MakeOHI/O 2022- The Ohio State University

Ohio Hotel & Lodging Association Challenge:

Hotel Challenge project #1: Identify a repetitive task(s) that could be automated as part of a housekeeping task.

Hotel Challenge project #2: Identify a repetitive task(s) that could be automated as part of laundry attendant task(s).

Design and build a prototype for a solution(s) that eliminates the most repetitive tasks for a housekeeper or laundry attendant working in hotels.

Prize: A voucher for a two-night stay at [Aloft Cleveland Downtown](#) for each participating student on the team.

Check out the white paper illustrating the need for technology in the hospitality industry: https://bit.ly/3hrPyiQ

Check out our roadmap here for innovation and technology happenings in 2021 for OHLA: Please refer to the roadmap link under the challenge on the MakeOHI/O website.

[Roadmap](#)

Check out our laundry pictures here to get a better idea of what a laundry room looks like at a hotel: Please refer to the roadmap link under the challenge on the MakeOHI/O website.

[Laundry Facility Photos](#)

Service sector background: The lodging industry makes up over 700,000 hotels globally, (> 1,400 in the state of Ohio) with nearly 17M hotel rooms globally (>140,000 in the state of Ohio) accounting for 10% GDP world-wide. The industry pre-pandemic grew 4.5% annually. The impact of this project will be global and as the travel economy continues to return to a new normal, accommodating the labor scarcity with robotic solutions will be required to continue to have the lodging industry thrive into the future. This challenge will have both short-term and long-term effects on an entire economic industry driver that can be transferred from a commercial solution to a consumer solution making this an awesome opportunity to make the travel industry better. Check out our landing page for more information about the state of Ohio's lodging call for solutions project completed in 2021: [Https://www.callforsolutions.org](https://www.callforsolutions.org)

Houseperson duties are cleaning multiple areas of a hotel room daily. Making beds (King, Queen, Double beds) and cleaning bathroom surfaces, including cleaning shower walls with a great deal of up and down motion or back and forth motion. Often these areas are in environments with tight spaces, sometimes wet floors, which can cause slip and fall injuries and shower door cleaning can cause additional time and less than optimal settings to both clean and dry, without streaking. In these settings, housekeepers can be moving at a high speed with wiping motion, which puts them at risk of back injuries. Currently, there is no hardware developed to handle the wiping motion needed to clean a shower door or shower walls effectively. If developed, the impact goes beyond a commercial lodging facility, but could also be used in consumer settings, making the market size in the billions with high use and scalability depending on the flexibility of the hardware.

Or

Laundry attendant duties include pulling linen from a linen chute in the laundry room, putting dirty linen (sheets, pillowcases) in a cart, moving the cart to the commercial washer, and loading the linen into the 75+ pound drum washer. Once the wash load is completed, the laundry attendant peels the damp linen off the inside of the washer and puts it into a cart. This task is extremely difficult for both hand and wrist motion as well as back movement, which causes a high degree of injuries including carpel tunnel and back strains. The damp linen is loaded from the cart to the dryer and once the dryer load is completed, the linen is pulled out of the dryer, back into a hamper, where it is then folded by hand and then placed on a rack to store until ready to be brought up to rooms for bedmaking, etc. This process is separate, but repeated for terry cloth items (bath towels, hand towels, wash cloths), which are even heavier. There is not currently a hardware solution to aid the laundry attendant in the repetitive motion of pulling, placing, folding, placing that causes a great deal of injury. If developed, this would have significant impact both commercially and for consumers.

Recommended Hardware:

Controllers:

Inland Uno R3 MainBoard (Arduino Compatible)
Arduino
Raspberry Pi
Input:
Axis Analog Gyro Sensors
Arducam Mini Module Camera
Joystick
IR Receiver
Magnetic Spring Sensor
Rotary Encoder
Temp and Humidity Sensor
Digital Temperature Sensor
Output:
DC Motors
Linear Hall
SMD RGB
Photo Interrupter
Servos and/or stepper motors (for designing the fittings in CAD and 3D printing)
Different types of LEDs
Power:
ELEGOO AC 100V-240V Converter Adapter
Power Supply Module
Connectors & Components:
Arm examples include Dobot or Arms like the OWI
Sensors
Manipulator/Mobile base Access to 3D printer
Robotic Gripper
Robot arm kit- google "cheap robot hobby arms"
5-DOF Humanoid robotic Arm & Hand