Abstract
In recent years there has been a focus on the accessibility and equity of music instruction in under-served communities. The value of private/guided instruction is clear, but the question of reaching students from lower economic classes presents challenges our current educational system struggles to address. The Blugold Computational Music Suite (BCMS) is a system that supports novice to intermediate musicians in their musical goals by giving them access to computer generated lessons that mimic what a private instructor would assign to them.

This work investigates methods for extracting data and meta-data from musical selections for automatic music generation. The focus of this work is to identify ways of extracting and storing extracted musical features that will be useful for generating etudes for musical instruction.

Approach

Markov Chain
First-Order Markov Chains is a simple statically based model. Each state has a set of possible transitions based on the probability of their occurrence. For this work, the note properties are the states and the transitions are the probabilities of those states extracted from the original musical selection.

Neural Network
A common practice in music instruction mirrors a Socratic approach commonly employed in the classroom. An instructor will consider the goal of the student musician (i.e., a target musical selection wished to be preformed), and break it down into a set of etudes for the student to practice based on the properties of the musical selection (e.g., rhythm, dynamics, range, etc.). As the student masters the various etudes, the instructor will present more difficult ones, or address other aspects of the musical selection; eventually preparing the student to master the desired selection of music. This approach to assisting the student musician is the corner-stone of the BCMS project.

Results

Future Works
Future work is looking further into comparing the similarities of different models and the original piece. Also looking at the intervals between notes, maybe those can be included with the neural network for more data. Another avenue of investigation will be identifying a song's rhythmic features and using them to aid in generation instead of singular duration.

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References