Daniel Kim (dskim89@mit.edu)
Gabriel Ha (gha11@mit.edu)
6.111 Final Project Abstract

Pad-Free DDR with Pseudo-Real-Time Music Processing

Dance Dance Revolution (DDR) is a pioneering music video game focused on rhythm and dance. Players stand on a dance platform or pad with four arrows (pointed front, right, back, and left). The goal is to hit these arrows with their feet according to visual and musical cues. Players are judged by how well they time their steps to the patterns displayed on the video screen and receive a score at the end of the song. In our FPGA design, we implement a novel version of DDR including new interfaces and pattern synthesis.

This project offers two major advantages over the original. First, the game removes the necessity of the DDR pad and uses cameras to detect the player's foot movement on the ground instead. This provides a freer user experience and will hopefully eliminate the frustrations of the DDR pad not recognizing intended movements by the player. Second, the game allows the player to dance to any song. The music is downloaded to the labkit and an algorithm processes the file and produces an appropriate and deterministic sequence of dance steps. While the player dances to one song, he may choose to upload a second song, which will be processed while the player is playing to the first song.

The more well-defined a song's beats are, the better the algorithm processes the song into an appropriate sequence of dance steps to be played and stepped to. The game features two levels of difficulty: Easy and Standard. Standard DDR rules, graphics, and scoring are emulated in the project, including bonus points for player's step-time accuracy, and additional bonus points for consecutive good step-timing.