CS 362 Project Write Up #1

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Introduction:

When one goes to a bar and order a drink, the bartender listens for which drink is requested, creates the drink, and serves it. The Automated Bartending Computer (ABC) is a personal bartender, upon request, will serve the user an alcoholic or non-alcoholic beverage of their choosing. The user will input which drink they desire and place a glass on the glass track, and the ABC will fill up the glass with the appropriate beverage. Which the user may pick up and enjoy.

The functionality of the ABC can be broken down into four essential components. There is going to be a frame work created to house the entire bartender, there is going to be an input mechanism which allows the user to choose their beverage, there is going to a track system which moves a glass to the desired beverage output, and finally, there is going to be a the fluid mechanism which dispenses the fluid into the user's glass. Each of these components will individually use an Arduino and come together to create a fully functional bartender, ABC.

Components:

- Frame Work: (Dhruv)

Frame work is the most essential aspect of this project, due to the fact that the automated mixer is mechanical machine being assembled on a wooden frame. The first and foremost part of the machine is the wooden frame which holds the entire machinery. It will be an L shaped wooden block which, on the y-axis, will have the bottles attached to dispense the drink. On the x-axis, the framework will hold the track, which will control the position of the glass. The length of the wooden frame will be decided upon determining the diameter of the largest cocktail bottle being fit into the ABC.

For the initial manufacturing of the framework, two wooden pieces will be attached together, in an L shape, by drilling screws into each. The Upside-Down bottle dispenser will be attached onto the top of the frame, horizontally (look at the below links for pictures). It is also screwed into the frame; thus, ensuring that the dispenser is rigid and not wobbly. Precision of fluid flow is a key aspect of the project, thus the dispenser must be attached correctly. The track is attached to the horizontal piece of the frame. The track will be attached horizontally, right below the bottle dispenser, so the glass will be in line with the dispenser. Lastly, since wires are going to running throughout the framework; thus, to clean the wires up and to avoid any fluid mishaps, there will be PVC piping encasing the wiring.

- Track System: (Andy)

For the track system there are two types of rails being proposed. The first proposal was to use aluminum channel for the rail. The rail itself will support the moving platform. On the bottom of the moving platform, each corner of it will have rubberized wheels where they will make contact with the aluminum channel. On the side of the platform there will a threaded pulley that will be used to guide a timing belt both over and under the pulley itself. This pulley will be used to move the platform back and forth on the rail. At the end of both sides of the track, there will be idler pulleys that will allow the timing belt the move freely. At one of the ends of the idler pulleys there will be a DC motor connected to it that will move the platform based upon the user command.

As for the second proposal, the idea of using a threaded rod to guide the moving platform back and forth was suggested. The ends of the threaded rod would be connected to the idler pulleys that will allow the rod the move freely. At the ends of one of the rods there will be a DC motor connected to it that will rotate the rod. On the bottom of the platform, there will be a nut welded that will allow the threaded rod to pass through it, doing so will make the platform move back and forth based on the rotation of the rod. The platform itself will have the same basic setup, it will have four wheels at each corner.

Out of the two proposals, the threaded rod will be better due to the possibility of less jerk of the platform when the DC motor moves. Another benefit of it is that there will be less free-travel once the motor stops moving allowing use to stop closer to our desired stopping point. Lastly, the moving platform itself will have a glass holder that will prevent the glass from tipping over once there is fluid inside of it.

- Fluid Flow: (Paul)

The bottles are placed upside down with a mechanism, which prevents the bottle from dispensing fluid unless a certain amount of pressure is applied against the mechanism. A mechanical pole that goes up and down will be implemented to allow the mechanism to be activated by the lifting pole applying pressure to it. Thus, dispensing fluid. There are two ways to implement the moving pole, having a servo that can operate the pole, or have a pole with threads and install a dc motor that spins the pole in the direction that it needs to go.

In order to stop the motor or servo, there will be a pressure sensor placed below the dispensing mechanism, which will sense the pole being pressed against it. When the pressure sensor reaches a certain value, the motor/servo will stop and stall for a few seconds based upon the measurement of fluid required to make the drinks. In order to get the dispenser to dispense the correct amount of fluid, much trial and error will be necessary.
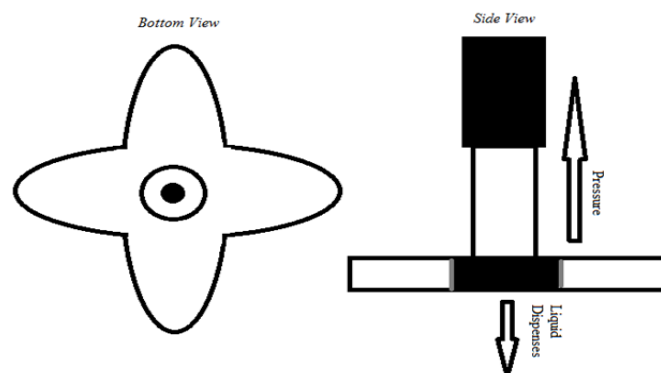
- Input: (Kunal)

Communication between the user and the bartender, ABC, is accomplished via an LCD screen showing the current drink and whether or not the drink is available, along with three buttons, each corresponding to a different option.

There are a total of three Arduino buttons will be used in order to cycle up and down through the drinks as well selecting the desired drink. One Arduino button, the UP Button, will be used to cycle up through the various drink options. Another Arduino button, the DOWN Button, will be used to cycle down through the various drink option. Lastly, the SELECT button will lock in the user's choice of drink as an input. As each of these buttons are pressed, the LCD screen will be updating the corresponding information of drink name and availability status of the drink.

Once the input is accepted, the Arduino will send the signal over to the track, move the glass accordingly, and then dispense the drink.

Current Work:
As seen above, we have planned out what we would like this bartender to do and how we might go about doing it. Now, we are currently trying to gather up the parts required in order begin constructing the ABC.

Parts needed:
BC Sanded Pine Plywood, PVC Conduit, 6 Bottle Dispenser, Threaded Rod, Large DC Motor, Rod for Dispenser, and Non/Alcoholic Beverages.
http://www.barproducts.com/upside-down-6-bottle-wall-dispenser