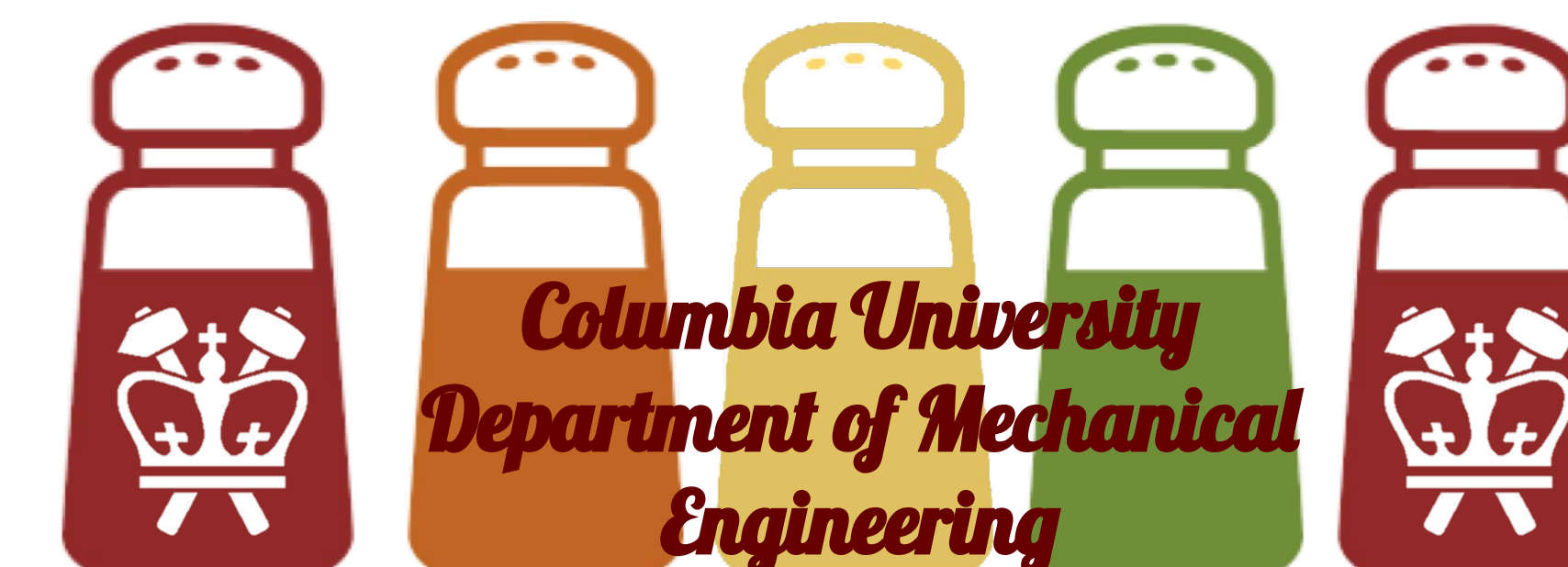


PreSpice

Automatic Spice Dispenser

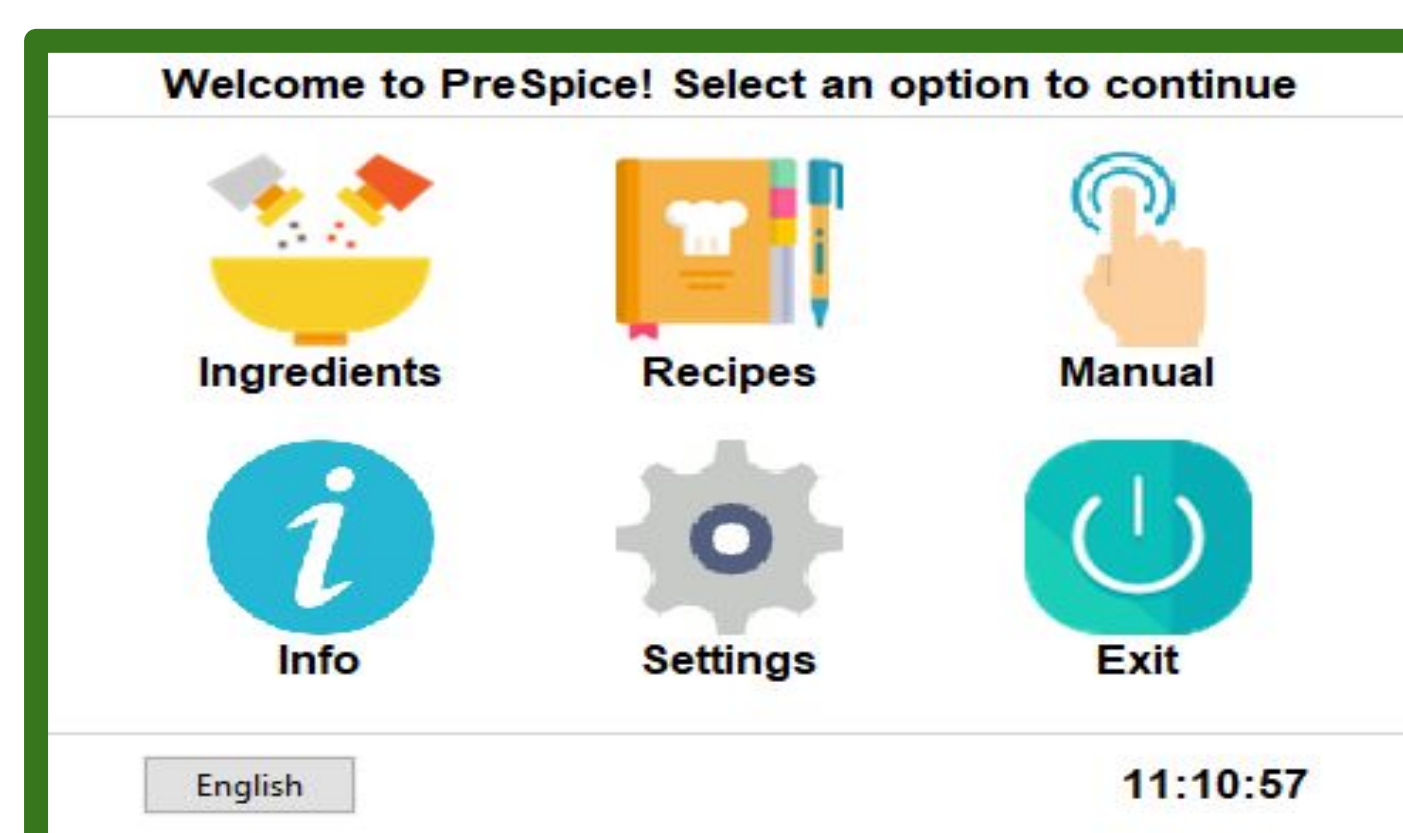
Senior Design 2019 MECE Group 1



Device



The *PreSpice* is an automated spice dispenser and cooking companion. By tracking the remaining volume of user's dried spices and offering recipe inspiration based on loaded spices, the *PreSpice* introduces the user to new and exciting flavor combinations. The *PreSpice* housing is designed to fit neatly in a standard kitchen cabinet.



An intuitive touch-screen interface allows the user to easily interact with the *PreSpice*. Users have the choice to manually input a set of desired spices to dispense or select a preprogrammed sequence.

Each spice container in the *PreSpice* is able to be easily interchanged. A dispensing wheel inside each container measures out the desired amount of spice, making cross-contamination impossible.

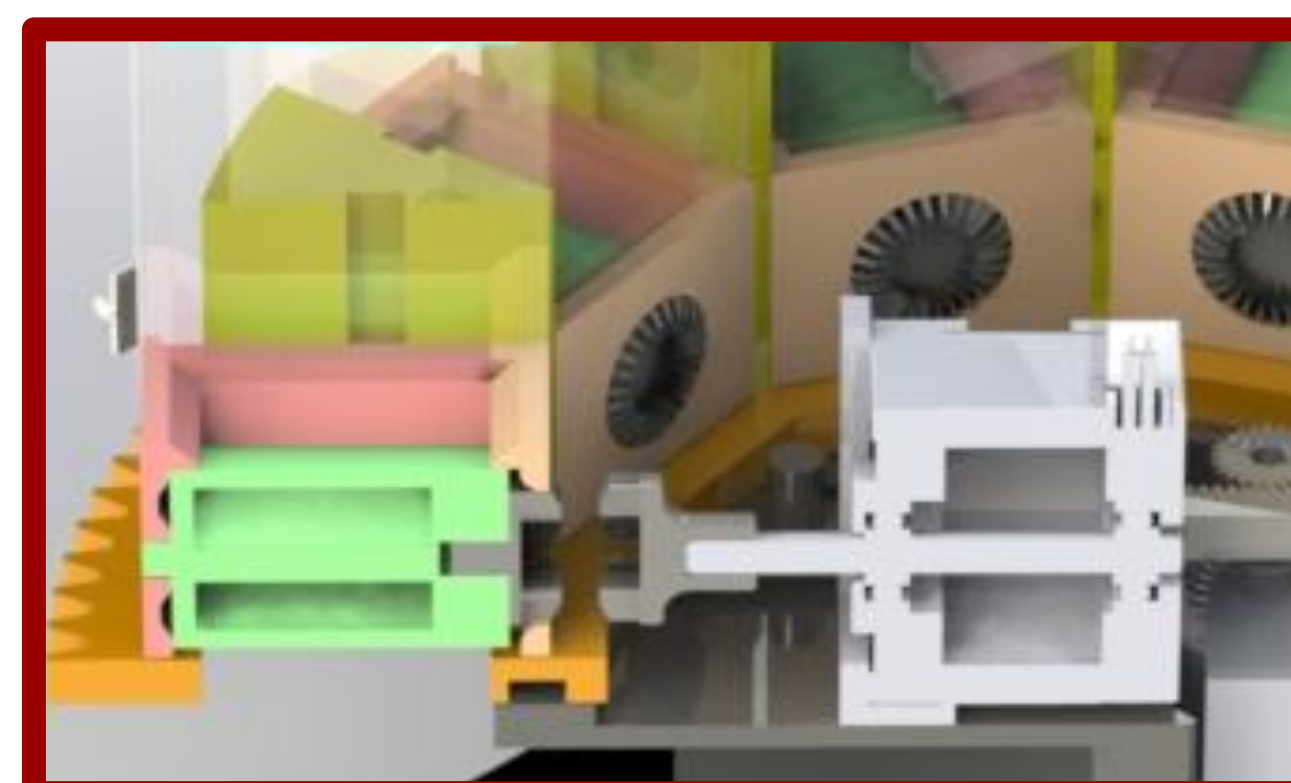
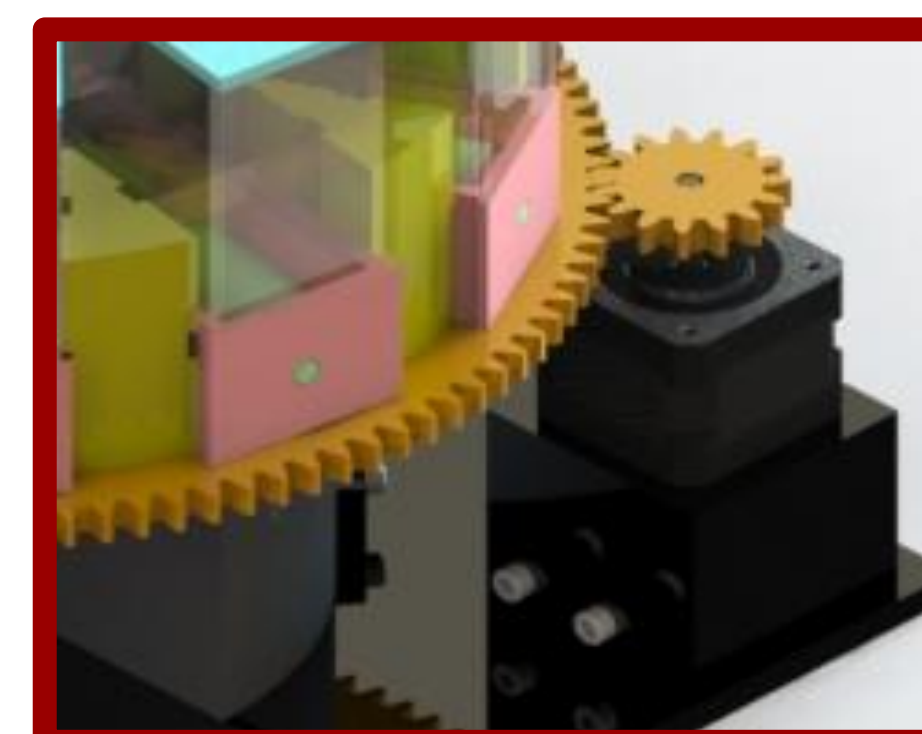
The container prototype was designed in accordance to FDA's standards for food safe devices. The primary material is PLA, and sharp corners were avoided for cleanability purposes.



Hardware

Carousel

The carousel is central to the functionality of the *PreSpice*, rotating each selected spice into the dispensing position. This maximizes space usage, prevents contamination, and minimizes the number of motors needed for functionality.



Spice Dispensing

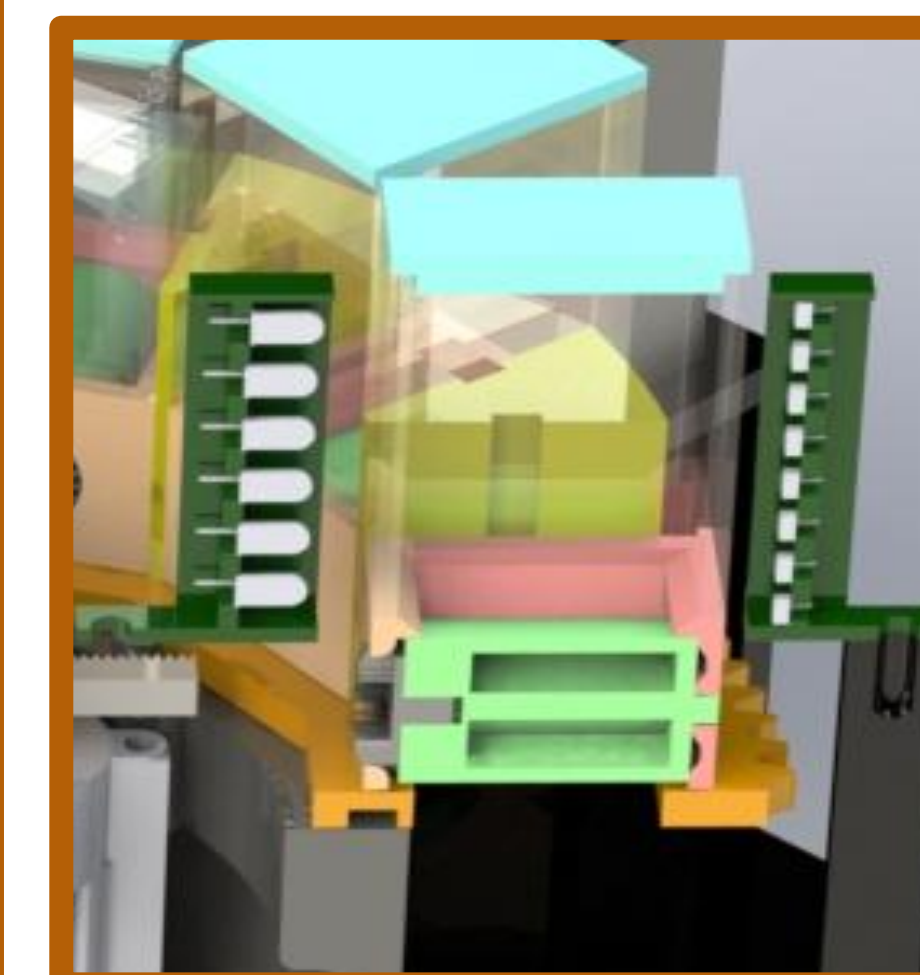
To dispense the spice, a stepper motor is moved forward by a linear actuator. The end-effector attached to the forward moving motor meshes with the matching device

the container, connecting the rotary action of the motor with the measuring wheel within the containers. Once the measurement is complete, the stepper motor retracts to allow the carousel to rotate to the next spice.

Features

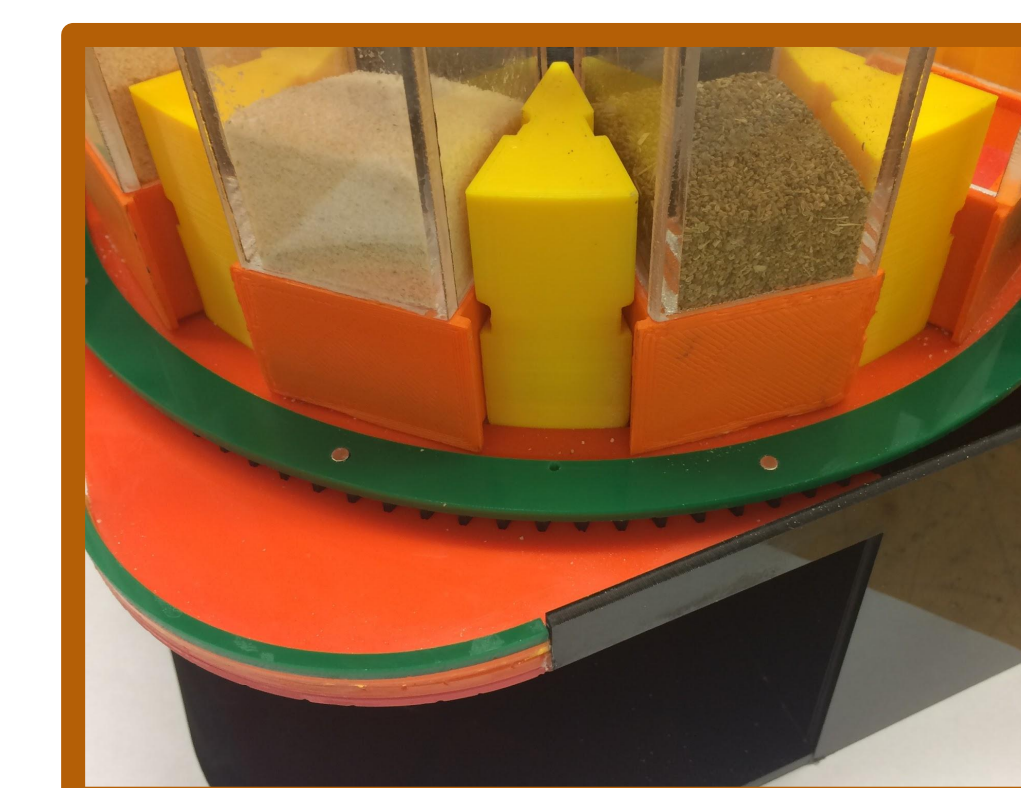
Volume Detection

When a spice is added or the *PreSpice* is turned on, the system cycles through all unknown containers and uses an LED and photo-resistor array to measure the amount of spice remaining in each container. This ensures that the *PreSpice* does not attempt to dispense more spice than what is present in the container. This feature also allows it to alert the user when a spice level is low and needs to be refilled.

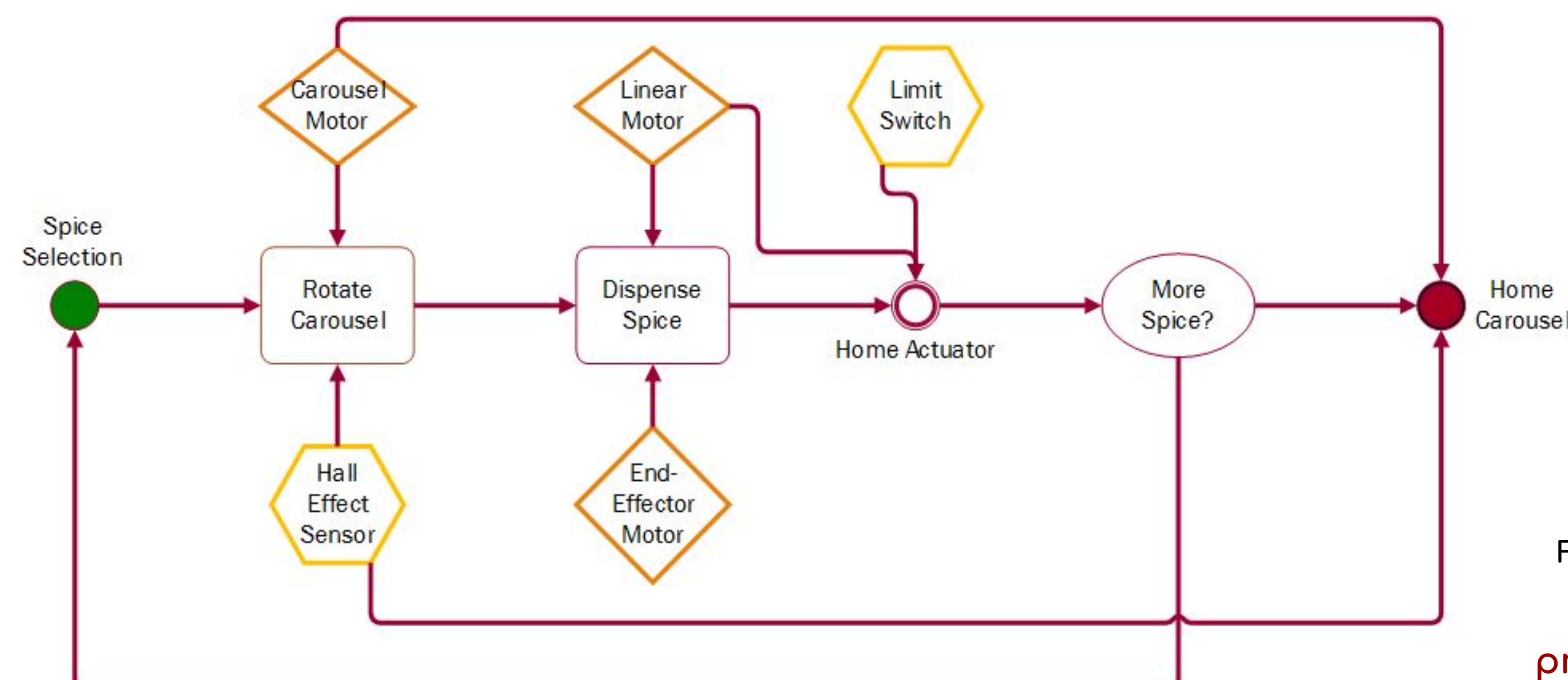


Container Alignment

To align the carousel, a magnet is embedded in front of every container's position. A hall effect sensor in a fixed location detects the magnetic field of each magnet. The magnetic field is strongest when the container is aligned. A larger magnet is also placed as a reference for carousel homing.



Work Flow



Thanks for a great year!
For future updates, feel free to contact us at

prespice.team@gmail.com