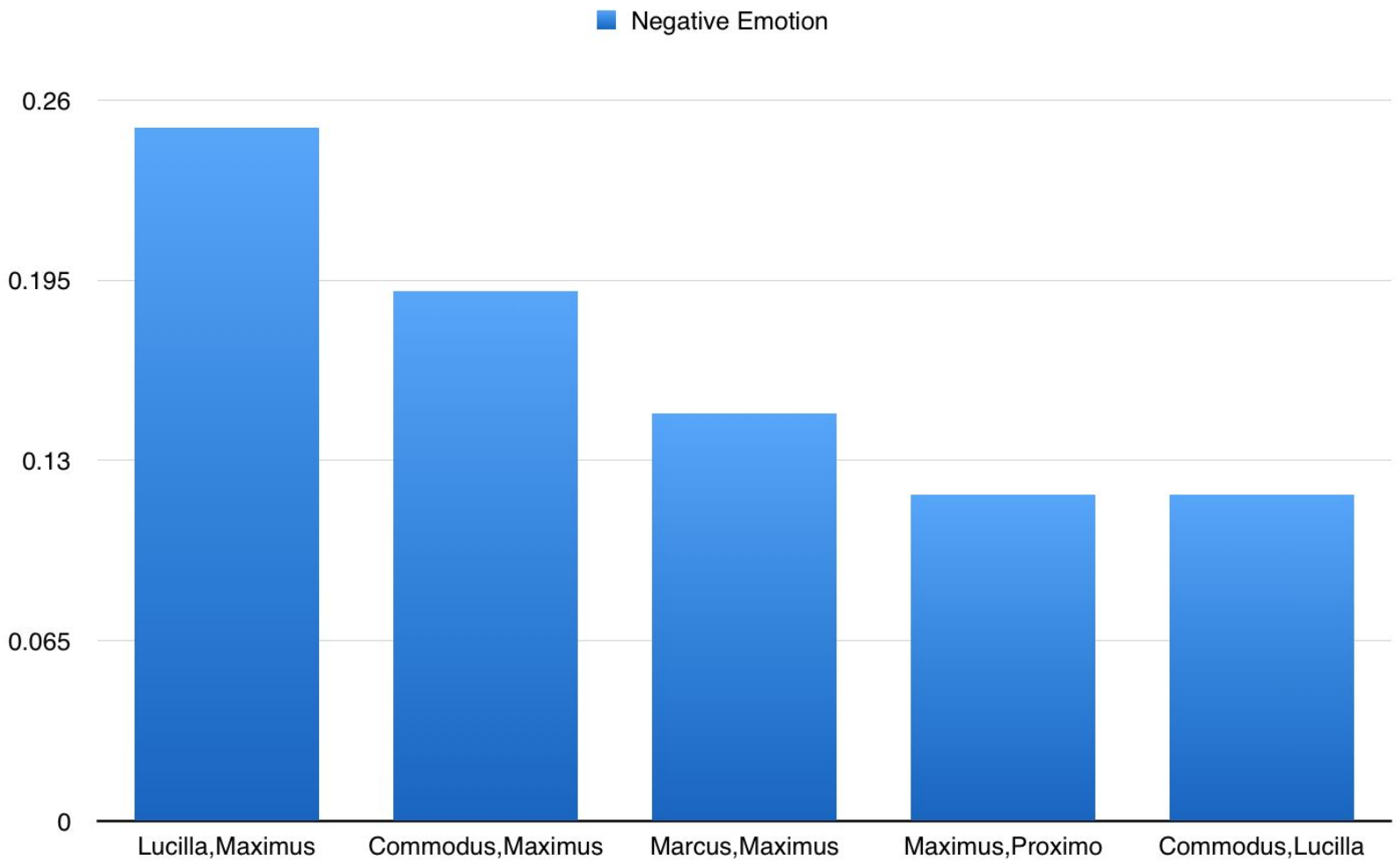

Sexual
Maximus
Commodus
Lucilla
Proximo
Marcus
Juba
0
0.04
0.08
0.12
0.16

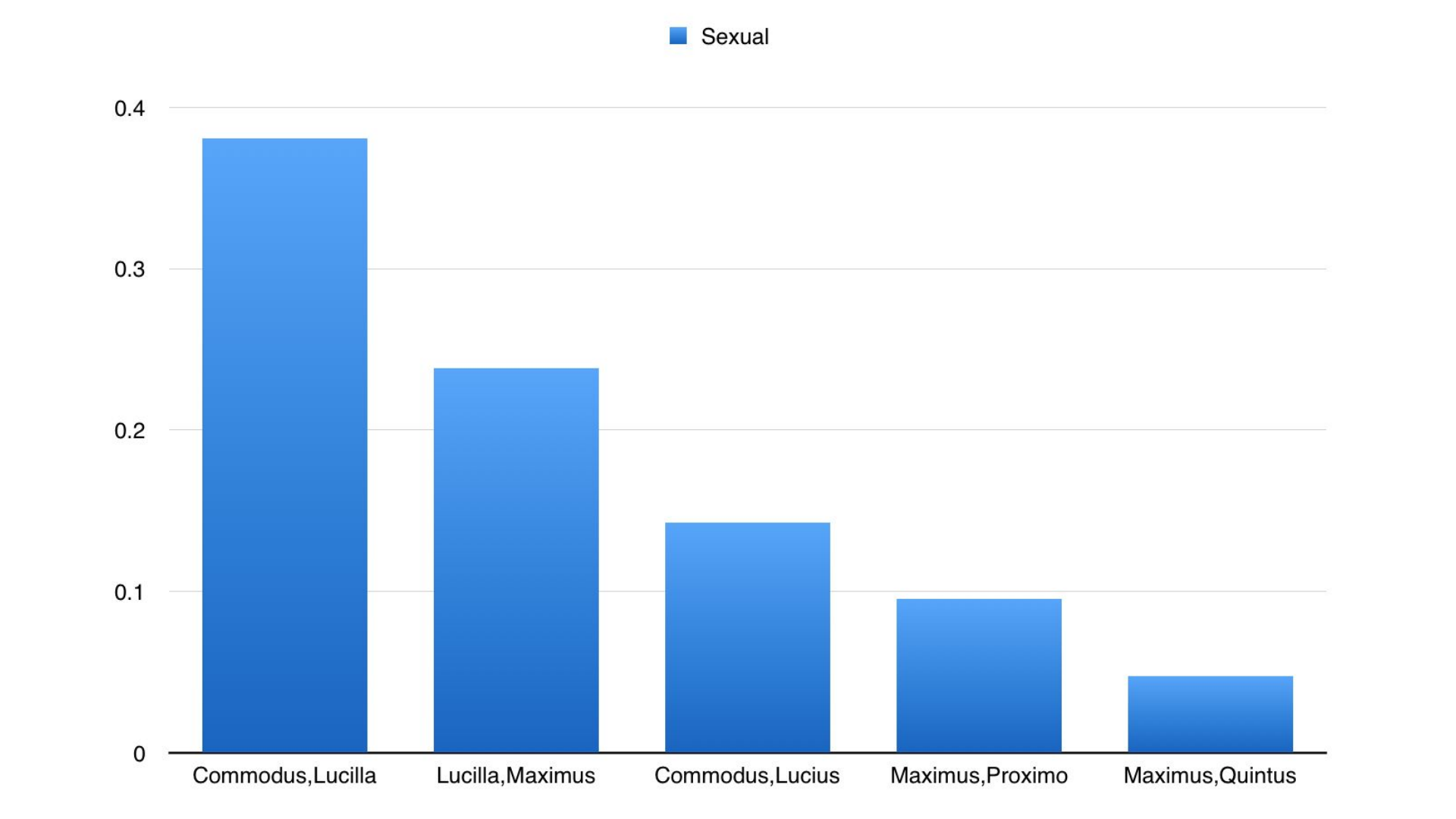

Negative Emotion
Maximus
Commodus
Lucilla
Proximo
Marcus
Juba
0
0.125
0.25
0.375
0.5

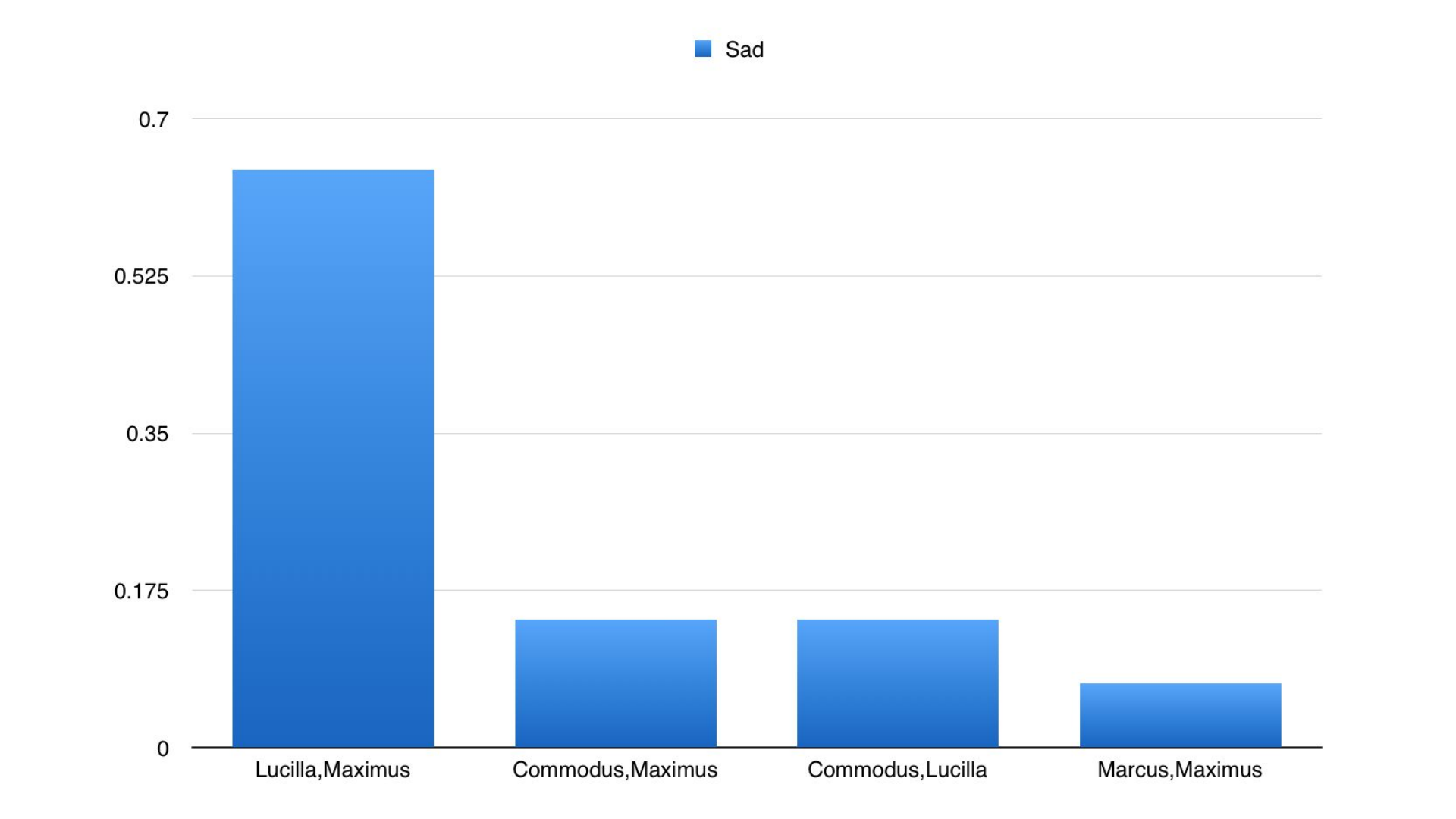

Sad
Maximus
Commodus
Lucilla
Proximo
Marcus
Juba
0
0.03
0.06
0.09
0.12


Anger
0.26
0.195
0.13
0.065
0
Marcus,Maximus
Maximus,Proximo
Commodus,Maximus
Lucilla,Maximus
Juba,Maximus


Positive Emotion
0.22
0.165
0.11
0.055
0
Lucilla,Maximus
Commodus,Lucilla
Maximus,Proximo
Marcus,Maximus
Commodus,Maximus


Negative Emotion
0.26
0.195
0.13
0.065
0
Lucilla,Maximus
Commodus,Maximus
Marcus,Maximus
Maximus,Proximo
Commodus,Lucilla


Sexual
0.4
0.3
0.2
0.1
0
Commodus,Lucilla
Lucilla,Maximus
Commodus,Lucius
Maximus,Proximo
Maximus,Quintus


Sad
0.7
0.525
0.35
0.175
0
Lucilla,Maximus
Commodus,Maximus
Commodus,Lucilla
Marcus,Maximus

Concluding Remarks

- After using the LIWC categories, the results are much more accurate
- We expect the approach can give interesting results for other movies as well
- Fun fact:
  - Researchers at UC Berkeley recently developed a similar project.
  - It pulls in the script, plot synopsis and captions to populate its results, and clicking on individual elements from each take you to the specific scene where it's happening.
  - http://www.engadget.com/2015/11/10/sceneskim-ucberkeley/

References

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