LELE LIU

PhD Researcher @C4DM QMUL

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Education

Queen Mary University of London

PhD Student *Sep 2019 – today*

- Topic: Automatic Music Transcription with End-to-end Deep Neural Networks
- Programme and group: UKRI Centre for Doctoral Training in Artificial Intelligence and Music (AIM CDT), Centre for Digital Music (C4DM)
- Supervisors: Dr. Emmanouil Benetos, Prof. Simon Dixon, and Dr. Veronica Morfi

Queen Mary University of London

Master of Science *Sep 2017 – Sep 2018*

- Programme: Sound and Music Computing (Distinction)
- Supervisor: Dr. Emmanouil Benetos

Beijing University of Posts and Telecommunications & Queen Mary University of London

Bachelor of Engineering *Sep 2013 – Jun 2017*

- Joint Programme in Telecommunications Engineering with Management (GPA: 3.47/4)

Work Experience

Guangzhou Winery Group Co., Ltd.

Web Development Engineer *Oct 2018 – Jun 2019*

- Web front end development and static page design using jQuery, html5 and CSS
- Development of functional modules for website management system using java, spring framework and MySQL

Publications & Preprints

[1] Lele Liu and Emmanouil Benetos, "From Audio to Music Notation", in Handbook of Artificial Intelligence for Music, Springer, 2021. (accepted)

[2] Lele Liu, Veronica Morfi and Emmanouil Benetos, "Joint Multi-pitch Detection and Score Transcription for Polyphonic Piano Music", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Canada, Jun 2021. (accepted)

[3] Adrien Ycart, Lele Liu, Emmanouil Benetos and Marcus T. Pearce. "Investigating the Perceptual Validity of Evaluation Metrics for Automatic Piano Music Transcription", Transactions of the International Society for Music Information Retrieval (TISMIR), 3(1):68-81, 2020.

[4] Adrien Ycart, Lele Liu, Emmanouil Benetos and Marcus T. Pearce. "Musical features for automatic music transcription evaluation", arXiv preprint arXiv:2004.07171, 2020.

[5] Lele Liu and Emmanouil Benetos, "Automatic Music Accompaniment with a Chroma-based Music Data Representation", Digital Music Research Network One-day Workshop (DMRN), London, Dec 2019.

Research Experience

Automatic Music Transcription (PhD project)

Investigating the use of Transformer architecture in audio-to-score transcription *ongoing*

- Comparing a Transformer architecture and the sequence-to-sequence architecture (ongoing)
- Testing the effect of using local attention in Transformers (ongoing, local attention is better than a global attention in the Transformer's encoder layers, the value of the optimal attention window length is still under investigation)

Joint multi-pitch and score transcription for polyphonic piano music *Publication in [2]*

- Comparison of different time-frequency representations for AMT (Variable-Q Transform achieves the best performance)
- Design and comparison of different music score representations (the designed reshaped representation outperforms a LilyPond representation)
- Designed the first multitask model that jointly transcribes a piano-roll and music symbolic notation using CRNN and sequence-to-sequence architecture with attention mechanism (achieved 87.8% accuracy on the MV2H metric on a created synthesized dataset, dataset published, code to be published)

Investigating the Perceptual Validity of Evaluation Metrics for Automatic Piano Music Transcription (in collaboration with Dr. Adrien Ycart) *Publications in [3-4]*

- Investigated the correlation between benchmark AMT evaluation metrics and human judgement via an online listening test (onset-only notewise F-measure correlates best)
- Defined a set of musical features and used them to create a new AMT metric, the new metric correlates significantly better with listener's judgement
- Examined the importance of musical aspects to raters by running an ablation study (result shows the importance of rhythmic features, code published)

Other projects

Machine learning-based head and neck cancer diagnostics (in collaboration with Dr. Helen Bear and Dr. Muy-Teck Teh) *ongoing*

- Compared different classification models on cancer diagnostics (logistic regression, decision tree, random forest, SVM with different kernels, naive bayes, XGBoost, among which XGBoost achieved the best performance)
- Explored the importance of different bio-marker features by conducting a feature ablation study (current results generally inline with observations using non-ML methodologies)
- Explored combining cancer qV2a feature with machine learning methods (achieved competitive results compared to non-ML state-of-the-art)

Automatic Music Accompaniment with a Chroma-based Music Data Representation *Publication in [5]*

- Designed a system for automatic music accompaniment for piano music using LSTM networks (code published)
- Implemented an original chroma-based music data representation
- Evaluated the effect of different music features used in the music data representation via an online user study.

Academic Activities

2020	DMRN+15: Digital Music Research Network One-day Workshop, conference organiser
2020-today	AIM CDT student representative
2019-today	C4DM seminar organiser
2019-today	Teaching assistant: Machine learning, Music Informatics

Awards

2019-23	QMUL and CSC joint Scholarship, by QMUL and China Scholarship Council
2017	Higher International Science and Engineering Scholarship Award, by QMUL
2016	Higher International Science and Engineering Scholarship Award, by QMUL
2015	The First Prize Scholarship, by BUPT
2015	Honorable Mention in the International Mathematical Contest in Modeling
2014	National Scholarship, by Ministry of Education (China)

Self Description

- Fluent in python and pytorch; can quickly recap MATLAB, java, and C++
- Strong interest in music and artificial intelligence-related problems
- Eager to learn and explore new technologies