

Preliminary Design Review

Alfred

(Wifi-enabled automated mixed drink maker)

Team 15:

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Problem Statement

- **Time-Saver:** People wait too long at bars trying to get the bartender's attention to order simple mixed-drinks
- **Eliminates Bartender Pouring Errors:** Bartenders can disproportionately pour drinks or provide the wrong drink
- **Alleviates Congestion:** The amount of people around the bar trying to order a drink is a nightmare



System Specifications

- Order through mobile device
- Pour a perfect drink in under 2 minutes
- Bartender can insert choice of alcohol (750mL) and mixers into dispensers
- Choice of 4 different drinks
- Does not spill the drinks
- Tab system to order drinks
- Drink served to correct customer using door system
- Rotatable base to access different cups to dispense the liquids



System Specifications (cont'd)

- 10 cups of ice placed onto base
- 18" diameter base
- Dispenses correct proportions of liquids into each specific drink
- Failsafes:
 - Sensor to make sure cup is removed before closing door
 - Sensor to detect correct orientation of base



Inputs and Outputs

- Inputs
 - User's name, ID, and drink selection
 - Cups of ice
 - Mixable beverages
- Outputs
 - User's desired drink



Tentative Mixed-Drink Options

- Rum and coke
- Vodka tonic
- Whiskey and coke
- Vodka cranberry



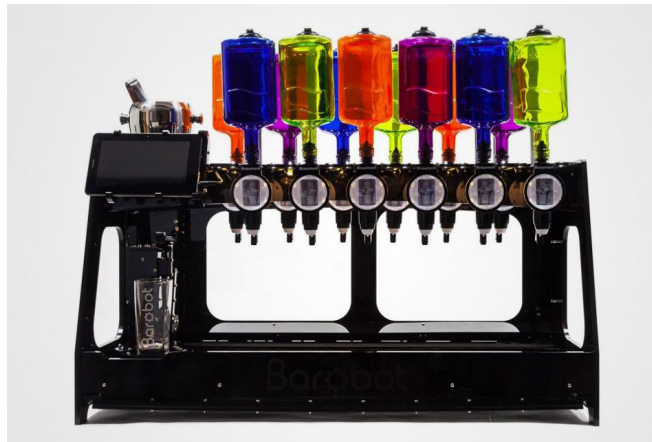
Design Alternatives (Existing Products)

- Using shot carousel/dispenser to measure out drinks and pouring it into cups : Consumer has to pour their own beverage
- Electronic drink dispensers (Coca-Cola Freestyle) : Too expensive

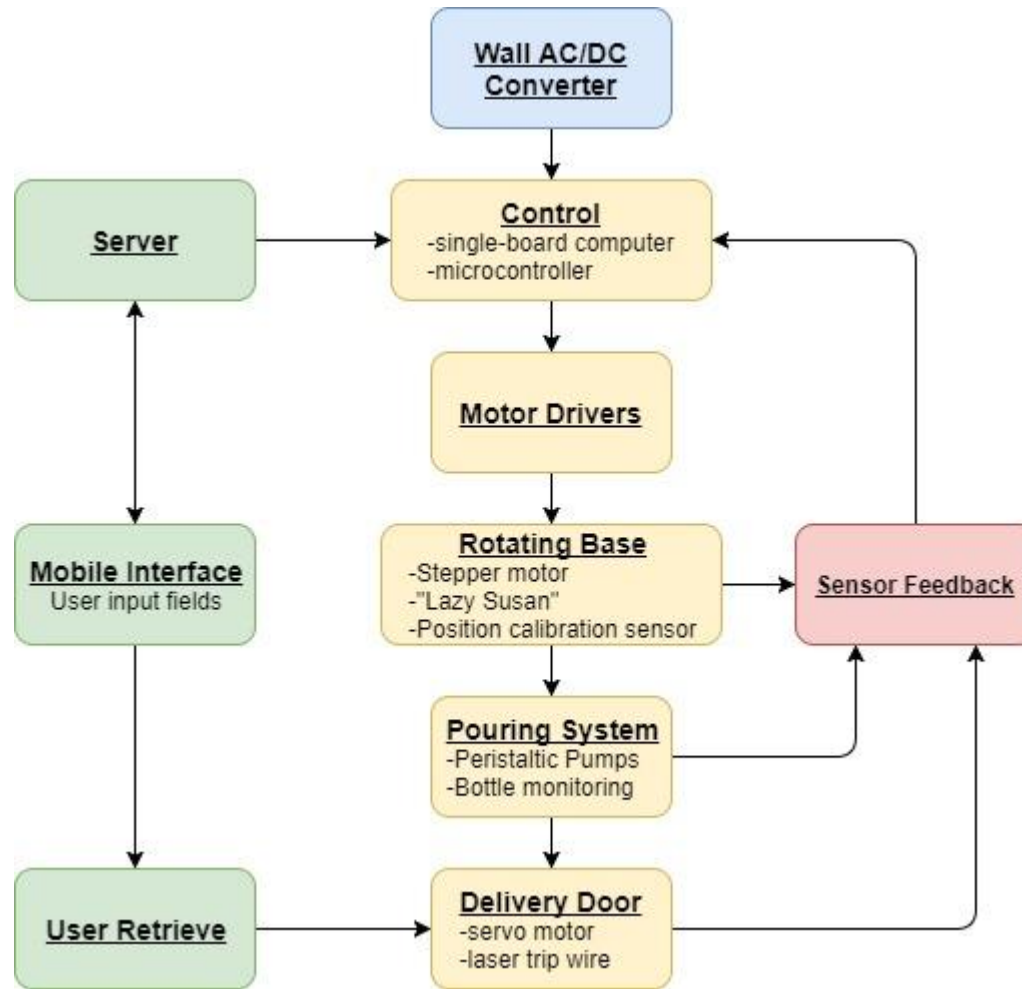


Design Alternatives (Existing Products)

- Bar2D2
 - Cost: \$2000
 - No user verification for orders
- Barobot
 - Linear System
 - Users have to wait in line to order



Block Diagram



Team Member Roles

- Chris: In charge of Power/Control system
- John: In charge of rotating bases/serving doors
- Ben: In charge of pouring mechanism, pumps
- Pat: In charge of Mobile Interface/Control system



Pouring Mechanism/Pumps

Peristaltic Pumps

- Precision volume dispensing used for medical dosing
- Allows liquid to travel without touching electronics
- Food safe
- Allows for bottle level monitoring

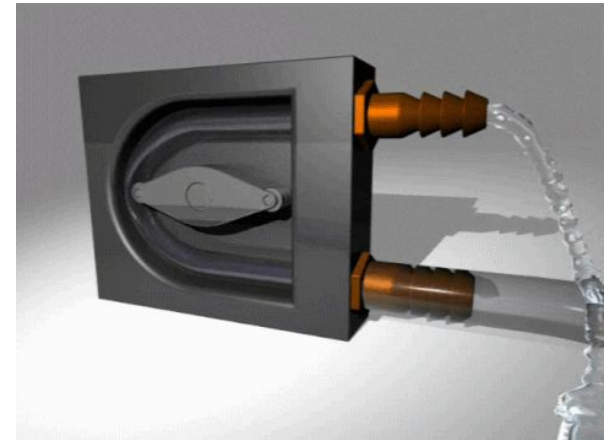
Specs

speed 3.4 fl. oz/min

12V/100mA

2 pumps/mixer = 6.8 fl. oz/min

1 pump/liquor = 3.4 fl. oz/min



Motors

- Rotating base - stepper motor
- Opening/closing door around completed cup - servo motor
- Pumps for getting soda/juice from lower level - DC motors

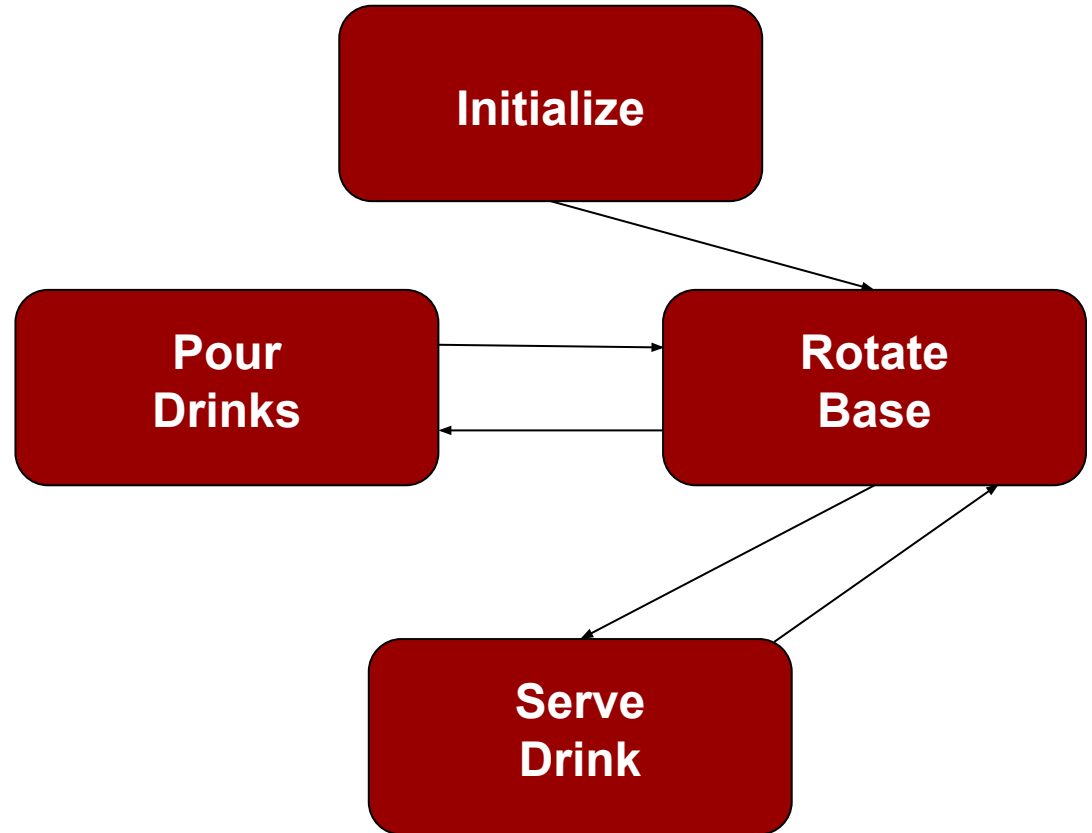


Power/Control

- 1800W maximum
- AC to DC converter/Step down voltage
- PCB amplifies signal from SBC for motors
- Server running on website (TCP)
- Single-board computer for main control and interface between server and machine
 - Can use additional microcontroller units for additional input/output processing, which can be controlled by SBC
- Interrupts triggered by serving door/personal identification



Bartender State Machine

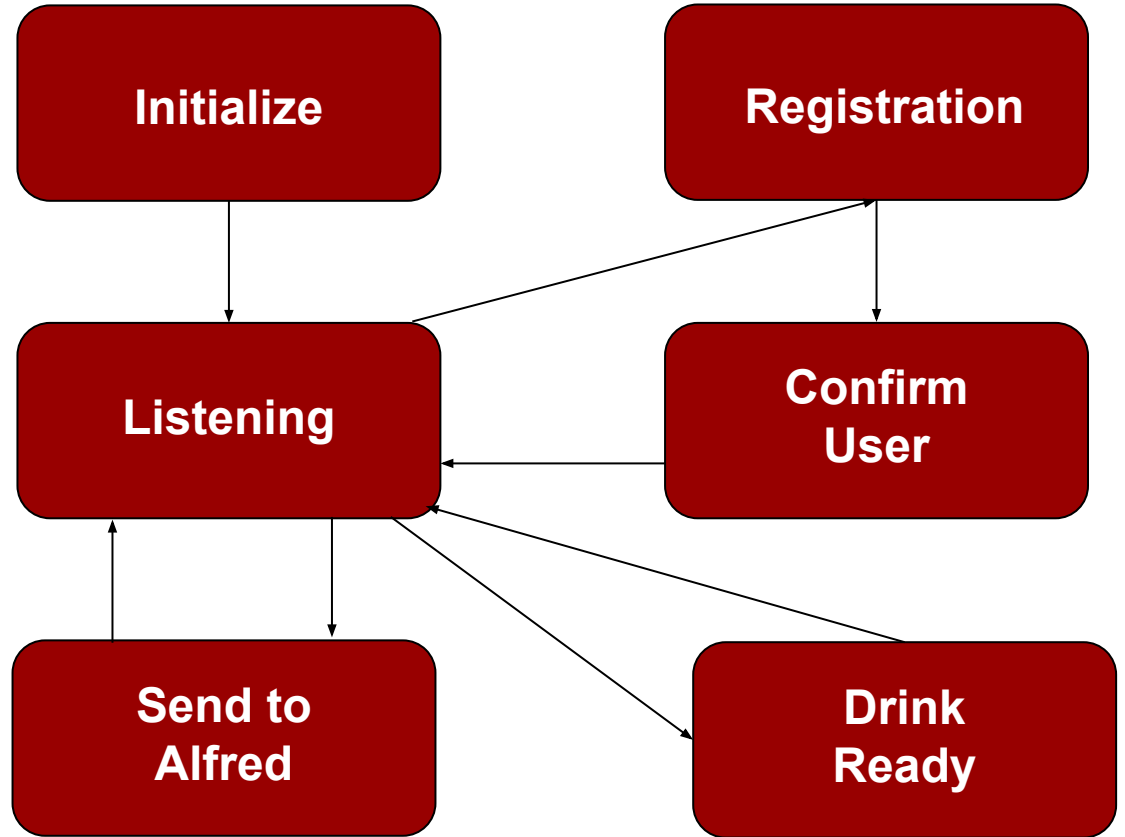


Mobile Interface

- Customers can order through a website after creating an account
 - Crossplatform
- Customers can order from selections on drink menu
- Server will interface with the hardware to make the drink
- Customers are notified when the hardware is finished making the drink
 - Given a personal identification code
- Customers can use personal identification code to open the serving door and retrieve their drink



Server State Machine



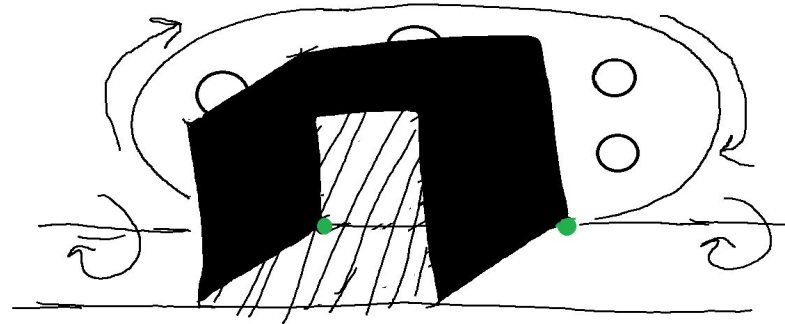
Rotating Base/Cup Holder

- Cups will be placed on circular positions on a rotating platform (~18" diameter)
- Circular platform will be covered with rubber to increase friction
- Tray will be mounted on lazy susan base, rotating using a stepper motor



Serving Door/Cage

- Vending door will be automated by servo motor
- Vending door will auto-shut after being opened and cup is taken
- Back side of door will drop down 3 walls around cup so interior of machine isn't exposed to user



Estimated Cost

- Single Board CPU: \$60
- Power: \$100
- Motors: \$50
- Base: \$30
- Drinks/cups: \$20
- Pumps: \$120
- Lasers/sensors: \$10

Total Budget = \$390



Additional Features

- Cups w/ ice preloaded into machine without help of bartender
- Completed drink taken out of machine automatically for pickup, without holding up rest of machine waiting for customer to pick it up
- Once cup is replaced, new cup is inputted immediately - not after all 8 are taken as it is now



MDR Deliverables

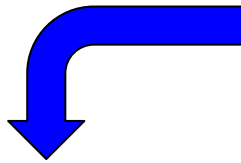
- System that can pour a drink given a set input
 - All initial instances are set by the team (i.e. cups with ice, full bottles, drink selections)
- Server and website are implemented
 - Users can post to database
- Will pump out exact amounts of each liquid
- Base will rotate to place correct cups under pumps
- Door opens when user inputs personal identification code



MDR Deliverables



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FPR & Demo Day Deliverables

- Users can access our website and order a drink
- User will receive an updated status when their drink is complete, along with a personal identification code
- User can use personal identification code to get their drink
- Server system and bartender system are fully integrated
- Fail safes are implemented





Questions??

Mobile Interface Details

- Http server
- SQL database for controlling inputs/outputs
- Accessible from mobile device



Cup Dispenser



Requirements:

- Dispense a single cup per into the same location on the base after a drink is served

Implementation:

- San Jamar C3400P Pull Type Cup Dispenser
12 oz. - 24 oz.
- Use of stepper motor to power a claw-like device that will be used to pull the cup down from the dispenser and into the one spot where we always place the cup

Ice Dispenser



Requirements:

- Dispense approximately the same amount of ice into each cup and dispense at the same location where the cup is dispensed

Implementation:

- Whirlpool W10204465A Ice-Contrn
- Use of stepper motor to physically dispense the ice from the container
- Additional funnel-like container can be added onto the Whirlpool ice container to allow for more storage of ice



Cup Loading Process

- The claw-like device will be initiated and pull a single cup straight down from the dispenser and place it into the slot in the back of the base (same spot every time)
- Once the cup is placed on the base, the ice dispenser will be initiated to rotate the spinning dispenser at the same rotation speed and same number of rotations in order to fill approximately 75% of the cup
- The claw-like device will hold onto the cup until the ice finishes dispensing to ensure that the cup will not tip and then it the claw-like device will release the cup with ice and will allow for the base to rotate again

