**Title**: Musical Instrument Classification Using Different Methods

**Keywords**: MFCCs, machine learning, CNN, SVM, ANN, GMM, instrument classification

**Abstract**:

Objectives: instrument recognition in monophonic music pieces

Method: data: MFCCs; models: 1) SVM 2) GMM 3) ANN 4) CNN

Result: CNN is the most accurate model and SVM is the fastest model

Conclusion: models can be adjusted to achieve high accuracy, but simple CNN is enough

**Introduction:**

背景+意义 ：

References:

Y. Han, J. Kim, and K. Lee, “Deep convolutional neural networks for predominant instrument recognition in polyphonic music,” IEEE/ACM

Trans. Acou., Speech, Lang. Proces., vol. 25, no. 1, pp. 208–221, 2017.

F. Fuhrmann and P. Herrera, “Polyphonic instrument recognition for exploring semantic similarities in music,” in Proc. of 13th Int. Conf. on

Digital Audio Effects DAFx10, Graz Austria, vol. 14, no. 1, pp. 1–8, 2010.

方法+目标：compare different models

**Datasets and data-preprocessing (with graphs):**

References:

Li, T.L.H., Chan, A.B. (2011). Genre Classification and the Invariance of MFCC Features to Key and Tempo. In: Lee, KT., Tsai, WH., Liao, HY.M., Chen, T., Hsieh, JW., Tseng, CC. (eds) Advances in Multimedia Modeling. MMM 2011. Lecture Notes in Computer Science, vol 6523. Springer, Berlin, Heidelberg. <https://doi.org/10.1007/978-3-642-17832-0_30>

J. Liu and L. Xie, "SVM-Based Automatic Classification of Musical Instruments," *2010 International Conference on Intelligent Computation Technology and Automation*, 2010, pp. 669-673, doi: 10.1109/ICICTA.2010.64.

**Methods:**

Method 1: SVM

J. Liu and L. Xie, "SVM-Based Automatic Classification of Musical Instruments," *2010 International Conference on Intelligent Computation Technology and Automation*, 2010, pp. 669-673, doi: 10.1109/ICICTA.2010.64.

Method 2: GMM

Marques, J., & Moreno, P. J. (1999). A study of musical instrument classification using gaussian mixture models and support vector machines. *Cambridge Research Laboratory Technical Report Series CRL*, *4*, 143.

Method 3: ANN

<https://link.springer.com/chapter/10.1007/978-981-13-2345-4_10#citeas>

Chakraborty, S.S., Parekh, R. (2018). Improved Musical Instrument Classification Using Cepstral Coefficients and Neural Networks. In: Mandal, J., Mukhopadhyay, S., Dutta, P., Dasgupta, K. (eds) Methodologies and Application Issues of Contemporary Computing Framework. Springer, Singapore. https://doi.org/10.1007/978-981-13-2345-4\_10

Method 4: CNN

Hung, Yun-Ning, and Yi-Hsuan Yang. "Frame-level instrument recognition by timbre and pitch." *arXiv preprint arXiv:1806.09587* (2018).

**Comparison & Result(200)(with graphs):**

Time, accuracy

**Conclusion(150):**