

Redesigning the Personal Mobility Experience

Senior Capstone Program in Engineering (SCOPE)
Olin College of Engineering & Toyota Motor North America

2019-2020





Olin College
of Engineering
SCOPE

TOYOTA

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A grayscale background image of a Toyota dealership. The building has large glass windows and signage for 'SCION', 'TOYOTA', and 'HOFFMAN'. Several cars are parked in the lot, and a few people are visible near the vehicles. A tall light pole stands on the right side of the frame.

TOYOTA

is expanding its role in
the mobility community

A grayscale background image showing a close-up of a person's hand resting on a joystick control of a wheelchair. The hand is positioned over the joystick, with fingers slightly curled. The wheelchair's control panel and part of the seat are visible in the lower right corner. The overall image is faded and serves as a backdrop for the text.

PROJECT GOAL:

Holistically design a system for
power wheelchairs that improves
user-chair interaction

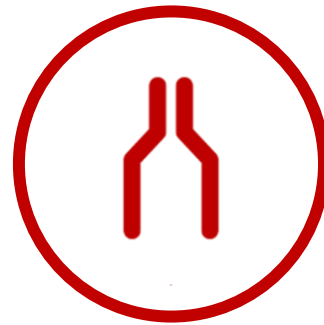
90% of PWC users report frustration:



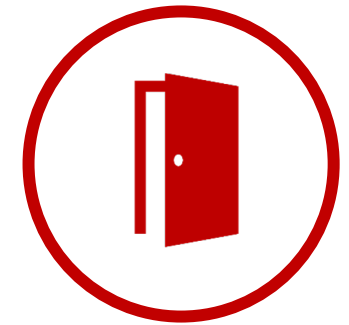
Bumping
into low
objects



Backing up



Navigating
tight spaces

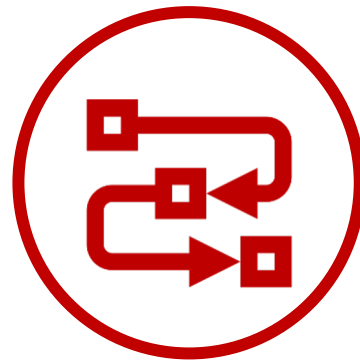


Navigating
doorways

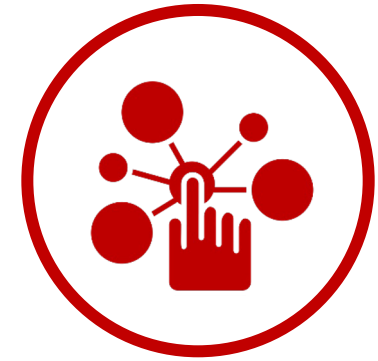
Surveyed PWC users state that:



“**Control buttons** are unintuitive, redundant, and hard to press.”



“There are **too many steps** in the process just to move the way I want.”



“I wish there were **different ways to interact** with the system.”

Enhanced Perception



Bumping into
low objects



Backing up



Navigating
tight spaces



Navigating
doorways

Enhanced Interaction



Control buttons



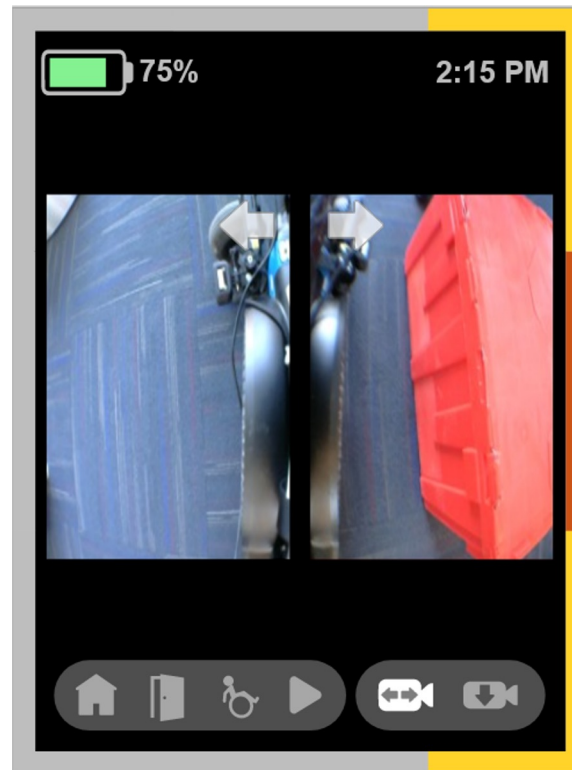
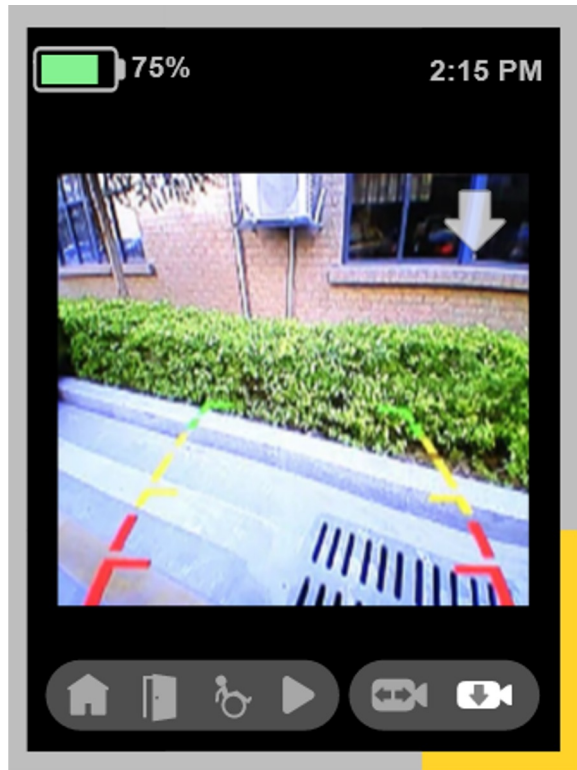
Too many steps



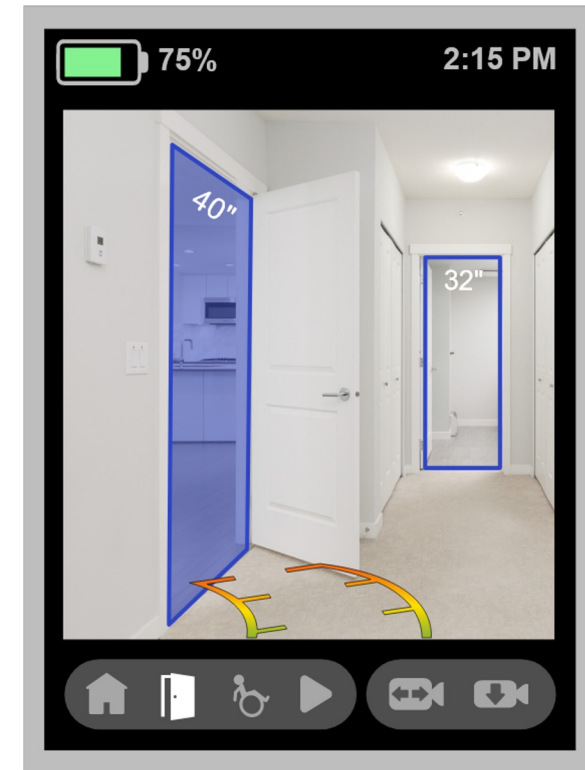
Different ways
to interact

Design for **Enhanced Perception**

Camera Feeds & Proximity Sensing

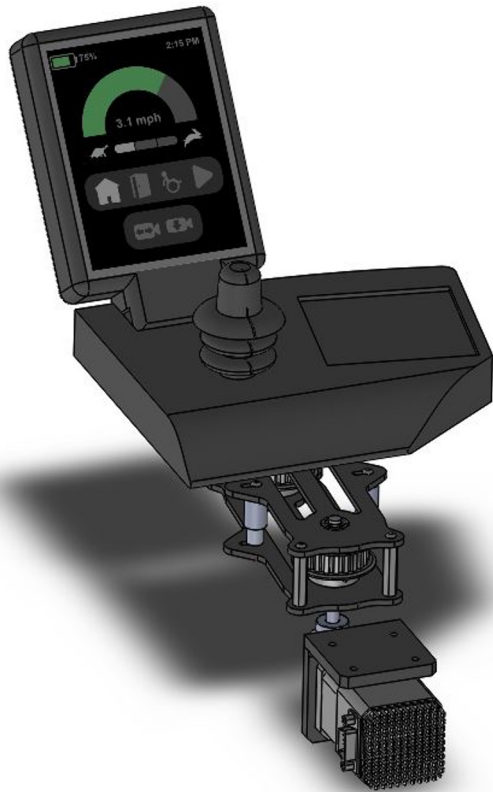


Door Detection

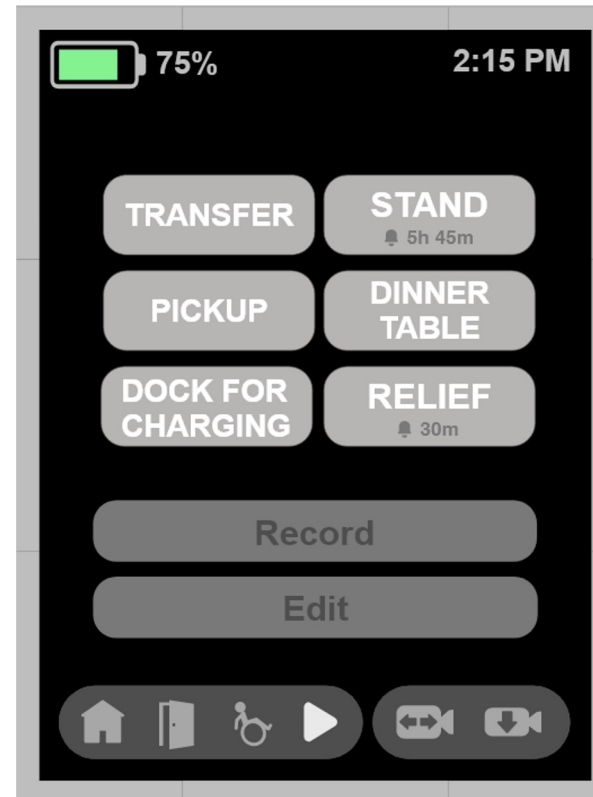


Design for **Enhanced Interaction**

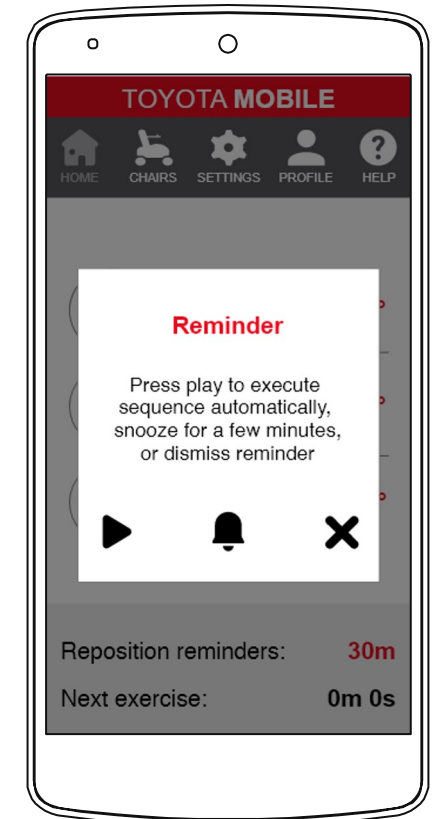
Physical & Graphical UI



Macro-Programming



Smartphone Integration





PROJECT OUTCOME:

Looks-like and acts-like **prototype** with design considerations based in repeated **user testing**