“Air-Sticks” Project Proposal

Fall ‘23, ECE 395

Team Members:

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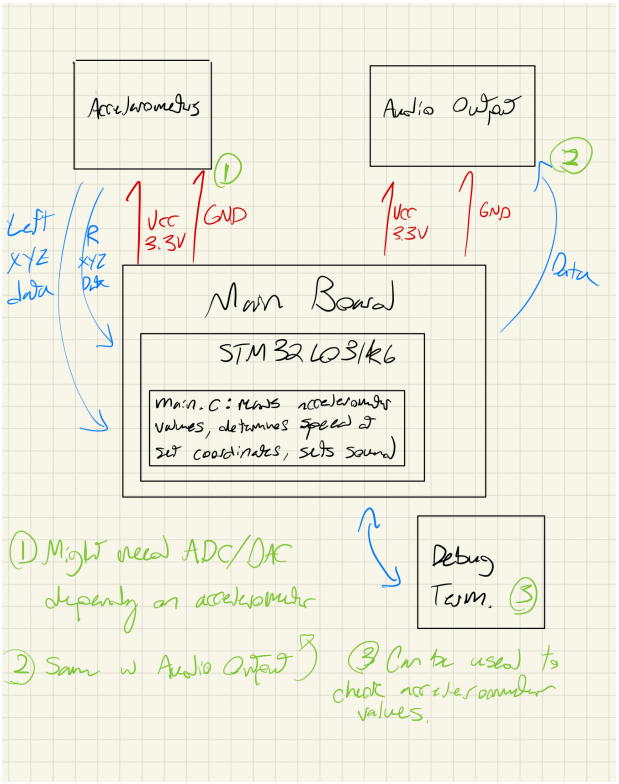
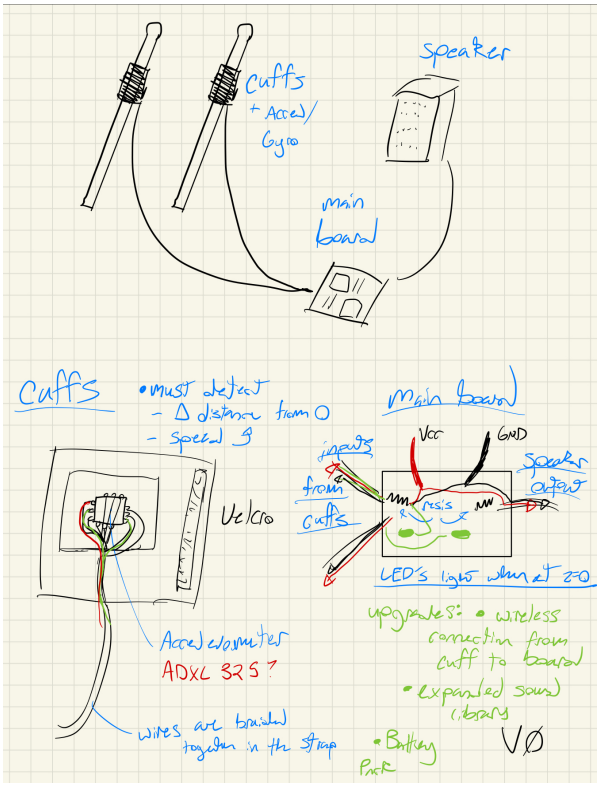
Project Description

Air-Sticks are a project designed to give the user the flexibility to play and practice different kinds of percussion instruments anytime, anywhere. Velcro cuffs equipped with digital accelerometers are to be slipped onto several types of sticks or mallets to track the acceleration and position of the sticks. The cuffs are wired to a board with an ARM processor, and from there are connected to a speaker output. In the future, we might hope to make this system wireless, and/or put the speaker right on the board. Additionally, for our stretch goal of several different types of drums, we may use a hardware input on the board to choose between these. During testing, LEDs on the board will be available to determine when a tap has been sensed.





Project Goals

By the first demo, we should be able to demonstrate the ability to sense the position and acceleration of the stick/cuff via terminal output and LEDs. By the final demo, we should be able to demonstrate speaker output based on position and acceleration. As stretch goals, we would like to have settings for different drums (snare, tenor, timpani, bass, etc.).
The overall goal of our project is to be able to have several different drum types available.

Low-Level Coding

The coding will be done in C. We need the ARM processor to receive input from the accelerometer. It is important that, for this, we zero the position data from the accelerometer from the initial position, as people might be taller/shorter or sitting. We will need to write a function that formats the position and time data from the accelerometer into acceleration, and the acceleration into the volume and frequency of the matching sound. We will also need to write the sound as an output from the processor to the speakers.

Tentative Schedule

The following times are when we plan to be in the lab together, though there are some times throughout the week that we may work individually.

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
		8:30-9:30 (AM) Class Meeting	1:00-2:00 (PM)	8:30-9:30 (AM)	1:00-4:00 (PM)	