

Robotic Service Revolution: Impacts of Restaurant Size on Efficiency & Reliability

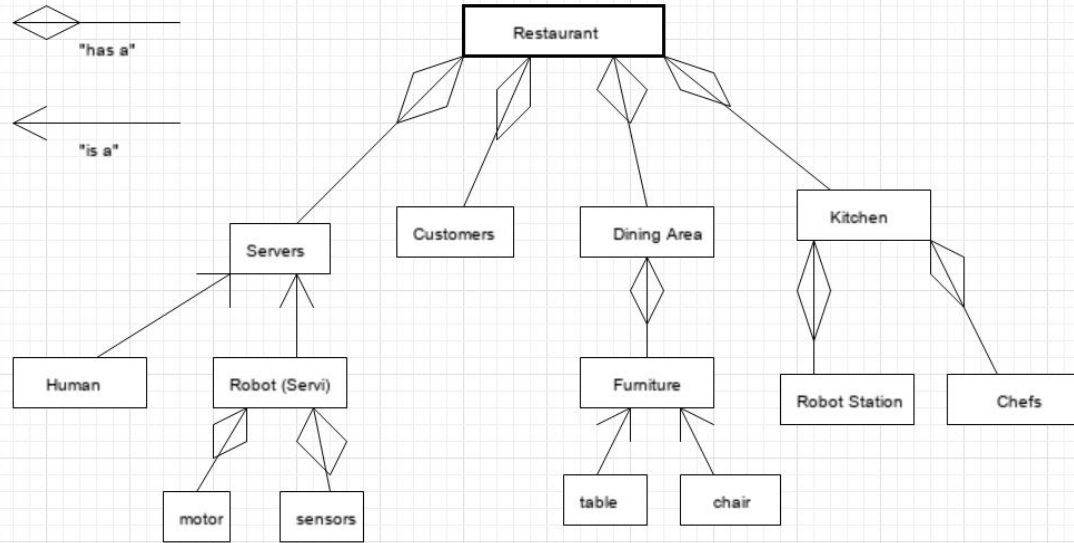
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Overview

- Automation of service in the restaurant industry
- Measuring the efficiency of humans, robots, and humans and robots across two different restaurant layouts
- Determining the impact of restaurant size on server efficiency

Object Diagram of Our Model



Methods

Dependent variable: Families Served

Independent variable: Time in restaurant

- **Big Layout**

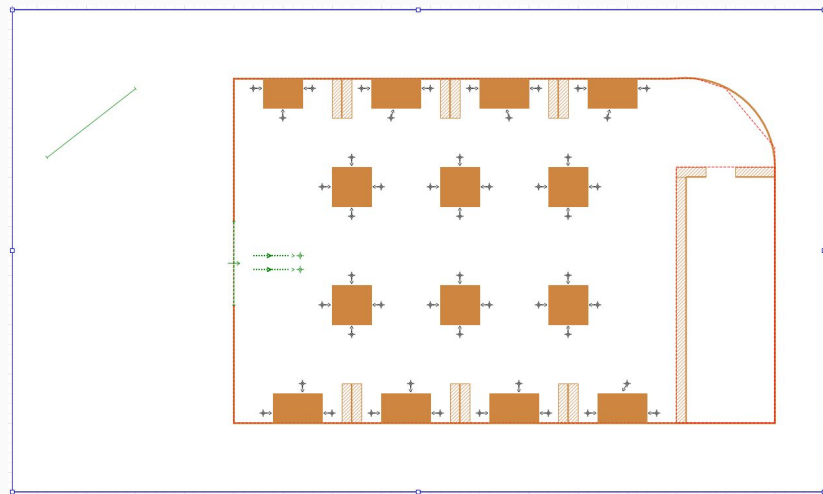
- **Humans:** 30, 40, 45
- **Robots:** 10, 15, 20
- **Humans and Robots:** 20, 25, 30

- **Small Layout**

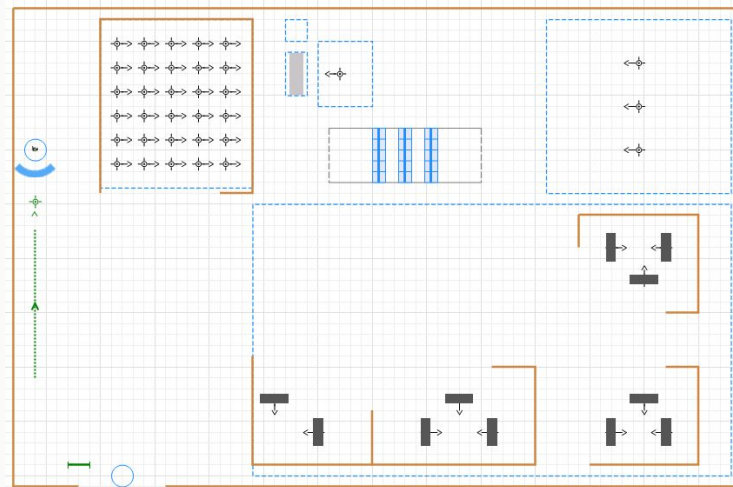
- **Humans:** 32.5, 45, 52.5
- **Robots:** 40, 50, 55
- **Humans and Robots:** 35, 40, 50

- How long the customers are waiting in Queue to be seated: Time in Queue
- How long customers are seated and being waited on: Time Spent Dining
- How long customers experience in the restaurant is in total: Time in Restaurant
- Total families served during simulation

Blended Model 1

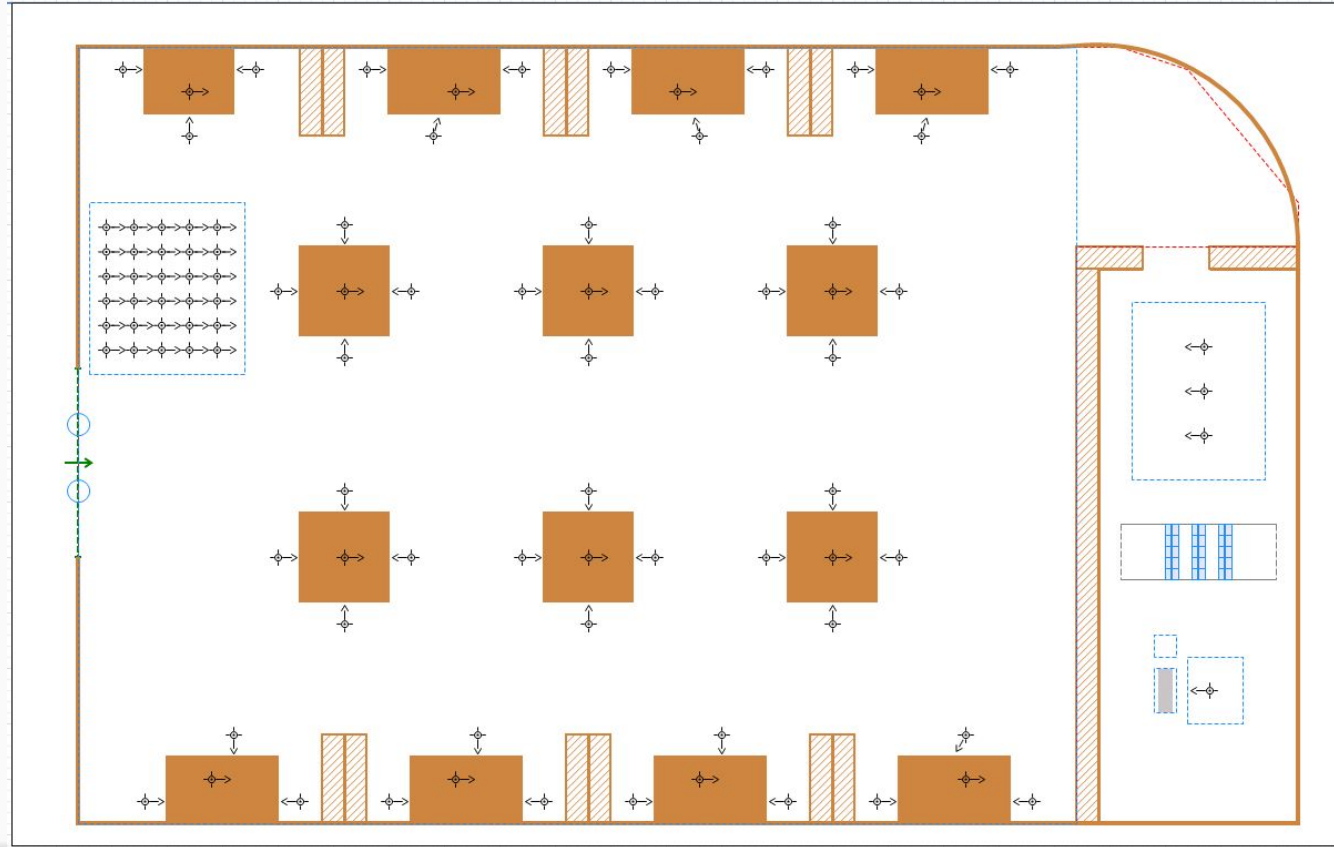


Marielle



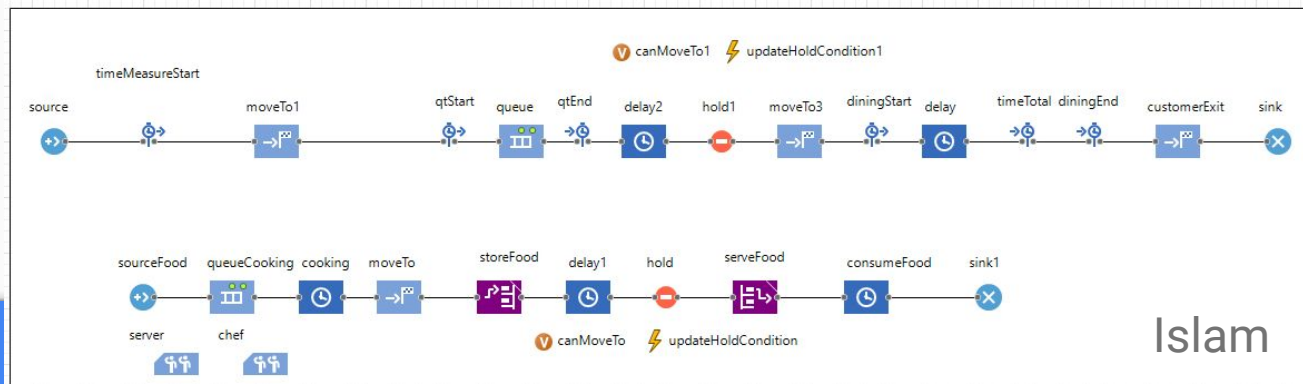
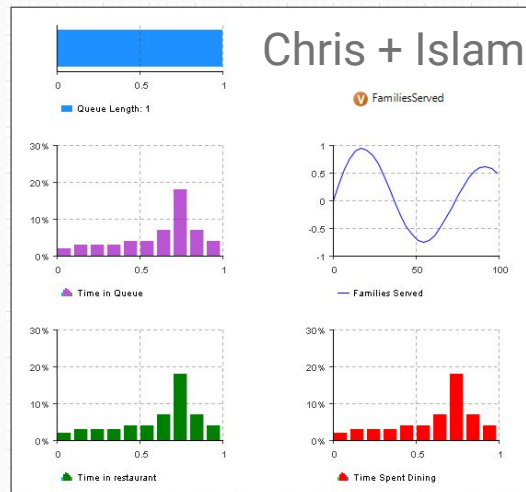
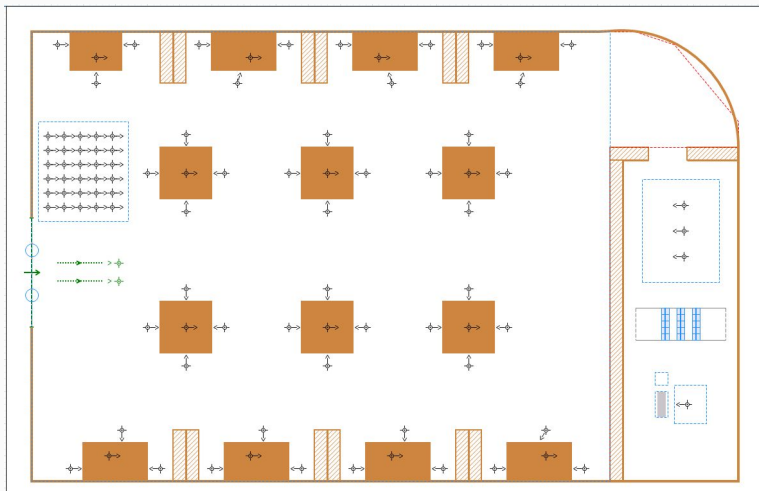
Islam

Blended Layout 1: Big Layout



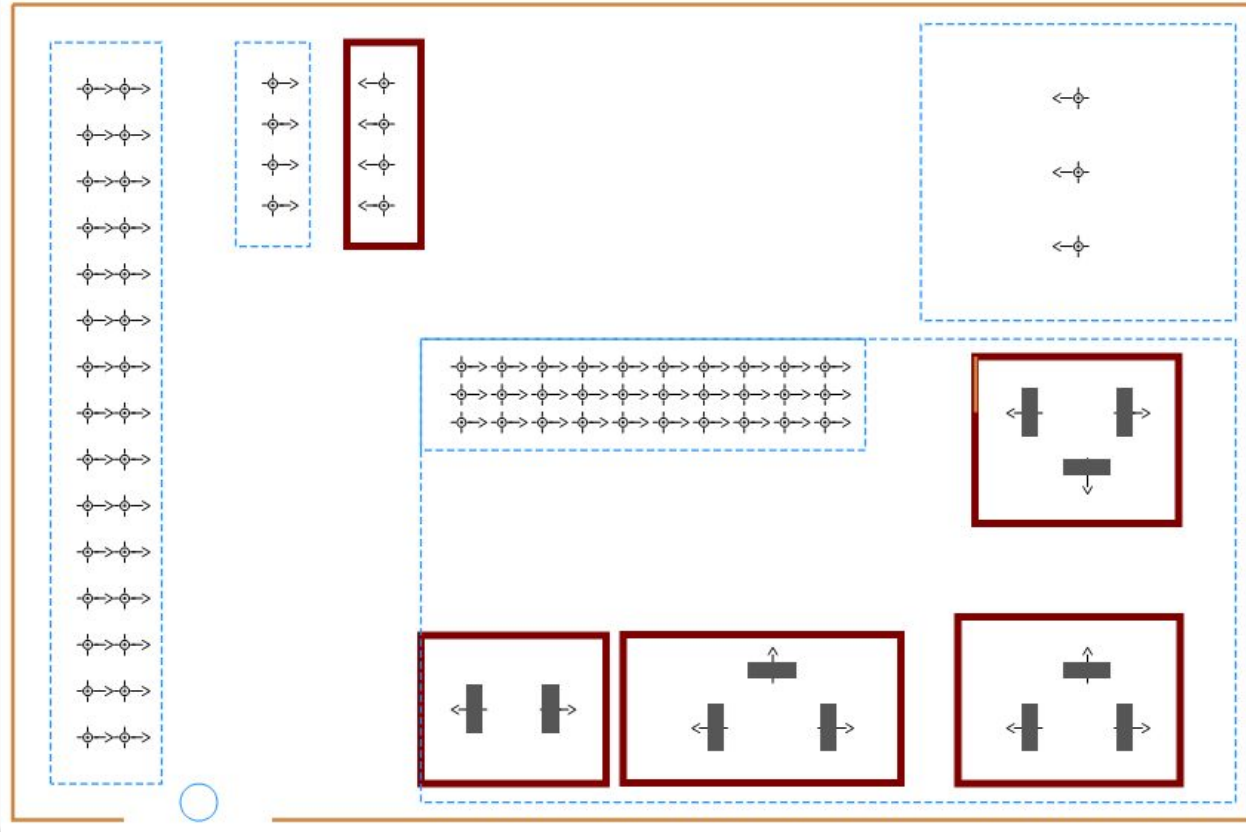
Blended Model 1: Big Layout

Marielle
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Islam



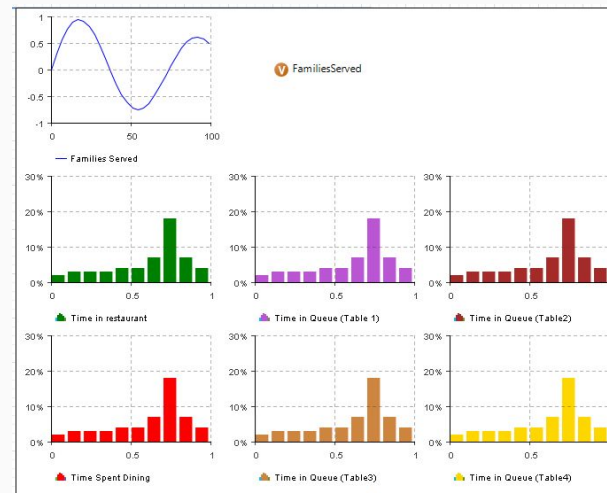
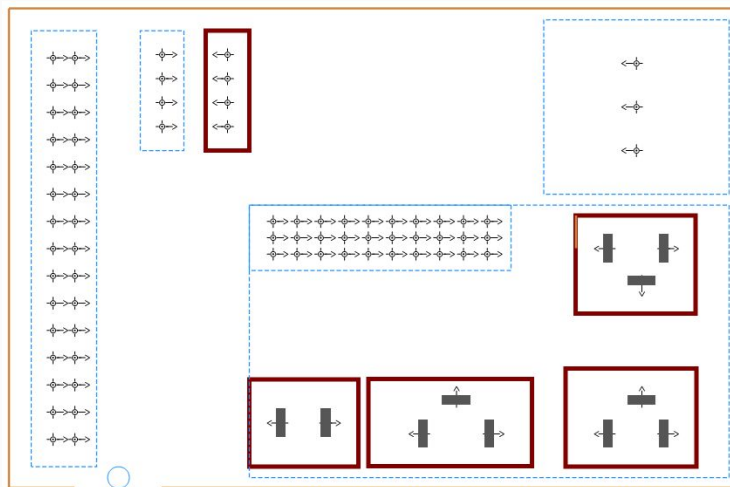
Islam

Blended Layout 2: Small Layout

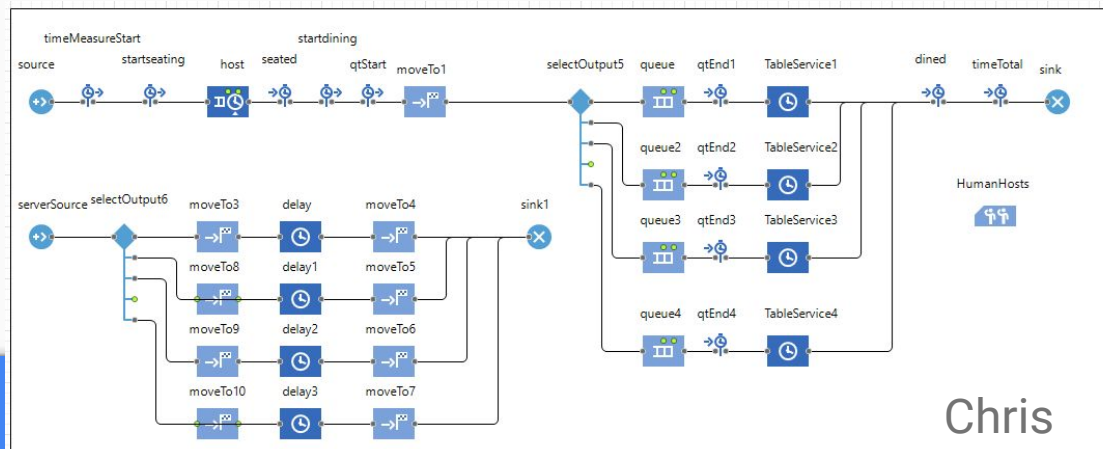


Blended Model 2: Small Layout

Islam



Chris
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Islam
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Marielle



Chris

Customer Arrival Rates and Simulation Time

Rates:

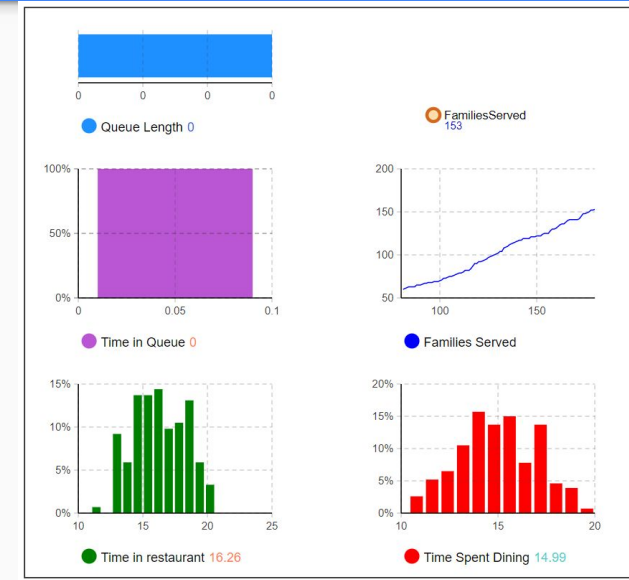
- 0.2 customer per minute
- 0.5 customer per minute
- 1.0 customer per minute

Simulation Time:

- 180 minutes

Results

Big Layout - Robot Only



0.2 customer per minute

0.5 customer per minute

1 customer per minute

Results

Big Layout - Human Only



0.2 customer per minute

0.5 customer per minute

1 customer per minute

Results

Small Layout - Human Only



0.2 customer per minute

0.5 customer per minute

1 customer per minute

Results

Small Layout - Robot Only



0.2 customer per minute

0.5 customer per minute

1 customer per minute

Discussion

- The data from the robot servers only scenario simulates the most efficiency of robot servers within restaurant dynamics.
- The use of robots increases the efficiency of the restaurant by
 - decreasing queuing times for customers
 - increasing the number of families served
- The most efficient layout was the Robots Servers only in the Large Layout
 - Supports our hypothesis: the optimal environment for the integration of robot servers would:
 - larger restaurant design
 - with robot servers only

References

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