

Abstract

I am building a xylophone-playing robot that comes up with its own melodies. The melody will use the chords played on the connected keyboard, the color it senses, and the proximity of onlookers to the robot to change the way it plays. The system will consist of a xylophone, 12 small solenoids that will be used to play the xylophone, a Sharp IR sensor to detect the proximity of onlookers, an Arduino Due to drive the solenoids and read the IR sensor, a laptop with a wired connection to the Arduino, a webcam built in to the laptop for color detection, and a MIDI keyboard connected to the laptop through USB.

My initial plan for generating the melodies is to use Markov chains. Markov chains take an input state and compare it to its chain that gives a set of potential next states in the chain, each with a different probability based on the learning set. The learning set will be developed from the works of great melody-writers. This system would form the basis for the melody generation. The keyboard input will tell the robot what key to play in and the time signature. The proximity sensor will cause the robot to play more or less notes in a measure (play “faster” or “slower”), while color detection may influence something like which artists to place an emphasis on (Blue for McCartney-esque, green for Brian Wilson, etc.).