http://folkrnn.org and https://themachinefolksession.org/

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Abstract

We demonstrate 1) a web-based implementation of a generative machine learning model trained on transcriptions of folk music from Ireland and the UK (http://folkrnn.org, live since March 2018); 2) an online repository of work created by machines (https://themachinefolksession.org/, live since June 2018). These two websites provides a way for the public to engage with some of the outcomes of our research investigating the application of machine learning to music practice [2, 3], as well as the evaluation of machine learning applied in such contexts. Our machine learning model is built around a text-based vocabulary, which provides a very compact but expressive representation of melody-focused music [4]. The specific kind of model we use consists of three hidden layers of long short-term memory (LSTM) units [1]. We trained this model on over 23,000 transcriptions crowd-sourced from an online community devoted to these kinds of folk music. Several compositions created with our application have been performed so far. and recorded and posted online.2 We are also organising a composition competition using our web-based implementation, the winning piece of which will be performed at the 2018 O'Reilly Al conference in London in October.³

¹http://thesession.org

²https://www.youtube.com/channel/UC7wzmG64y2lbTUeWji_ bKhA

³https://folkrnn.org/competition/

Technical specifications

Our demo requires only a computer (laptop provided), headphones (provided), a table and an internet connection. The space and time for setup are minimal.

Description of presentation

Our presentation will be an interactive demo of the web-based implementation and the online repository. Figure 1 shows the *folkrnn* application after a user has generated a new transcription. This user has clicked on "Compose", and the model has generated the text seen at top. The implementation renders this in common practice notation, and provides a way to audition the tune. A user can also change the initialisation of the model, and can provide seed tokens to start, e.g., the beginning of an existing melody. Figure 2 shows the welcome screen of The Machine Folk Session. This website allows people to explore and submit tunes generated by or with computers.

Examples of use

Our model has found use in several new compositions that have been performed, e.g.:

- "Bastard Tunes" by Oded Ben-Tal https://www.youtube. com/watch?v=YZ2jb0ksOm4
- "Between the Lines" by Oded Ben-Tal https://www. youtube.com/watch?v=GdvyIH-0Q1k
- 3. "Safe Houses" by Úna Monaghan https://www.youtube.com/watch?v=x6LS9MbQj7Y&t=115s
- "March to the Mainframe" by Bob L. Sturm https://www. voutube.com/watch?v=TLzBcMvI15M
- 5. "Dialogues with folk-rnn" by Luca Turchet https://www. youtube.com/watch?v=pkf3VqPieoo

Furthermore, several tunes generated by folk-rnn have also been interpreted by professional musicians, e.g.,

- Sets #1, 2 & 3 by an Irish ensemble: https://www. youtube.com/watch?v=IZKc363886Y; https://www.youtube. com/watch?v=qpHaSwiJ-o&t=35s; https://www.youtube. com/watch?v=j7RpmmahiZQ
- "Interpretations of Computer-Generated Traditional Music" by John Hughes (db) https://www.youtube.com/ watch?v=GmwYtNgHW4g
- "Transcriptions #1469, 1470 & 1472 from The folkrnn (v2) Session Book, vol. 1 of 10" by Torbjörn Hultmark (sop. trom.): https://www.youtube.com/watch?v= 4kLxvJ-rXDs

Outside of these recordings, we have used the model to create "The Endless folk-rnn Traditional Music Session" and 34 pdf volumes of 100,000 "machine folk" tunes.⁵

Acknowledgements

"Engaging three user communities with applications and outcomes of computational music creativity", AHRC AH/R004706/1.

REFERENCES

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parameters mean? An analysis of a specific LSTM
music transcription model, starting with the 70,281
parameters of its softmax layer. In *Proc. Music* Metacreation workshop of ICCC.

⁴ http://www.eecs.qmul.ac.uk/~sturm/research/RNNIrishTrad/index.html

⁵ https://highnoongmt.wordpress.com/2018/01/05/volumes-1-20-of-folk-rnn-v1-transcriptions/

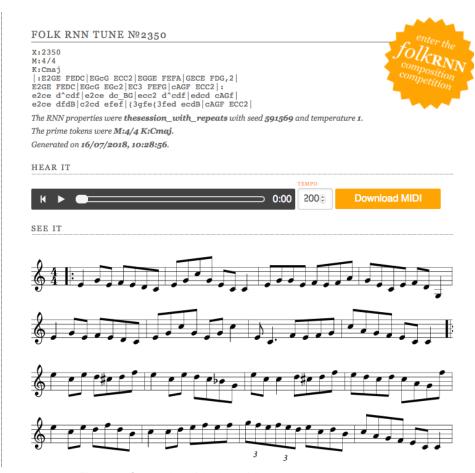


Figure 1: Screenshot of the http://folkrnn.org.

2. B. L. Sturm and O. Ben-Tal. 2017. Taking the Models back to Music Practice: Evaluating Generative Transcription Models built using Deep Learning. *J. Creative Music Systems* 2, 1 (Sep. 2017).

generate a folk tune with a recurrent neural network

thesession.org (w/:II:

Enter start of tune in ABC notation

4/4

PRESS TO GENERATE TUNE

946491

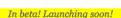
C Major

 B. L. Sturm, O. Ben-Tal, Ú. Monaghan, N. Collins, D. Herremans, E. Chew, G. Hadjeres, E. Deruty, and F. Pachet. 2018. Machine Learning Research that Matters for Music Creation: A Case Study. J. New Music Research (submitted) (2018).

THE machine folk SESSION

TUNES RECORDINGS EVENTS

Bob: log out; submit a tune; Q & A. Help



Hello Bob

The Machine Folk Session is a community website dedicated to folk music generated by, or co-created with, machines.

You can find tunes to play, recordings of them, or events where they're played.

machine folk, live



Popular tunes



Figure 2: Screenshot of the welcome page of https://themachinefolksession.org/.

 B. L. Sturm, J. F. Santos, O. Ben-Tal, and I. Korshunova. 2016. Music Transcription Modelling and Composition Using Deep Learning. In *Proc. 1st* Conference on Computer Simulation of Musical Creativity. Huddersfield, UK.