FRUIT: Food Retrieval Utilizing Intelligent Technology

Bokus, Justin
Sayward, Liam
Neureuther, Bradley

Robots are used in various ways to assist the elderly and handicapped. Since the elderly and disabled often have issues with mobility and manual dexterity, they are more likely to select the most convenient food to eat. This can result in unhealthy food choices. To address this issue, we developed FRUIT: Food Retrieval Utilizing Intelligent Technology. The purpose of this project was to design and build a robot that, upon receiving a user request, retrieved a healthy food choice from a closed refrigerator. We designed a robot with a omni-directional drive-train system that identifies fruit using 3D imaging technology. The user selects a fruit from a drop-down menu on an Android phone. Using the object recognition software Vuforia, the robot navigates to the refrigerator, opens the door and scans the contents for the requested fruit. When the robot camera locks on the desired fruit, the robot arm retrieves the fruit and places it in a transportation basket for delivery. Testing showed the robot structure and attachment arm reliably met the goals of the project, including navigating to the refrigerator, opening the refrigerator by at least 60 degrees, retrieving the correct fruit, safely placing the fruit in the retrieval basket, and navigating back to the user. Further object discrimination testing was done using a combination of 2D and 3D imaging software. We found that using combined 2D and 3D imaging worked more reliably to gather the correct fruit than 2D or 3D imaging alone.

Awards Won: