



# A Mobile Manipulator Robot for Drink Preparation and Serving

## OVERVIEW

Bartenders have the challenge of always delivering quality service, especially during peak hours. We programmed the robot to dispense drinks, thus reducing the time bartenders spend on tasks.

## FRONTEND

The frontend was developed using a Mobile First approach that adheres to Material by Google design principles. This optimizes usability by simplifying the ordering process to just two clicks: select a drink and select a size.

## SOLUTION

We are programming the robot to be a bartender that can dispense beer from a tap, allowing human bartenders more freedom to interact with customers and deliver better service.

## TARGET AUDIENCE

Given the cost of the robot, we are looking at upscale bars to be our primary audience. The novelty of the robot would also be appreciated by the customers at the bars.

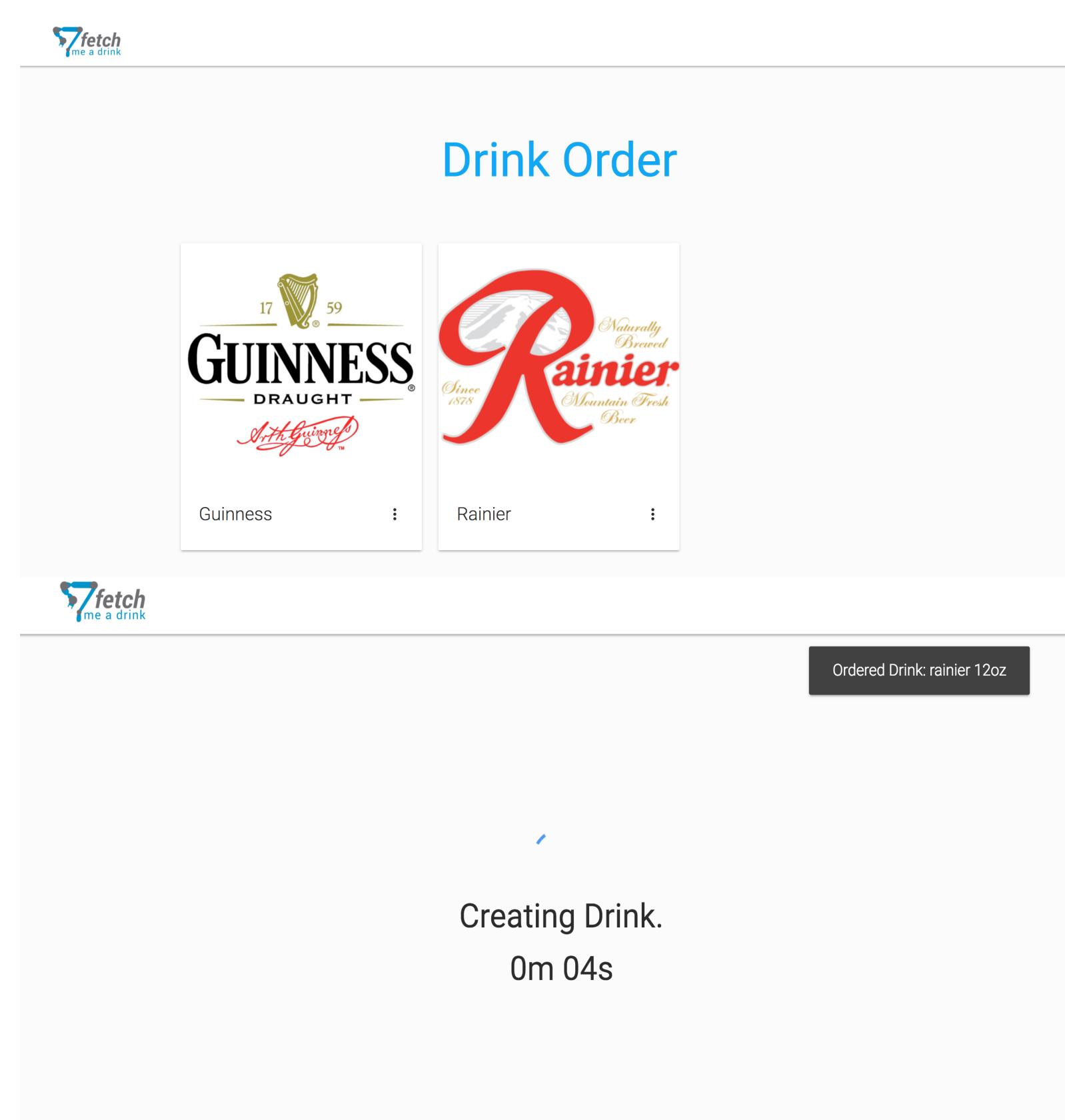


Fig 1: Frontend on Desktop

WEB APP

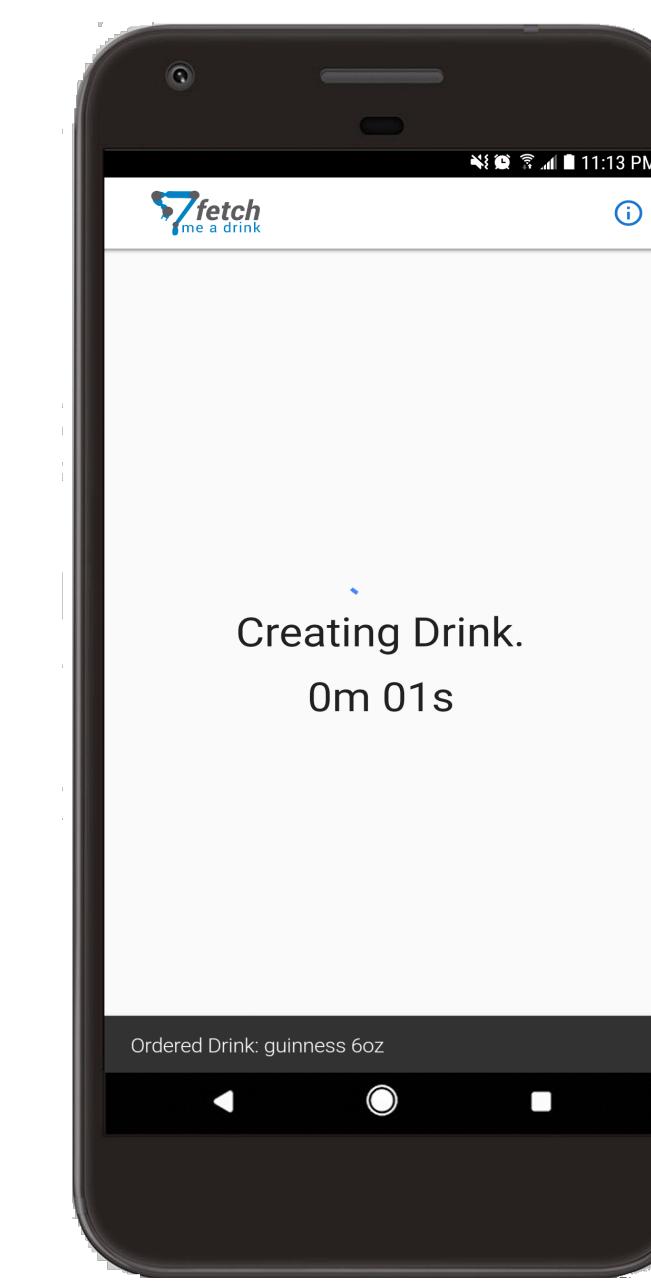
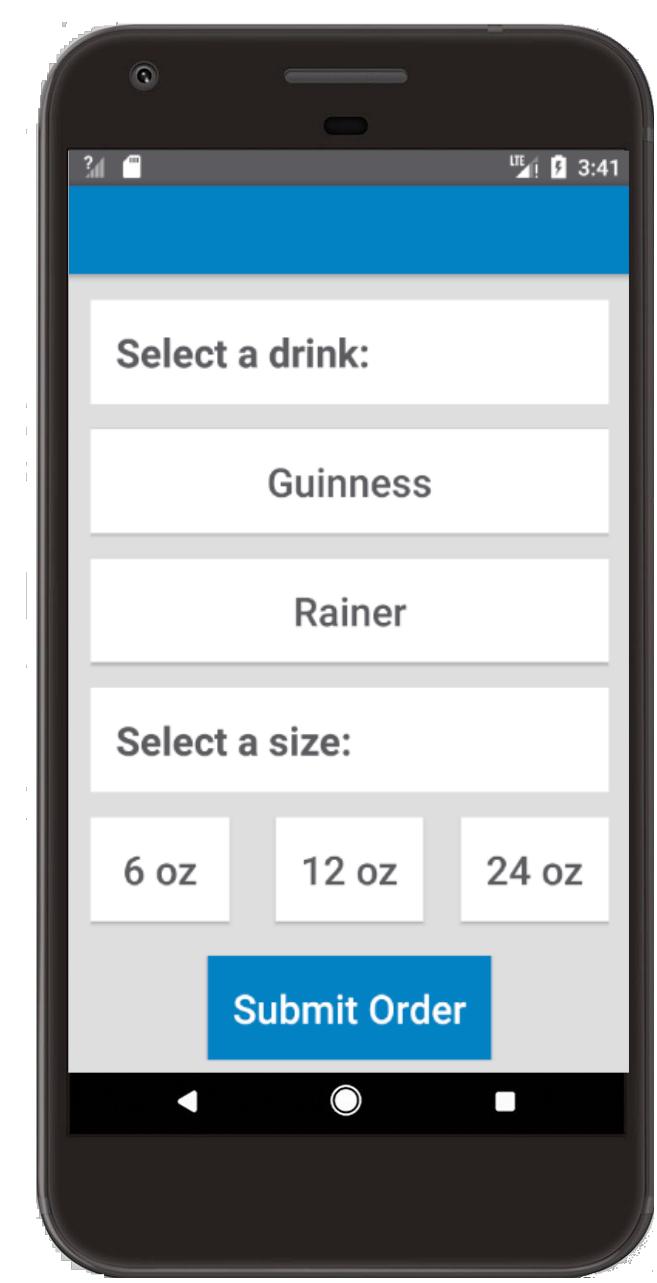


Fig 2: Frontend on Mobile

ANDROID APP



## PERCEPTION

Perception helps the robot identify the cups on the table allowing it grab the cup. The algorithm segments the surface using RANSAC and identifies objects above the surface. The robot then recognizes the surface as the table and uses thresholds to group objects above the table as cups.

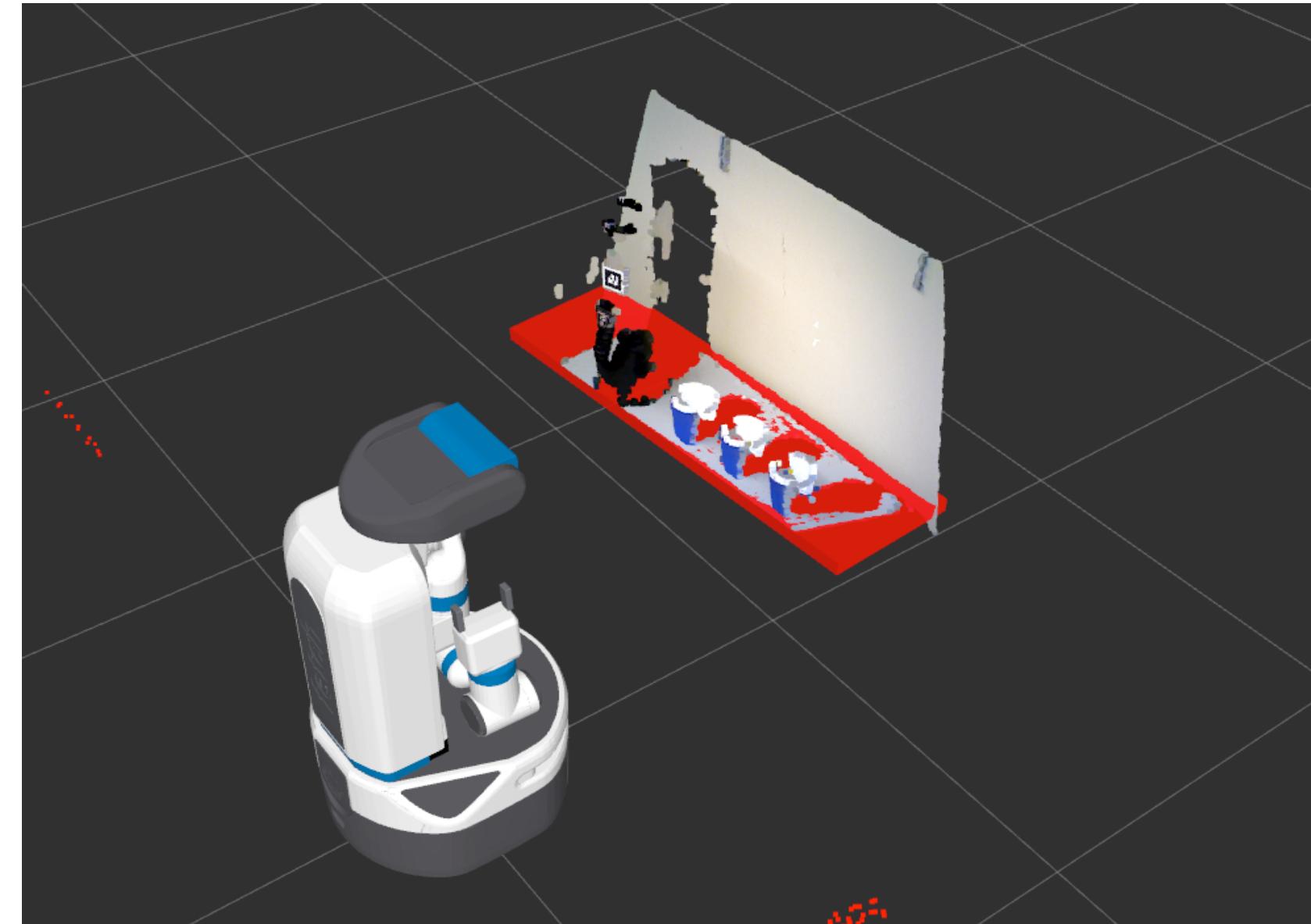


Fig 3: Perceiving the table in 3D

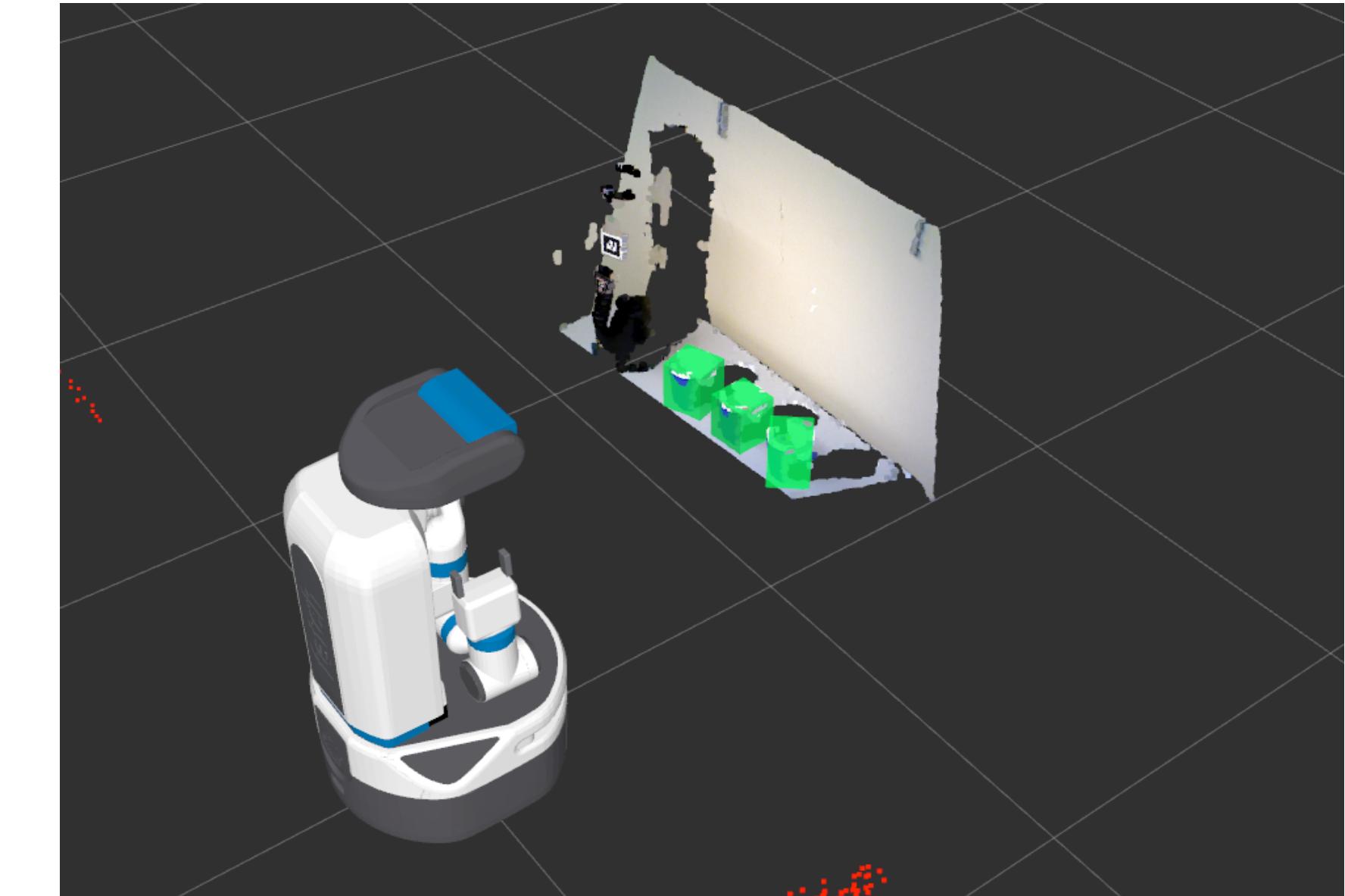


Fig 4: Perceiving the cups in 3D

## MOTION and NAVIGATION



Fig 5: Lifting the cup from the table

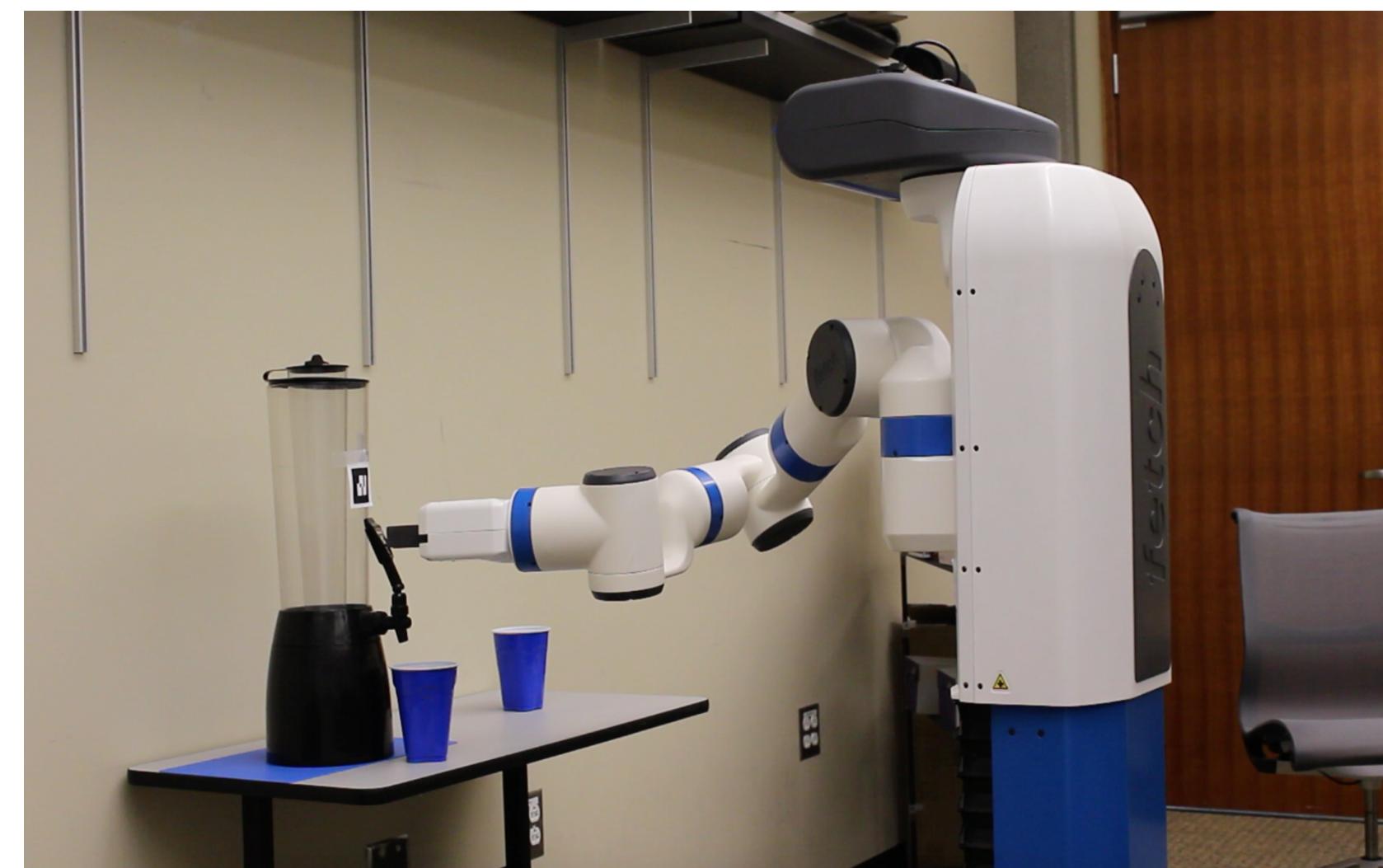


Fig 6: Operating the dispenser

Motion planning determines the behavior of the arm. It uses perception to locate the cups and fiducial markers to interact with the dispenser. These arm poses are programmed by demonstration. Navigation determines the robot's base movement, allowing it to move between designated areas.