

Classical Music Generation

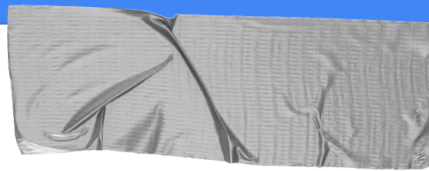
Using Markov Chains



Grapheme To Phoneme Conversion

Raga : Classical mode of music

Different ragas are generated by Markov Chain Model based on assumption that 'Probability of current state depends only on previous state.'



Technologies Used

Text to Speech is complex process especially with music involved. Midi Files are used for reducing this complexity. These file contains instructions to play musical notes.

→ **Python 3.5.2**

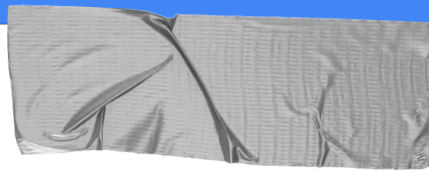
Easy to use with huge library support. Best suited Mido library supported. JMusic tool for Java avoided, comparatively complex.

→ **Mido Library 1.2.8**

Library written in python with support read, write and parse content of midi files.

→ **onlinesequencer.net**

For playing midi files with different instruments, tempo and visualization of notes written



Directory Structure

Directory structure is as follow. At outermost level README and LICENSE is there for project.

→ **/_in_raga & /_out-raga**

For input and output midi files, are stored in these respective directories.

→ **/util**

Contains script for printing information about midi files.

→ **/src**

Contains one script for **generating** the output file. A **markov chain script** for creating **markov script** for input & output. **Parser script** for parsing midi files as Markov chains.

Working & Explanation

Step 1

generator.py

Firstly it calls parser.py for parsing input midi file and getting the markov chain dictionary structure.

parser.py

It takes previous & current chunks of notes, permutes them. Finally, average current duration & add to chain.

markov.py

Here, From_Notes to To_Notes are added into the dictionary. get_chain returns the markov chain.



Working & Explanation

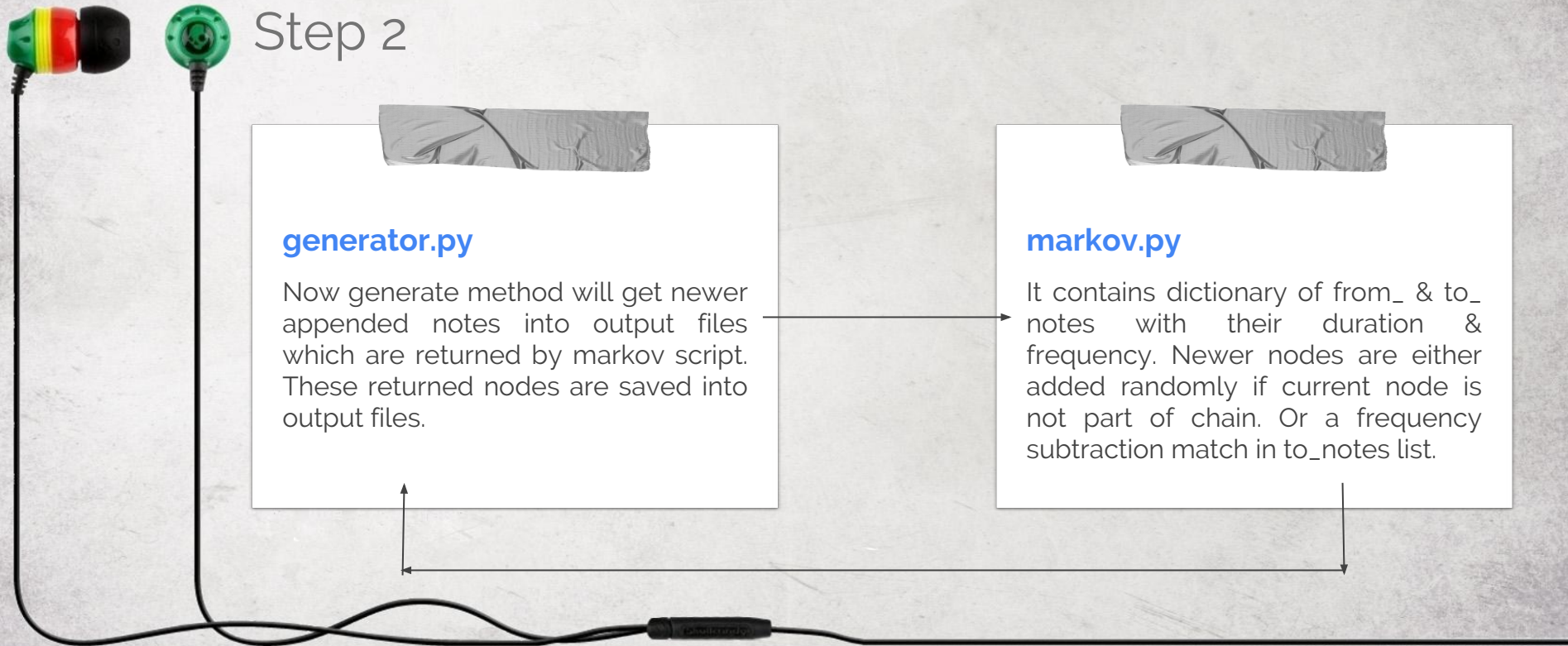
Step 2

generator.py

Now generate method will get newer appended notes into output files which are returned by markov script. These returned nodes are saved into output files.

markov.py

It contains dictionary of from_ & to_ notes with their duration & frequency. Newer nodes are either added randomly if current node is not part of chain. Or a frequency subtraction match in to_notes list.



Limitations

With no previous direct link between specific notes. No new connected component notes can be created.

Solution

Hidden Markov Model is required in such cases. Which will take into account non-observable factors into account.

Result

The above code handle such situation with exception handling. But, the markov chains fails to create new music.

References

<http://home.iitk.ac.in/~aawasthi/cs365/project/report.pdf>

<https://hackernoon.com/generating-music-using-markov-chains-40c3f3f46405>

Resources

<https://www.cse.iitk.ac.in/users/tvp/music/>

https://mido.readthedocs.io/en/latest/midi_files.html

Thank You !!