

The usage of state-of-art Neural Networks in the classification problems



Joao Sauer and Leandro dos Santos Coelho

INTRODUCTION

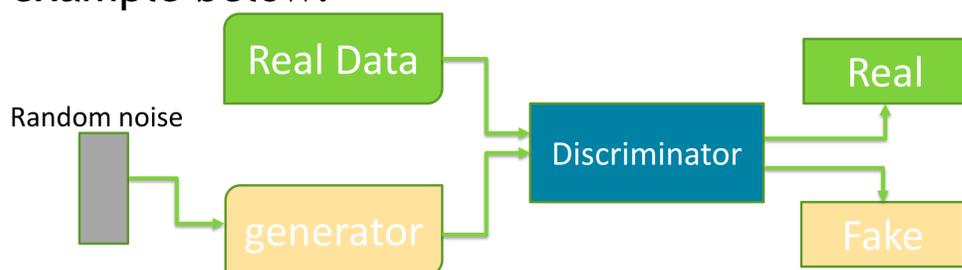
The musical genre nowadays can be very ample and, in some cases, creating discussions about what a person would consider it as only one particular kind of music. So, this kind of classification makes the machine learning algorithms to struggle in being able to analyse it correctly.

However, some new technologies like Genetic Algorithm Networks(GANs) and eXtreme Deep Factorial Machine(XDeepFM) could being manipulated to be used in as a classification tool to help in this kind of problem, helping in identify correctly a particular kind of music focusing only in identify the most important genre of it.

CONTRIBUTIONS

The contributions expected from this work is the usage of GAN² and XDeepFM³ to be used as classification tool for the musical genre classification⁵. Also, another important works has being carried to analyse the dataset, which is a merge of two available ones: The Million Song Dataset(MSD)¹ that contains already some features extract of 1 million songs and the Last.fm⁴ dataset which gives the genre of the music from the users that voted in a contest. On the other hand, a carried research using K-Means, T-SNE, SVM and Random Forest was also used to allow a better comparative between the results.

The original GAN be showed as in the example below:



And the new suggested would be:



CONCLUSIONS

This is still a work in progress, with constant analyses of the dataset and new state-of-art approaches. There are several work to be done yet, as showed in the results obtained so far.

GAN approach appears to be showing a good approach, but with some results that can be better analysed and improved. The next approach, XDeepFM is still in development and analyses. Some examples are up and running and needs to be changed to support the MSD dataset.

So far the results are as showed:

	GAN	K-Means	Random Forest	CVS	Kernel CVS
accuracy	0.684	0.064	0.629	0.458	0.639
F1_score	0.682	0.064	0.629	0.458	0.639
recall_score	0.684	0.064	0.629	0.458	0.639
precision_score	0.688	0.064	0.629	0.458	0.639

REFERENCES

1. D. Liang, H. Gu, and B. T. O'Connor, "Music genre classification with the million song dataset 15-826 final report", 2011
2. I. Goodfellow, J. Pouget-Abadie, M. Mirza, B. Xu, D. Warde-Farley, S. Ozair, A. Courville, and Y. Bengio, "Generative adversarial nets", in Advances in neural information processing systems, 2014, pages 2672-2680
3. J. Lian, X. Zhou, F. Zhang, Z. Chen, X. Xie, and G. Sun, "Xdeepfm: Combining explicit and implicit feature interactions for recommender systems", In Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, pages 1754-1763, 2018.
4. Last.fm dataset, the official song tags and song similarity collection for the Million Song Dataset, available at: <http://labrosa.ee.columbia.edu/millionsong/lastfm>, [Online; accessed 07-february-2019], 2011.
5. D. Gärtner, "Tempo detection of urban music using tatum grid non negative matrix factorization", in ISMIR, 2013.

CONTACT

Joao Sauer

Universidade Federal do Paraná
Electrical Engineering Sector
joao.sauer@gmail.com

Leandro dos Santos Coelho

Universidade Federal do Paraná
Electrical Engineering Sector
lscoelho2009@gmail.com

