

Snackbot: Food delivery robot in a post-pandemic world

Overview

Snackbot is a **food delivery robot** meant to serve snacks and drinks to guests in movie theaters. When the **Covid-19 pandemic** hit, there became an increasing need to reduce human interaction in everyday life.

Snackbot was created by the **UCI Engineering Conference** team as part of the 2021 annual conference.



Some initial design planning was done Fall 2020 quarter, but almost all of this design was completed during Winter 2021.

Existing Solutions



Fig 1. Food delivery robot that currently exists in hospitals, diners, and more.



Fig 2. Meal delivery robot serves fresh meals in restaurants.

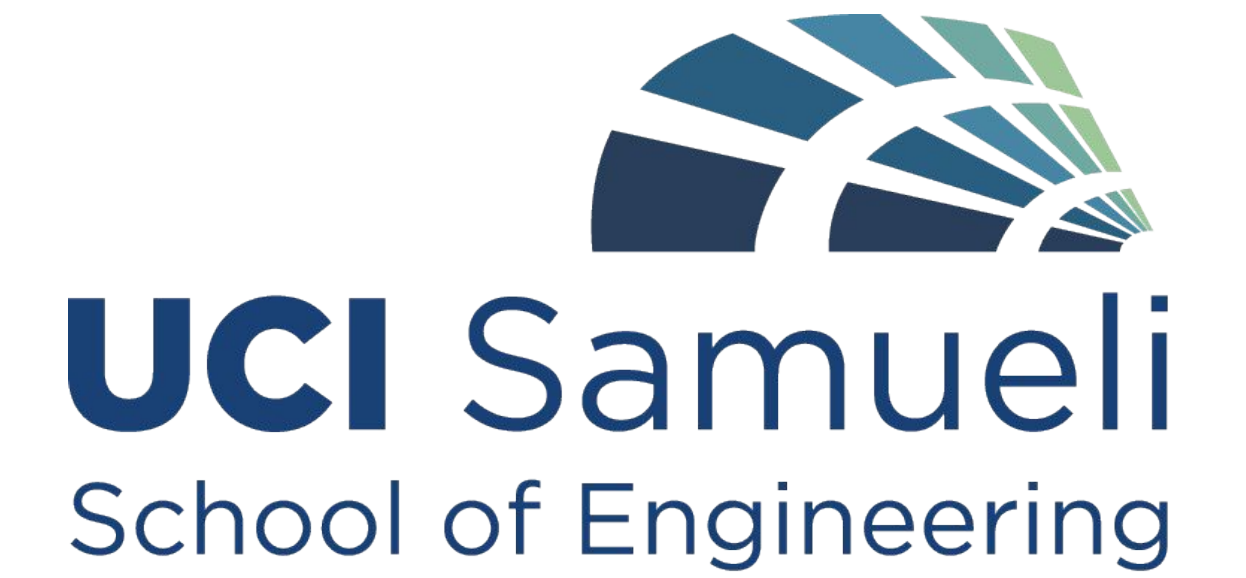
- Aker D Smart Delivery Robot (**Fig 1.**)
- Keenon Food Delivery Robot (**Fig 2.**)

Acknowledgements

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Snackbot

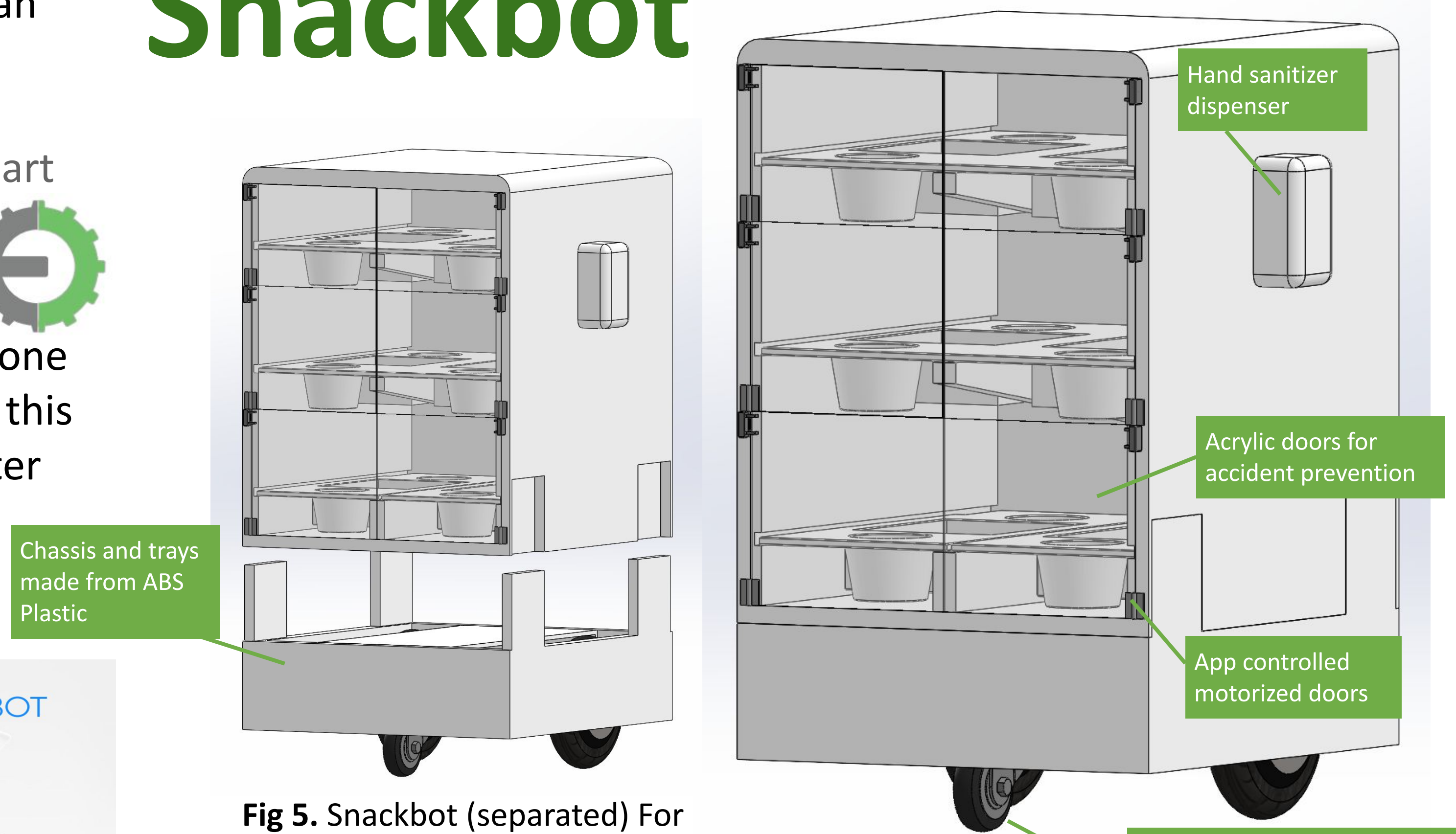


Fig 5. Snackbot (separated) For easy loading and unloading

Fig 6. Snackbot

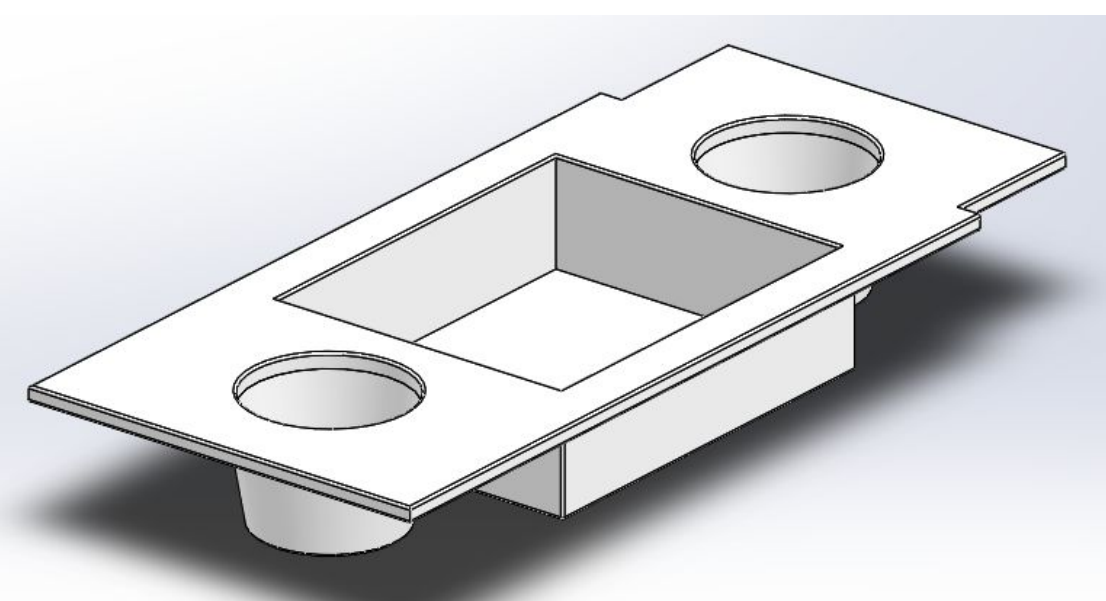


Fig 3. Half Tray (for smaller orders)

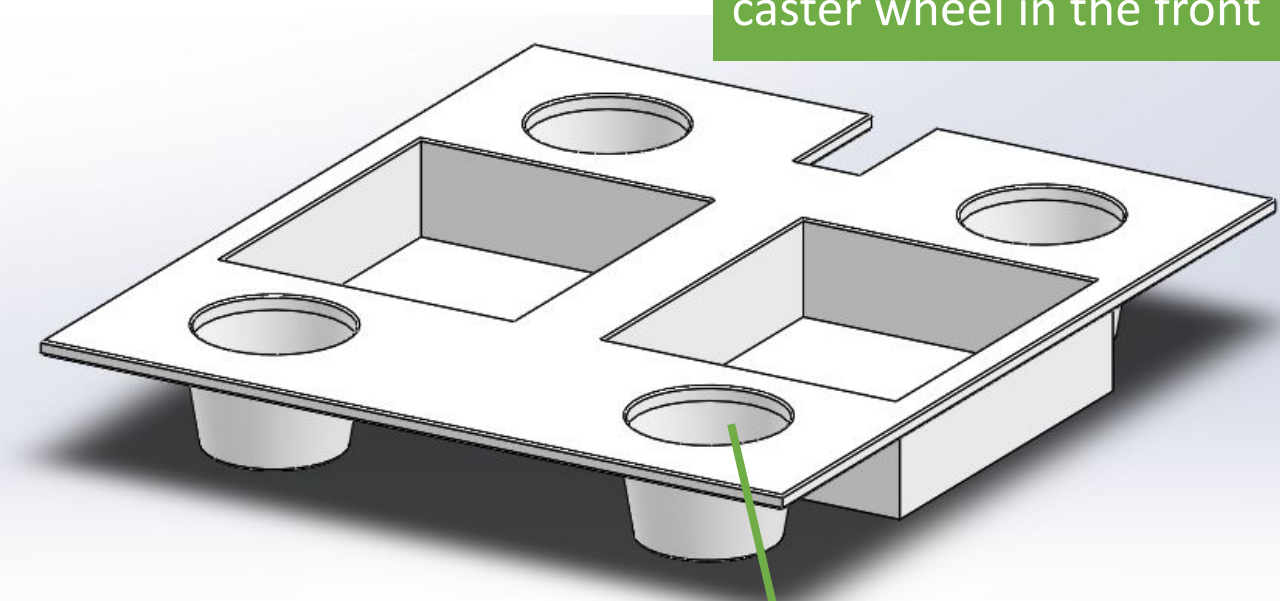


Fig 4. Full tray

Impact on Society

- Decreases **germ propagation**
- Increases **conveniency**
- Could be used in various capacities

Analysis

$$\sum F = ma$$

$$F_w - F_s = ma$$

$$F_w = F_s + ma$$

$$F_{wheel} = \mu mg + ma$$

$$F_{wheel} = (0.4)(68kg) \left(\frac{9.81m}{s^2} \right) + (68kg) \left(\frac{0.33m}{s^2} \right)$$

$$F_{wheel} = 290N$$

The analysis done to determine the total force at the wheels required to drive the robot with the desired acceleration of 0.33m/s². This number was used to compute the power requirement.

Hardware Performance

Dimensions	30" x 18" x 20"
Weight (No Load)	120 lbs
Weight (with Max Load)	150 lbs
Power Rating	300 W
Battery Capacity	20 Ah
Voltage	36 V
Maximum Speed	1 m/s
Maximum Acceleration	0.333 m/s ²

Future Improvements

- Chassis to be made completely out of **sheet metal with ABS plating**
- New **tray designs** to accommodate different order types
- **Lights** to correlate with current order
- Door design change to have all **machine parts internal**
- Sleeker Design

References

(1) Aker D. csjbot. 2019 Suzhou Pangolin Robot Corp., Ltd All Right Reserved. <https://en.csjbot.com/Wap/list/113.html> (2) Delivery RobotT6. Keenon. Copyright© 2020 Keenon Robotics Co., Ltd <https://www.keenon.com/en/index/Page/index/catid/7.html>