Project Proposal: Creating Playlist Names using Tracklist Information

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1 Problem Description

The goal is to implement a model that comes up with a name for a playlist given information about its tracklist. In particular, we will attempt to construct a network that builds an internal representation of the names of the tracks included in the playlist and then uses natural language generation techniques to come up with a title that could be close to one a human might devise.

2 Data

Spotify recently released the *Million Playlist Dataset*, official website hosted at https://recsys-challenge.spotify.com, as part of its 2018 RecSys Challenge. It comprises a set of $1,000,000$ playlist that have been created by Spotify users along with a variety of features, including playlist name, description, timestamp when the playlist was last updated, and an array of information about each track in the playlist (track name, artist, album name, duration, position in the playlist). Additionally, Spotify provides a `python` script that computes the following statistics for the dataset:

Table 1: Statistics for the *Million Playlist Dataset*

Number of playlists	1000000
Number of tracks	66346428
Number of unique tracks	2262292
Number of unique albums	734684
Number of unique artists	295860
Number of unique titles	92944
Number of playlists with descriptions	18760
Number of unique normalized titles	17381
Avg playlist length	66.346428

Table 2: Top playlist names, artists, and songs (with counts)

Playlist Title	Track	Artist
Country	HUMBLE. by Kendrick Lamar	Drake
Chill	One Dance by Drake	Kanye West
Rap	Broccoli (feat. Lil Yachty) by DRAM	Kendrick Lamar
Workout	Closer by The Chainsmokers	Rihanna
Oldies	Congratulations by Post Malone	The Weeknd
Christmas	Caroline by Amin	Eminem
Rock	iSpy (feat. Lil Yachty) by KYLE	Ed Sheeran
Party	Bad and Boujee (feat. Lil Uzi Vert) by Migos	Future
Throwback	Location by Khalid	Justin Bieber
Jams	XO TOUR Llif3 by Lil Uzi Vert	J. Cole

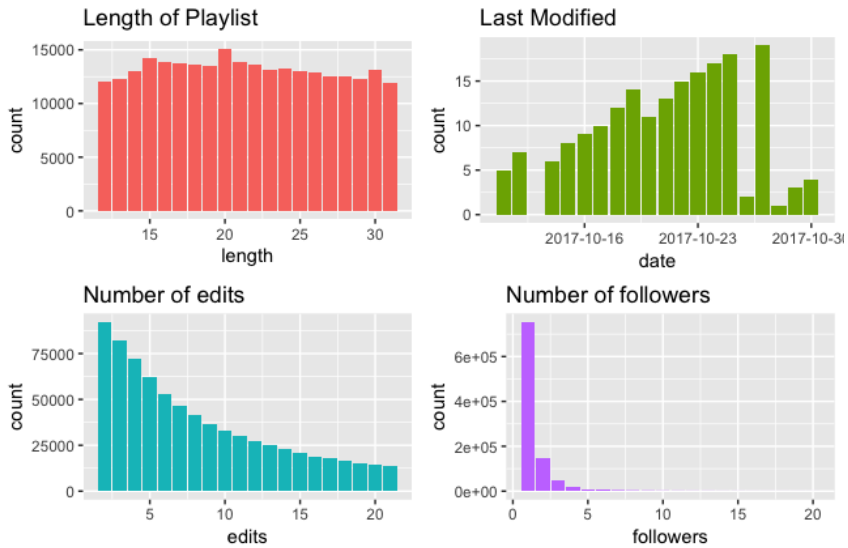

Figure 1: Histograms for selection of variables

3 Methodology

Coming up with a playlist name is somehow related to the task of creating a condensed representation of an input text, namely the names of the songs contained in it, the artists that perform them, and their genres. Therefore, we could try to use automatic summarization techniques for this purpose. In particular, we could achieve this in two ways: through extractive summarization, that is, by choosing a subset of words in the original input that capture the gist of the playlist, or though abstractive summarization, that is, by generating a new title that conveys the relevant information, aspects of which may not appear in the input text. One way to modify such methods would be to somehow introduce the numerical features we have available (such as duration of the platlist, number of unique artists, time created) as additional input to our neural network, as this might help the network come up with better names for the playlists.

4 Related Work

To inform our understanding of automatic summarization and the mehology to tackle this problems, we propose the following references:

- **A neural attention model for abstractive sentence summarization**[7], by Rush, Alexander M and Chopra, Sumit and Weston, Jason.
- **Abstactive text summarization using sequence-to-sequence RNNs and beyond**[6], by Nallapati, Ramesh, and Zhou.
- **Opinosis: a graph-based approach to abstractive summarization of highly redundant opinions**[2], by Ganesa, Kavita and Zai.

Meanwhile, for a better understanding of generative language techniques, we propose the following references:

- **Generating text with recurrent neural networks**[8] by Sutskever, Ilya and Martens, James and Hinton, Geoffrey E.
- **System and method for natural language generation**[1] by Bangalore, Srinivas and Rambow, Owen Christopher.
- **Generating sentences from semantic vector space representations**[5] by Iyyer, Mohit and Boyd-Graber, Jordan and Daumé III, Hal.

Other good sources of inspiration could be the following blogposts:

- Deep Writing (Medium)
- Recurrent Neural Networkds (Paperspace)
- Natural Language Generation and Machine Learning (Ehud Reiter's Blog)

5 Evaluation Plan

Deciding whether a playlist name is 'good" is a highly subjective task and best determined by human judgement, so coming up with an automatic evaluation metric could be particularly difficult. One possibility would be to to calculate the n-gram overlap between automatically generated playlist titles and previous titles devised by humans, as proposed in NIST's annual Document Understanding Conferences (this metric is known as ROUGE: Recall-Oriented Understudy for Gisting Evaluation). However, this could lead to bad scores for creative titles that no humans have come up with before.

6 References

[1] Srinivas Bangalore and Owen Christopher Rambow. System and method for natural language generation, June 12 2007. US Patent 7,231,341.

[2] Kavita Ganesan, ChengXiang Zhai, and Jiawei Han. Opinosis: a graph-based approach to abstractive summarization of highly redundant opinions. In *Proceedings of the 23rd international conference on computational linguistics*, pages 340–348. Association for Computational Linguistics, 2010.

[3] Cambridge Dialogue Systems Group. Rnnlg. `https://github.com/shawnwun/RNNLG`, 2017.

[4] Facebook AI Group. Namas. `https://github.com/facebookarchive/NAMAS`, 2018.

[5] Mohit Iyyer, Jordan Boyd-Graber, and Hal Daumé III. Generating sentences from semantic vector space representations. In *Nips workshop on learning semantics*, 2014.

[6] Ramesh Nallapati, Bowen Zhou, Caglar Gulcehre, Bing Xiang, et al. Abstractive text summarization using sequence-to-sequence rnns and beyond. *arXiv preprint arXiv:1602.06023*, 2016.

[7] Alexander M Rush, Sumit Chopra, and Jason Weston. A neural attention model for abstractive sentence summarization. *arXiv preprint arXiv:1509.00685*, 2015.

[8] Ilya Sutskever, James Martens, and Geoffrey E Hinton. Generating text with recurrent neural networks. In *Proceedings of the 28th International Conference on Machine Learning (ICML-11)*, pages 1017–1024, 2011.