Lyrics Generation using Language Models

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Outline

Data Collection	Exploratory Data Analysis	Modeling	Fine-Tuning	Lyrics Generation
Web Scraping the Hot 100 songs in Billboards.	Most Frequent bigrams	Creating Models, - Baseline - RoBERTa - GPT-2	Fine-tuning the best models in each genre on the selected artists of each genre.	Generating lyrics for from artist specific models
Web Scraping the lyrics for Pop, Rock & Rap Genres.	Word Clouds	Preprocessing the data	Fine-tuning the models of each genre on artists of different genre.	Generating lyrics for from mix and match models
Web Scraping lyrics for 15 selected artists (5 from each genre)	Custom Metrics such as, Line Length, Vocabulary Richness etc.	Training 9 models (3 models in 3 genres)		
		Evaluating the models		
		Selecting the best models		

Data Collection

We have scraped Billboard Hot-100 charts from 1960-2021 to extract the most popular songs and extracted the genres of the songs from Spotify API

Selected Pop, Rock & Rap genres from the above scraped data and scraped lyrics for the songs from Google Information Boxes

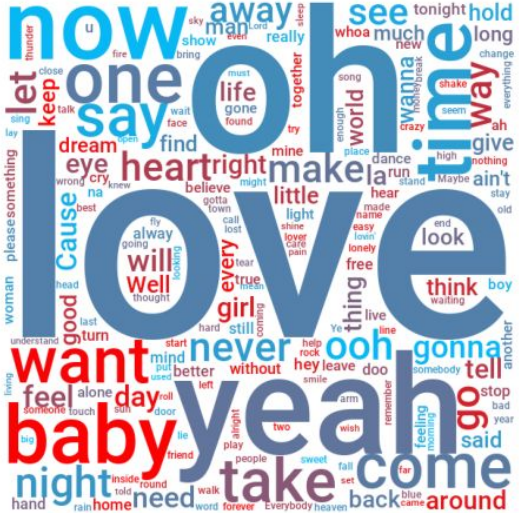
Selected 15 artists (5 from each genre) and got their Essential playlists from Spotify and repeated the same process as above to scrape the lyrics

Insights

Word Clouds

For Pop Genre

For Rock Genre



For Rap Genre

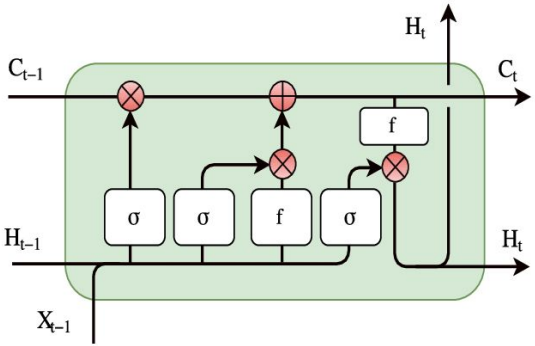
Insights

Custom Metrics

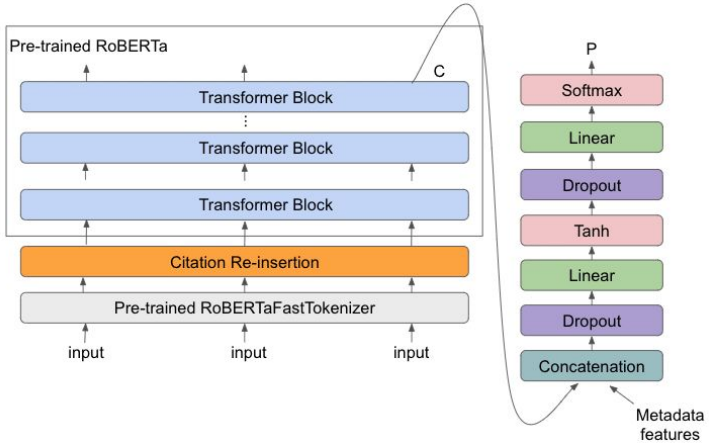
	Average No. of Lines	Average Line Length	Average Vocab Richness per Song	Average Vocab Richness in Genre
Pop	60.0	6.79	0.34	0.02
Rock	40.37	6.51	0.41	0.03
Rap	80.17	7.94	0.39	0.04

Average Line Length is the mean number of words per line in a song.
Average Vocabulary Richness is the mean of number of unique words per total number of words in song.

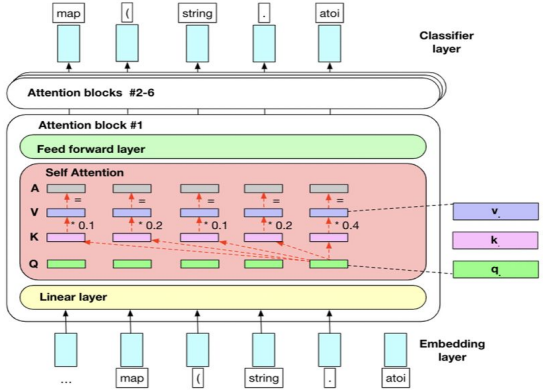
Modeling



(i) LSTM Block



(ii) Architecture of RoBERTa Model



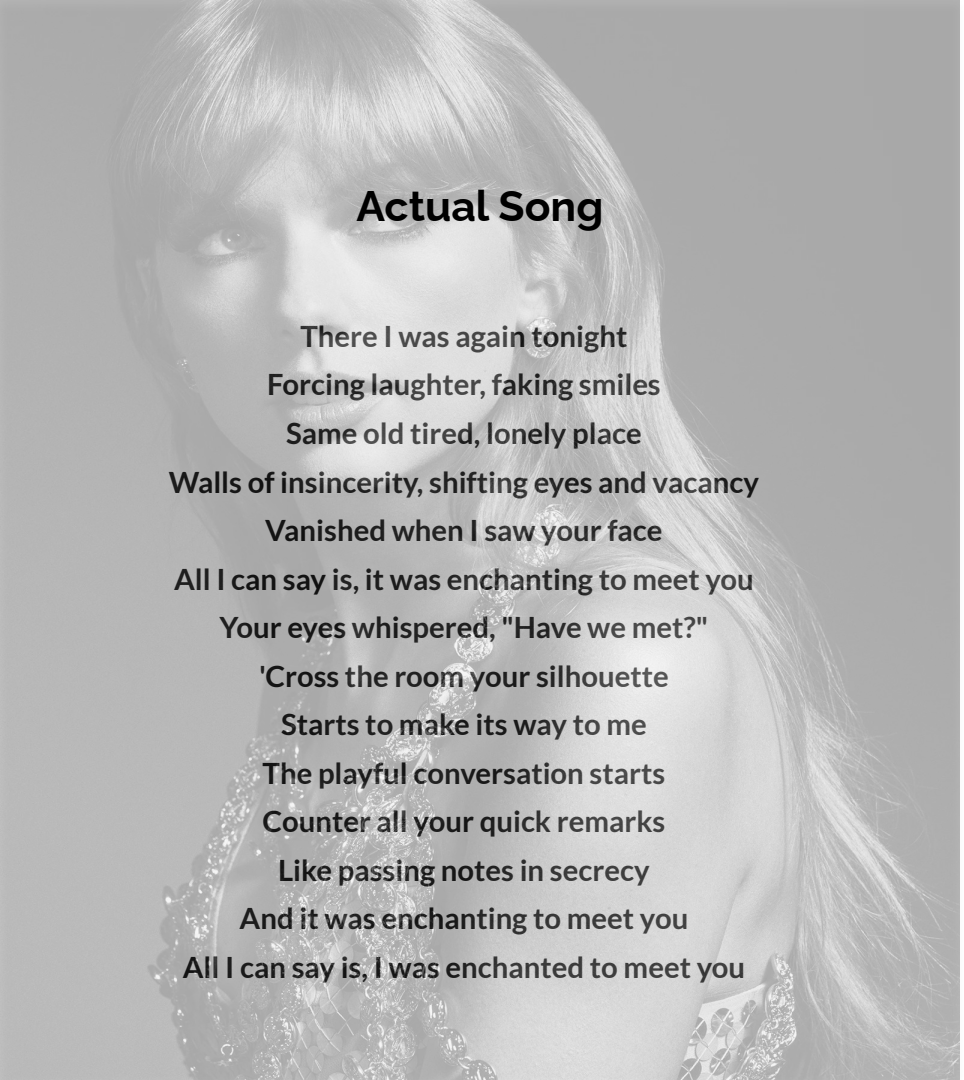
(iii) Architecture of GPT-2 Model

Modeling

Model Comparison

	Pop		Rock		Rap	
	Loss	Val. Loss	Loss	Val. Loss	Loss	Val. Loss
GPT-2	1.935	3.127	2.146	3.337	2.303	3.942
RoBERTa	5.955	6.15	6.059	6.269	6.382	6.495
Baseline	6.016	6.061	6.023	6.083	6.418	6.497

Basing on the loss values, we have chosen GPT-2 to be our best model using which we will perform fine-tuning

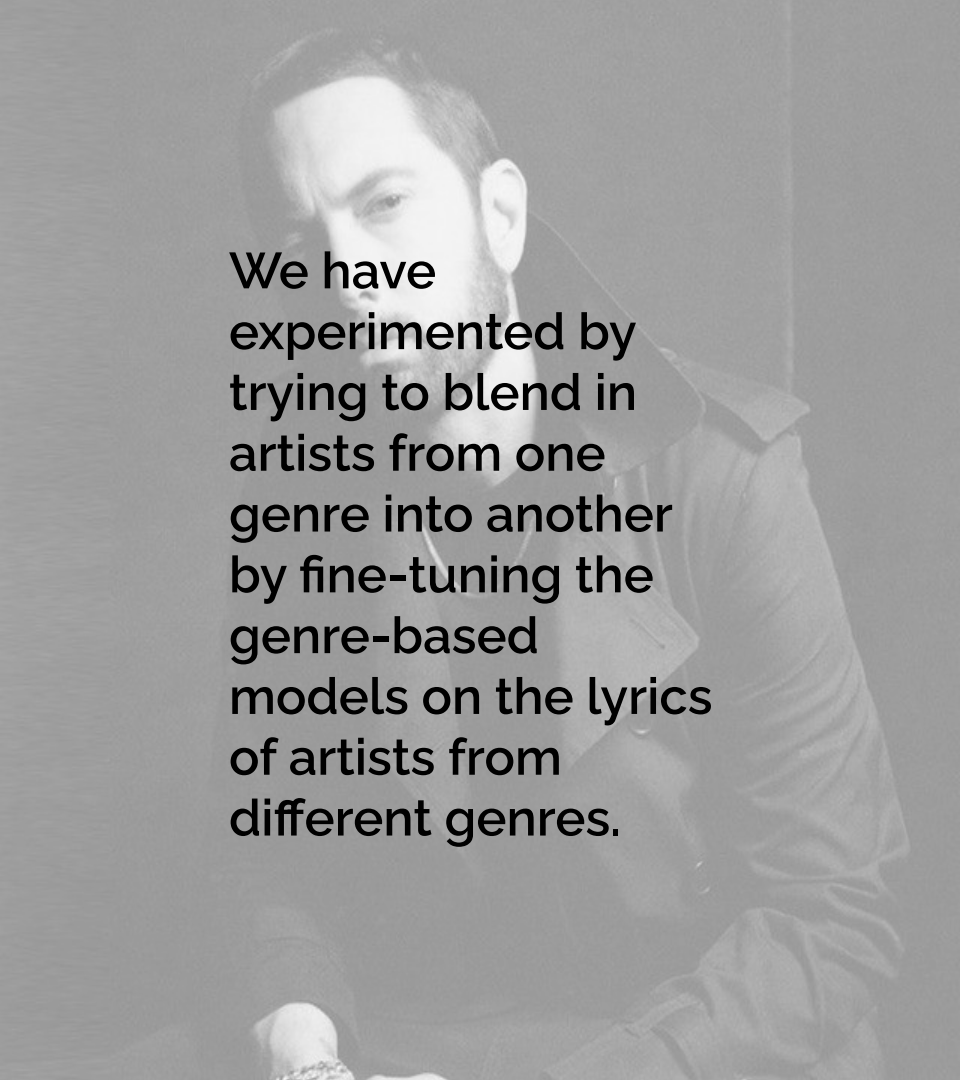


Actual Song

There I was again tonight
Forcing laughter, faking smiles
Same old tired, lonely place
Walls of insincerity, shifting eyes and vacancy
Vanished when I saw your face
All I can say is, it was enchanting to meet you
Your eyes whispered, "Have we met?"
'Cross the room your silhouette
Starts to make its way to me
The playful conversation starts
Counter all your quick remarks
Like passing notes in secrecy
And it was enchanting to meet you
All I can say is, I was enchanted to meet you

Model Generated Song

There I was again tonight
Forcing laughter, faking smiles
Same old tired, lonely place to fall in
I said I would feel this after time
It's a feeling I don't know when
That you'd hear me
Oh, oh, mmm
You should be perfect for me
Now sadly you're too busy with someone else
You're too busy with someone else
And, why am I not there
What happened to you?
Yeah
You should bet that you should be the one that you gave



We have experimented by trying to blend in artists from one genre into another by fine-tuning the genre-based models on the lyrics of artists from different genres.

Reimagining Eminem as a Pop artist,

We touch, I feel a rush, we clutch, it isn't much
But it's enough to make me wonder what's in store for us
'Cause I keep you up (all night)
Wanna see you (real)
'Cause I can't believe that I am anything we should be
I can believe that I am the one to blame
'Cause I'm too serious about you tonight
And you'll stumble into that (fall into that)
(I will stumble into that) it without you
I see the real, just something I'm hoping about you
The real, life, just... we get together, you got, you can light of our life again
We're a fever
I know what I wanna believe it seems
We're gonna be getting the same now
There doesn't feel the answers to it feels

Conclusion & Future Work

- **Basing on the performance metrics and the generated lyrics, GPT-2 is providing us the best results, syntactically and semantically.**
- **However, even though we produced satisfactory results with GPT-2, we believe it can be improved.**

- **This is because, GPT-2 is pre-trained on a large corpora of prose text which is very different to the lyrical text in terms of structure. Prose text doesn't have the same rules as musical lyrics.**
- **For example, line length is often dictated by physical restrictions and not the creativity of the writer.**
- **Word variation, Word repetition, Rhyming density cannot be observed in prose text.**
- **Hence, with more computational power, we believe we can achieve better results by training State of the Art Language Models from scratch, using a large corpora of lyrical text (song lyrics, poems etc.) instead of using models pre-trained on prose text.**

THANK YOU!