

Who wrote that song?

A neural network for predicting
classical composers

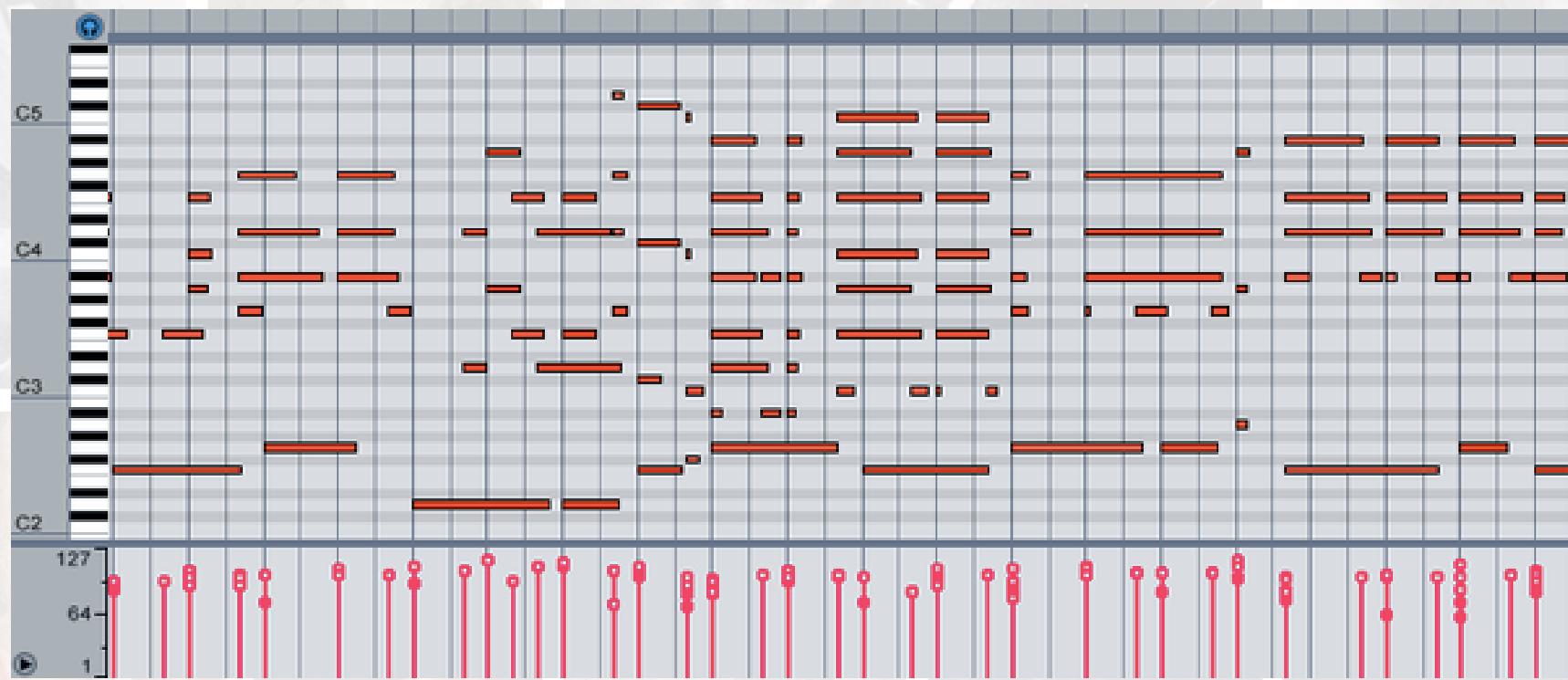
Mark Evers

How are we able to recognize new songs by our favorite musicians?



MIDI Files

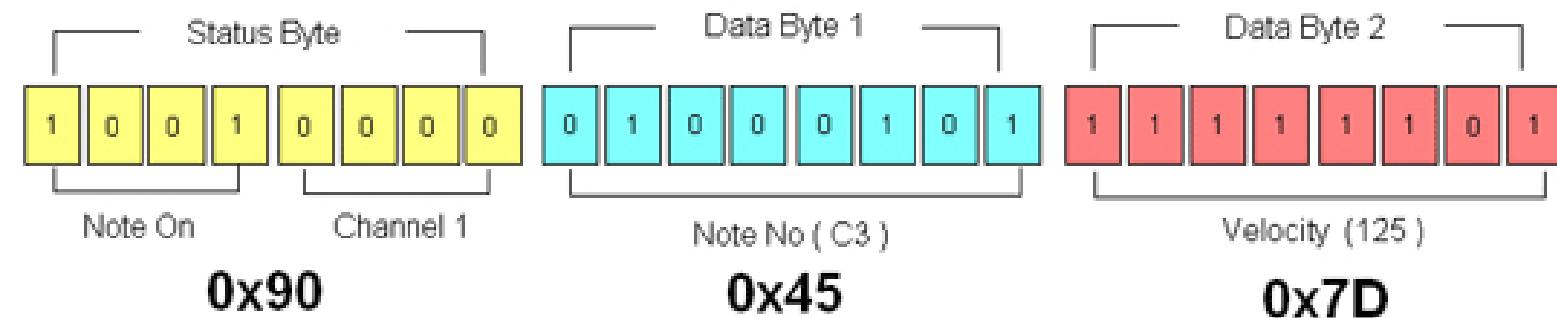
- Acronym for Musical Instrument Digital Interface
- Binary file format
- Sheet music for computers



Challenge: Converting into usable input

- MIDI is a data protocol

MIDI Message Structure



- MIDI files are a timestamped sequence of MIDI messages
- Must be converted into a sequence of k-hot vectors.

Input

It's not audio!

Yes:

Page 798 NOVEMBER 1925
A very graceful drawing-room piece.
Right under the hands, Grade 4.

Andantino M. M. $\text{♩} = 72$

SPRING SERENADE THE ETUDE

GEORG EGGLING, Op. 251

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No:



Music Notation

Vector Notation

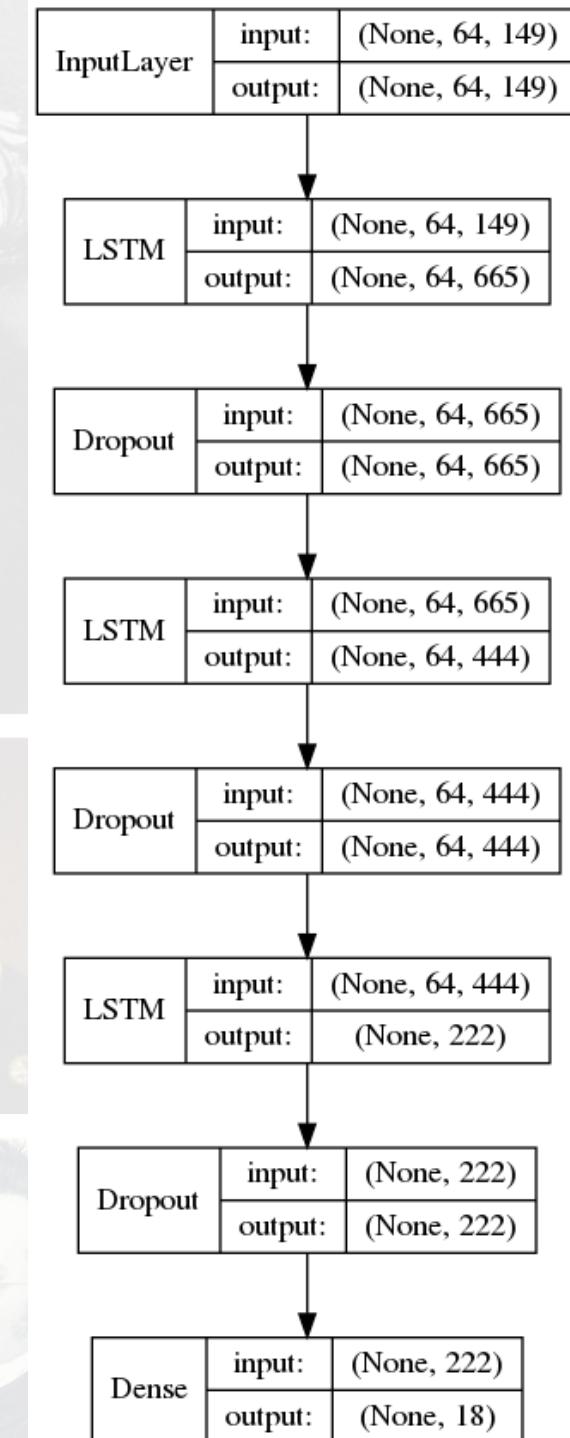
n	C	C#	D	D#	E	F	F#	G	G#	A	A#	B	1/2	1/4	1/8	1/16
1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
3	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
4	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
5	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
6	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
7	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0

Time



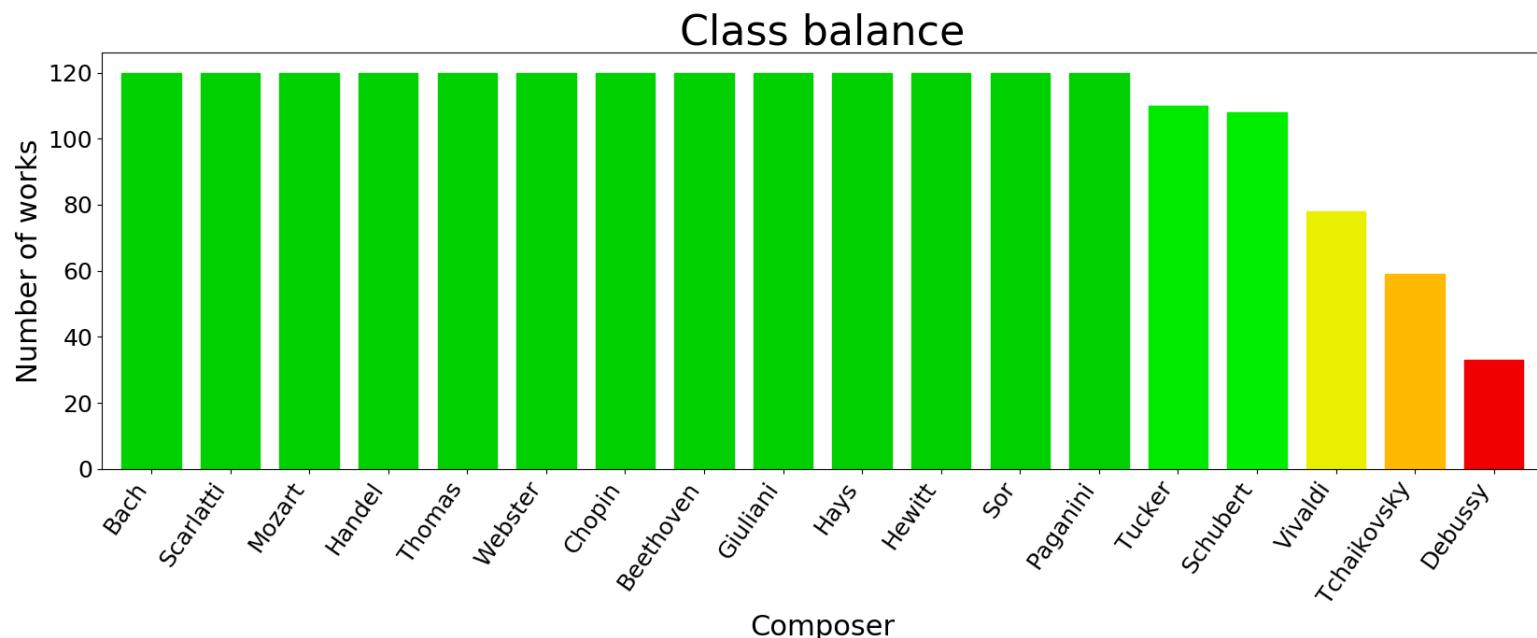
Neural Net Architecture

- Recurrent Neural Network
- Long Short Term Memory
- Analyzes sequences of notes for patterns



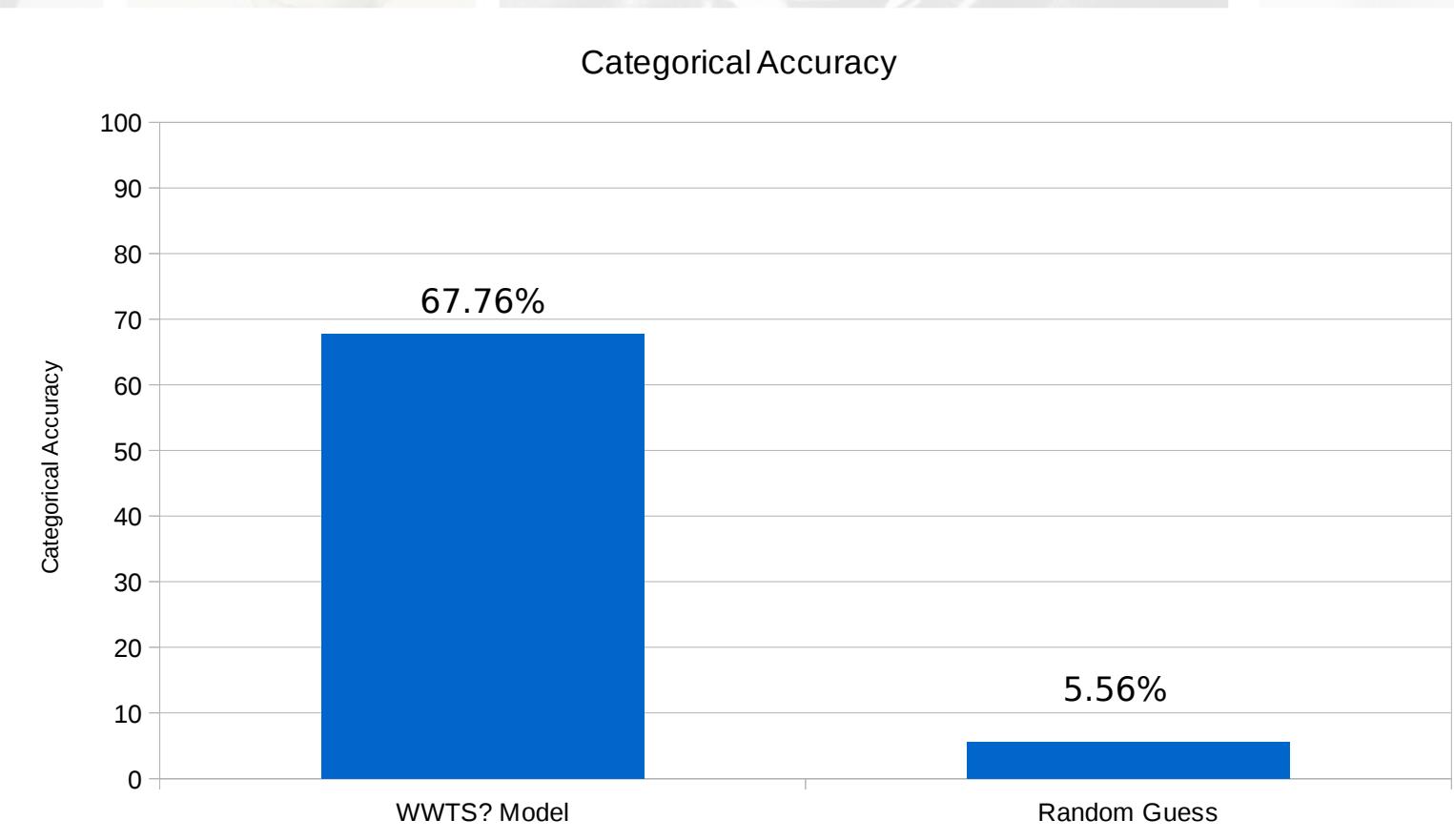
Composers

- Bach
- Beethoven
- Chopin
- Debussy
- Giuliani
- Handel
- Hays
- Hewitt
- Mozart
- Paganini
- Scarlatti
- Schubert
- Sor
- Tchaikovsky
- Thomas
- Tucker
- Vivaldi
- Webster



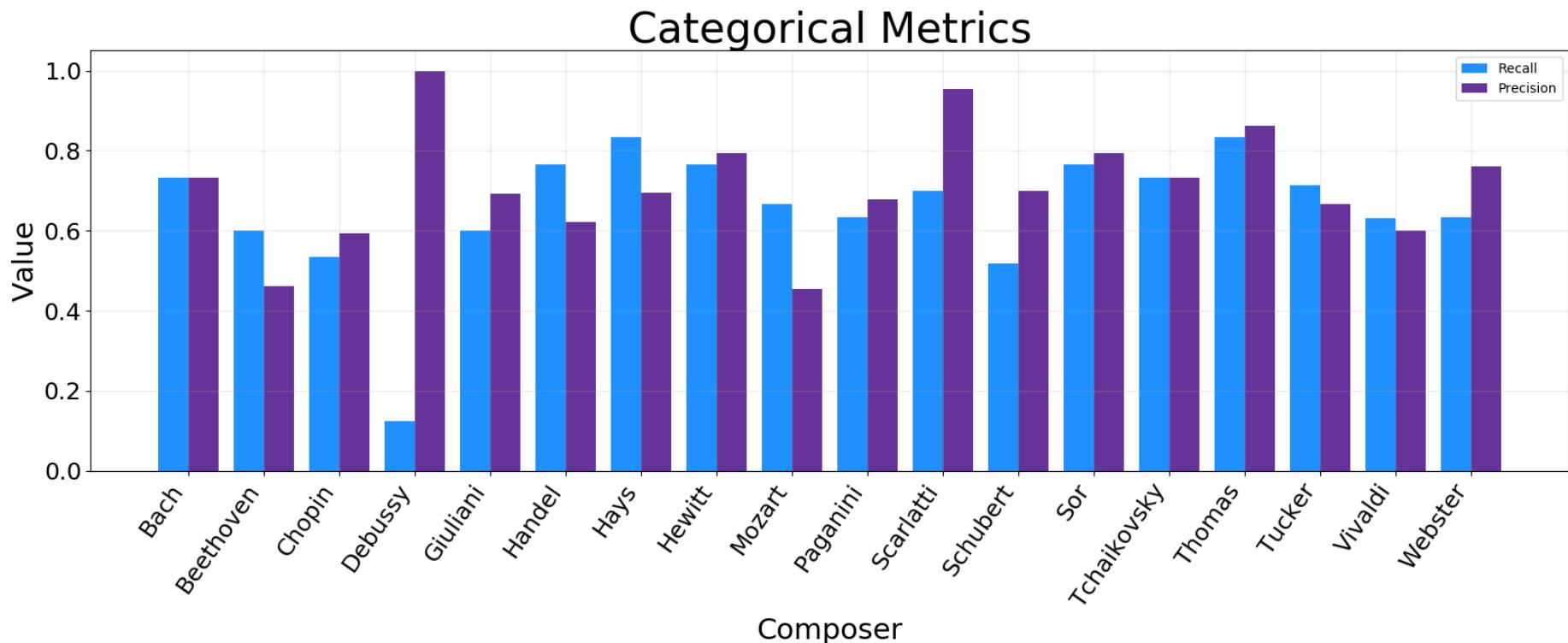
Results

- Test categorical accuracy: 67.76%
- Random guess accuracy: 5.56%



Categorical Metrics

- Debussy had trouble from the class imbalance
- Mozart and Beethoven have low precision



http://WhoWroteThatSong.net

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Stack logos!