RapVision

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Background and Motivation

Since rap's reemergence in 1970, rap has evolved from simple rhyming intended for a party atmosphere, to much more complex word play rhyming to genre-crossing of today that has a global reach

While the genre has a global reach, little have been done to study rap lyrics algorithmically

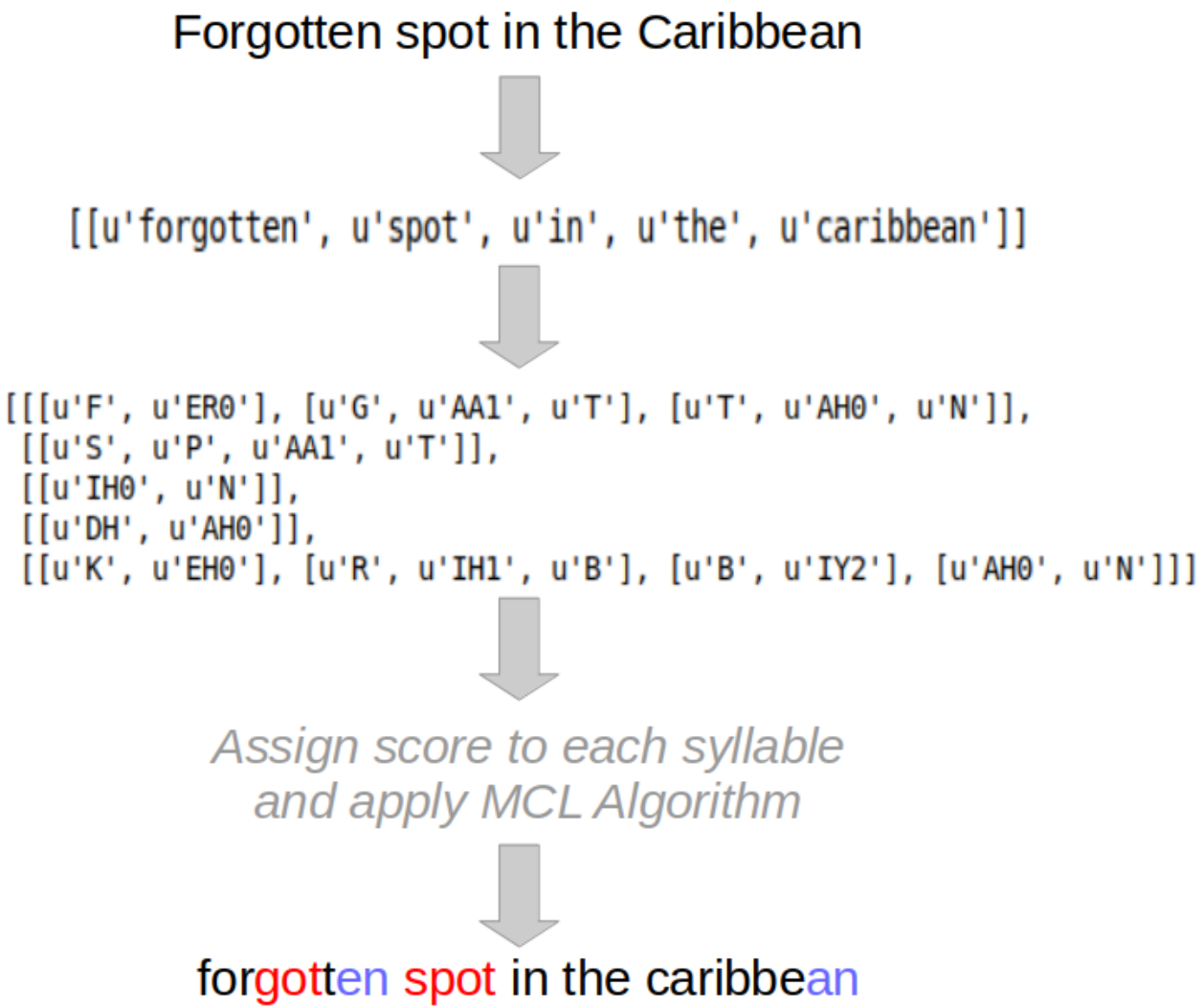
The aim of this capstone project is to analyze rap lyrics and visually present families of rhyming syllables

Methodology

Analysis of the process is as follows:

- Tokenize and using CMU dictionary, translate each word into it's phonetic representation
- Devise a rhyme scoring system between each syllables
- Using Markov Clustering Algorithm, group each rhyming syllables according to their phonetic sounds
- Assign a unique color for each rhyme family

The Process


Forgotten spot in the Caribbean
[[u'forgotten', u'spot', u'in', u'the', u'caribbean']]
[[[u'F', u'ER0'], [u'G', u'AA1', u'T'], [u'T', u'AH0', u'N']],
[[u'S', u'P', u'AA1', u'T']],
[[u'IH0', u'N']],
[[u'DH', u'AH0']],
[[u'K', u'EH0'], [u'R', u'IH1', u'B'], [u'B', u'IY2'], [u'AH0', u'N']]]
Assign score to each syllable
and apply MCL Algorithm
forgotten spot in the caribbean

Visualizing Hamilton

Rap lines from the popular broadway show, Hamilton, are used to test the algorithm

I am sailing off to London
I'm accompanied by someone who always pays
I have found a wealthy husband who will keep me in comfort for all my days
He is not a lot of fun,
but there's no one who can match you for turn of phrase
My Alexander

```
i am sailing off to london
im accompanied by someone who always pays
i have found a wealthy husband who will keep me in comfort for all my days
he is not a lot of fun
but theres no one who can match you for turn of phrase
my alexander
```

While RapVision found not so obvious rhymes, **fun** and **one** (wun), it also grouped **turn** with **not** and **lot**

Visualizing Kendrick Lamar

Contemporary rap lines; Rigamortis (2011)

Got me breathing with dragons
I'll crack the egg in your basket, you bastard
I'm Marilyn Manson don't ask for your favorite rapper
I rapped him and made him Casper, I captured the likes of NASA
My pedigree to fly past ya, I pass the weed to the pastor

```
got me breathing with dragons
i'll crack the egg in your basket you bastard
i'm marilyn manson don't ask for your favorite rapper
i rapped him and made him casper i captured the likes of nasa
my pedigree to fly past ya i pass the weed to the pastor
```

Visualizing Rap's Evolution

Kendrick Lamar compared to Sugarhill Gang, 'Rapper's Delight' (1979)

```
you start poppin' your fingers and stompin' your feet
and movin' your body while while you're sitting in your seat
and then damn! ya start doin' the freak i said
damn! right outta your seat
```

```
got me breathing with dragons
i'll crack the egg in your basket you bastard
i'm marilyn manson don't ask for your favorite rapper
i rapped him and made him casper i captured the likes of nasa
my pedigree to fly past ya i pass the weed to the pastor
```

The saturation of colors on Kendrick Lamar's line indicate the complexity of contemporary rap music

Future Work

Limitations and future improvements:

- Clean up the code, and rewrite functions for improved runtime
- Revisit scoring criteria
- Devise a method to handle slangs and purposefully misspelled words
- Occasionally, word syllabification tool fails to syllabify words; issue to be revisited
- Add additional features, and create a web app

References

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The End