

CS5244 Introduction to Cyber-Physical Systems

Project # 3 Electric Guitar Using LabView, Due Jan. 16 2014 (10:10 a.m.)

Introduction

In this project, we are going to try LabView (<http://www.ni.com/trylabview/zht/>) to implement electric guitar. LabView is not a popular language in CS department, and CS people usually have no prior experience on it. Hence, the requirement of this project will be slightly lower than the previous ones. You need to download LabView free trial version and its corresponding NXT module to do this project, since we do not have enough licenses for all the students.

The goal for the electric guitar is to make different sounds according to different sensors' reading. The ultrasonic sensor measures the distance to a moveable plate that slides along the neck of our electric guitar. The position of the plate determines which note or chord to play. Once you press a touch sensor on the body or you use acceleration sensor to detect the movement of your hand, the NXT make sounds.

Implementation (6%)

- | | |
|---|------|
| 1. Readings of the distance between the plate and the ultrasonic sensor | 1.5% |
| 2. Build your guitar using Lego bricks | 1.5% |
| 3. Enable NXT to play different sounds according to different sensor readings | 2.0% |
| 4. Choose a way to trigger NXT make sounds | 2.0% |

Report (2%) & Video(2%)

Describe how you implement the NXT electric guitar using LabView, and make a video to show how you play your guitar. If the sounds of the electric guitar are well designed, you will get bonus points at most 2 points.

Reference

[1] The following blog offers a series of tutorial on programming NXT using Labview. All tutorials contain step-by-step instructions. Please find it at <https://sites.google.com/site/robtorok/>