



An Interactive Computational System to Accompany Jazz Improvisation

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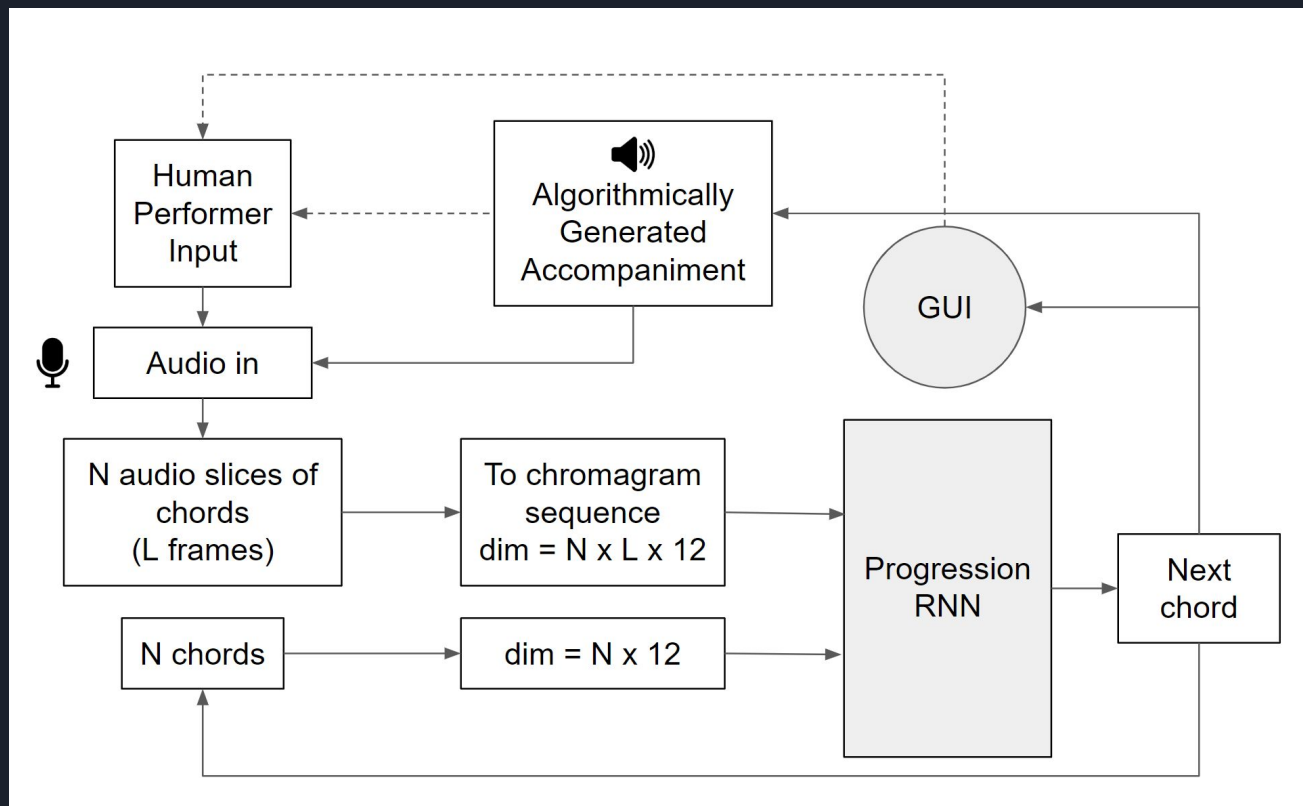
Overview of project: **Automatic chord generation to accompany and interact with any number of players**

Idea: Computer will generate chords in real-time based on both the human players and previously generated chords.

Motivation:

- Improvisation is critical element in jazz
- Pre-recorded backing tracks do not provide a realistic experience
- Our interactive system will provide a powerful and enjoyable practice tool for jazz musicians

Flow of information



Settings:

Tempo: ▶180

Lv. Random: ▶3

Key: E ▼

Swing: ✕

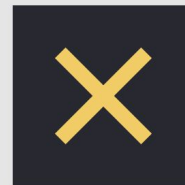
Instruments:

Piano: ✕

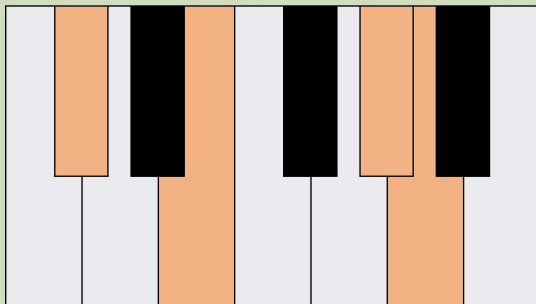
Drums: ✕ new pattern ○

Bass: ✕

Click To Start



Current Measure: ○ ○ ○ ●



A:maj7

Next Chord:

E:maj7



Chord prediction module: RNN with two LSTMs

Chroma LSTM:

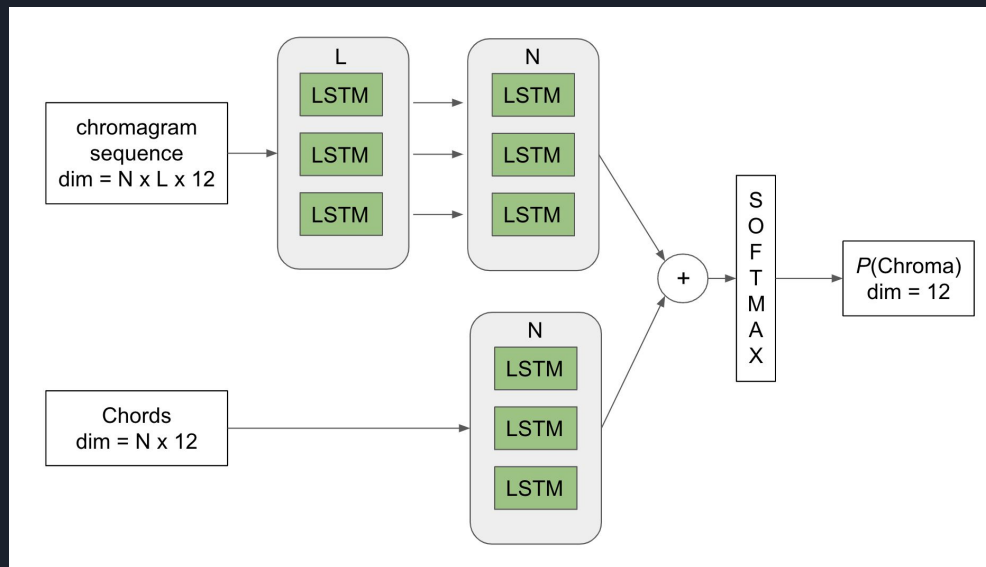
- Two steps: reduce dimension each time

Chord LSTM:

- One step dimension reduction (w/ multi-layered LSTM)

Chord dictionary:

- No extensions past the 9th right now
- No plain triads (could easily allow triads if desired)



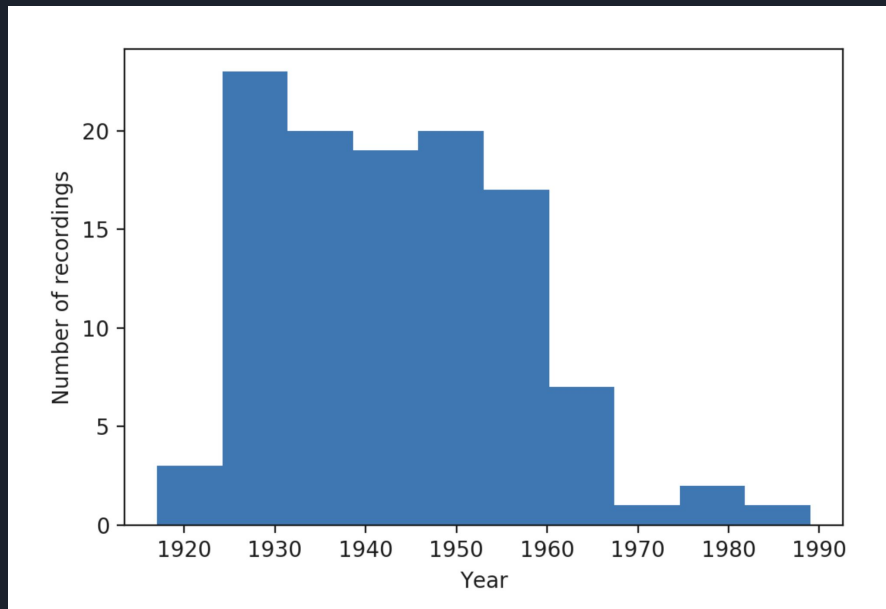
Training

Dataset: Jazz Audio-Aligned Harmony (JAAH) Dataset

- Contains early jazz standards
- Trained with 80 songs
 - Saved 26 for validation and testing

Details:

- Transposed to one key
- 4 chords to get prediction for next chord
- Pad with zeros at the beginning of the song
- Pad chromagram sequences to make a batch
- For every training iteration, randomly choose among 4 modes (no alteration, chord only, chroma only, skip)



Demo





Discussion

Observations:

- System emphasizes ii-V-I progression in pre-set key, limited ii-V-I's in other keys
- Very basic system

Fixed parameters: tempo, key, mode, meter, swing or straight

Limitations:

- Rhythm is not determined by the model
- Only the harmony is interactive
- One chord per measure
- Training was limited to early jazz standards



Survey

<https://forms.gle/2Zksmsuzm9EG2bda8>



Questions?