



WRS Future Convenience Store Challenge Preliminary Competition 2018

“Customer Service” Task

Rulebook

2018 /02/02

Revision History

February 2, 2018

- A subject about an energy saving was added.

January 15, 2018

- First Draft

0. Definitions of Terminology

Term	Definition
Mobile Robot	A robot that can move autonomously.
Infrastructure (Robot)	Unique infrastructure that can be installed inside convenience stores to assist in tasks of the robot. This equipment includes markings, IC tags, sensors, actuators and auxiliary tools to add equipment to products. Infrastructure made up of sensors and actuators can also be seen as stationary robots.
Manipulator	Robot arms, hands and other equipment that execute operations which can be equipped or installed on a mobile robot or as part of the infrastructure.
Product	Products found at a convenience store.
Customer	Person who visit the store to purchase products.
Container	Container used to hold and transport multiple products. A container may also be called a carton.
Product Display Area	Section of the convenience store with display cases or book shelves installed.
Cashier Area	Section of the convenience store with the cashier counter installed.
Restroom Area	Section of the convenience store with the toilet installed (Abbreviation: Restroom).
Aisle Area	Section of the convenience store for customers and mobile robots to come and go. (Abbreviation: Aisle)
Backyard Area	Area of the convenience store customers are not permitted (Abbreviation: Backyard).
Home	Standby station of the mobile robot. The standby station is located in a designated place inside the backyard area.
Display Case A	Case for displaying products. There are no products placed in this display initially.
Display Case B	Case for collecting disposal items. Multiple products are mixed in this case initially.

1. Overview

This challenge aims to develop technology to automate customer service, which is part of the job for employees at a convenience store. The people participating in this competitive task shall develop a robot that autonomously moves and performs customer service operations as well as infrastructure to install inside of the simulated convenience store. In this competitive challenge, participants will use the robots and infrastructure they develop to compete in the innovativeness, viability and feasibility of the systems developed to perform customer service demonstrations in a simulated convenience store space.

The layout of the convenience store interior is made up of a product display area, cashier area, restroom area, aisles, and backyard area as shown in a document provided separately.

Participants can set the challenge related to customer service freely to perform a system demonstration within the time limit for the competitive task.

In addition, the proposed system must contribute to energy saving in general or to the clerks' work reduction that leads to energy saving at the convenience store businesses.

2. Flow of the Competitive Task

The time limit for this competitive task will be 20 minutes. The competitive task will proceed in the following order:

- (1) Renovation time
- (2) Setting time
- (3) Presentations
- (4) Customer service demonstrations

Participants can distribute the time to each block however they would like. Participants should indicate their progression to the judges when transitioning to each block and when completing the competitive task.

2.1. Renovation time

Participants add or replace furnishings such as the infrastructure and shelving. The work allowed during the renovation time is as follows:

- Installation of unique infrastructure inside the convenience store.
- Replacement of existing furnishings such as display cases and the cashier counter.

Participants shall indicate to the judges when they have finished their renovations or if renovations are not required.

2.2. Setting time

Participants next set up their robot and necessary products. Participants arrange the robot and products in any initial position inside the simulated convenience store. Participants shall indicate to the judges when they have finished their setup or if the robot setup is not required.

2.3. Presentations

Participants explain the purpose and an overview of the system they have

developed. The presentation may also be conducted at the same time as the demonstration below. Participants should indicate to the judges when the presentation is finished or when conducting the presentation at the same time as the demonstration.

2.4. Customer Service Demonstration

Judges confirm the preparations have been made, and then initiate the start of the demonstration.

Participants operate the task start command for the system.

After the system operations start, participants are not allowed to control the robot or take any actions that will influence the operation of the system. Participants who initially manipulate the operations of the system shall be withdrawn from the task at that point.

However, participants can decide to retry the task as described hereafter if continuing the demonstration is deemed difficult due to system malfunction.

3. Details of Challenge

3.1. Customer Service Challenge

Participants can set the challenge related to customer service freely to perform a system demonstration within the time limit for the competitive task. For example, the competition expects a demonstration similar to those below.

- Heating purchases (lunch boxes, etc.) or bagging products
- Receiving orders and retrieving products for products ordered through a clerk such as hot snacks and cigarettes
- New services based on recognizing gender, age and products customers are hesitant to purchase
- Recommendation of products
- Prevention of shoplifting
- Customer service for customers with special needs such as elderly, foreign nationals, or people who use a wheelchair
- Assistance and other services

These are only a few examples of customer services. Not all of these services need to be implemented. However, including the interaction between people (staff/customers), the competition expects proposal and demonstrations that foresee a future of new services. The competition also expects participants to generate appeal by illustrating the specific use prescribed to their system in their demonstration via role-playing and other means. Participants shall apply with a description of their customer service in advance. The judging panel evaluates those customer services from the perspectives outlined below.

Judges score customer services by awarding points based on the following criteria:

- Presentation
- Viability
- Feasibility

Furthermore, customers to provide customer service shall be prepared by participants.

3.2. Retry

Participants can ask the judges to terminate the demonstration to retry the task if the system malfunctions and continuing the demonstration is deemed difficult during the customer service task.

However, the clock will continue to run while the demonstration is stopped. The participants can decide in what state to resume the competitive task.

4. Specifications and Restrictions

4.1. Simulated Convenience Store

The convenience store will be an 8 m × 7 m space made up of a product display area, cashier area, restroom area, aisles, and a backyard area. The cashier area will have a counter. The product display area will include display cases and book shelves. Detailed information about the layout, counter and display cases inside the convenience store will be provided in a separate document.

Participants are not allowed to change the layout inside the convenient store such as rearranging the display cases in the aisles during the renovations.

4.2. Product

Participants shall prepare the products to use in the demonstration.

4.3. Mobile Robot and Infrastructure Restrictions

4.3.1. Hardware Restrictions

- There are no restrictions for the number of mobile robots.
- Each mobile robot must take up less than 1 m x 1 m of floor space and all of the mobile robots must fit into the home station.
- Infrastructure can be installed anywhere inside of the convenience store, but different restrictions apply according to the area of the store. Please see the documents provided separately for more information.

4.3.2. Software Restrictions

- The robots and infrastructure must move autonomously after the start of the competitive task. However, participants may monitor the internal status remotely to learn the state of their system.
- Mobile robots are prohibited from moving outside of the convenience store.

4.3.3. Energy Source Restrictions

- Participants shall prepare an energy source to use for their robots.
- A power supply within AC100V/1500W is planned as the energy source for participants to use.
- Any energy source deemed to be dangerous or inappropriate for use will not be permitted.

4.3.4. Venue Restrictions

- Participants are prohibited from intentionally staining or damaging the convenience store.
- Infrastructure can be removed immediately after the competitive task ends to return the venue to its original state.
- The convenience store has no ceiling or walls.

4.3.5. Safety Restrictions

- Systems must have an emergency shutdown switch in case of an emergency. All of the movable parts included in the system must immediately stop operation if the emergency shutdown switch is pressed.
- The design must prevent the system from tipping over at all times, including during an emergency stop.
- Measures must be put in place to shield any area with a danger of entangling the arms or legs of people in the vicinity.
- Hot areas and sharp edges must not protrude.
- Energy sources utilizing fire or high temperatures are prohibited.
- Any laser used in the system must be class 1 or lower.
- Products and parts of robots must not eject anything.

5. Other

This rulebook is subject to change without notice.