ⓟⓡⓘ | platt | retail | institute

Platt Retail Institute (PRI) is an international consulting and research firm that focuses on leveraging technology to impact the consumer experience and store operations. Central to this is building actionable data models that aid retailers and technology companies in gaining insights into their customers and operations. In addition to its global consulting expertise, PRI also publishes pioneering industry research. [Learn more.](#)

Northwestern | Retail Analytics Council

The Retail Analytics Council (RAC) is the leading organization focused on the study of consumer shopping behavior across retail platforms and the impact of technology. Established in August 2014, RAC is an initiative between Medill's Integrated Marketing Communications department, Northwestern University and the Platt Retail Institute. [Learn more.](#)

Standards Support Robots in Retail

By Richard Halter, President, Global Retail Technology Advisors, LLC

In 1993, a group of retailers wondered why every new point-of-sale system purchase required replacement of their data model. After all, the data had not changed since previous systems were purchased and continued to include standard categories such as item identification, price, quantity, taxes, etc. The retailers consulted with the National Retail Federation (NRF) about their concerns and the Association for Retail Technology Standards (ARTS) was formed.

According to an NRF news release[1] on March 13, 2017, "ARTS … is best known for making technology less expensive for retailers. Its standards offer reference designs to help retailers build or acquire integrated business applications, help developers and analysts understand basic retail business principles, and offer a suite of data management tools to allow different data formats to communicate."

The news release also announced a new partnership between NRF and the Object Management Group to manage a portion of the functions previously performed by NRF's ARTS division. OMG is an international, open membership, not-for-profit technology standards consortium, founded in 1989.[2]

Currently, there are two groups in OMG working on retail robotic interfaces:

- OMG.org/Retail is the organization within OMG that is responsible for all the ARTS standards and any new standards created under the OMG umbrella.
- OPOS-J is the organization in Japan started in the 1990s to provide Japanese input into the standards process under the ARTS and now OMG.org/retail umbrella.

The mission of OMG.org/Retail is to increase the benefits and reduce the costs, risks, and timescales of using information technology within the retail sector by:

- Developing and promoting standardized retail business models and practices that foster a shared understanding of retail business principles, terminology, and data between retailers and their suppliers.
- Establishing technical standards, specifications and best practices that enable communication of business data within retail enterprises, and between retail enterprises and their suppliers.
- Creating standards for the integration of IT applications and devices into retail business systems.
- Communicating the requirements of the retail industry to IT suppliers and users, both inside and outside OMG.[3]

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[1] https://nrf.com/media-center/press-releases/nrf-and-object-management-group-form-partnership-retail-technology

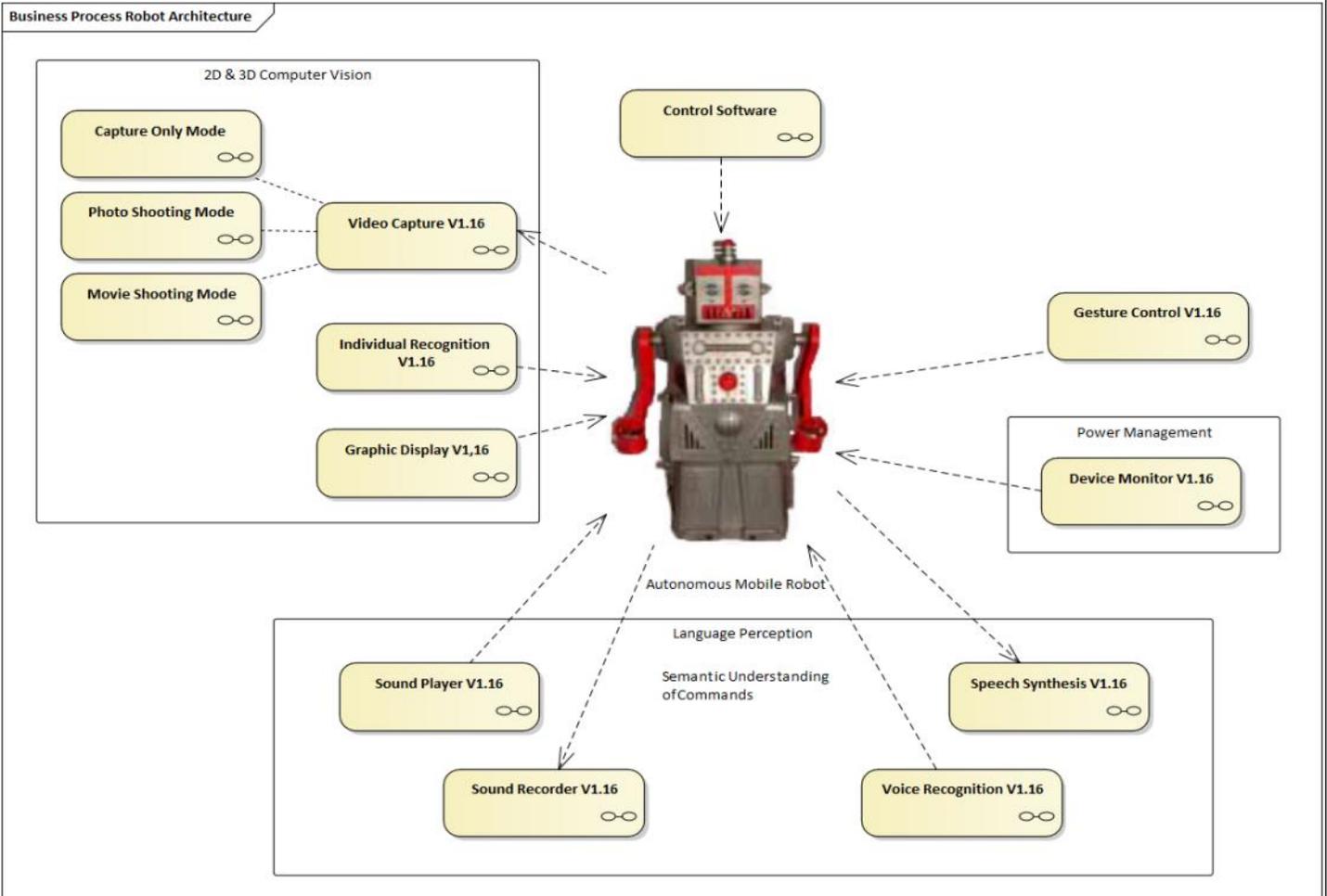[2] https://www.omg.org/about/index.htm

[3] https://www.omg.org/retail

What are the Robot Command Messages?

Tadashi Furuhata and Toyohiro Yasumoto were the primary authors of the OMG robotics work. They created a set of commands for controlling the movement of a robot, as pictured in the Business Process Robot Architecture diagram below.

- 2D and 3D Computer Vision – The robot can capture still or video images, then be able to recognize individuals in the image. On the output side, the robot can format an image for display.

- Language Perception – The robot can either record or play various sounds. In addition, it can recognize if a voice is spoken and from that be able to decode the speech in the audio recording.

- Gesture Control – What good is a robot that can't move and grab things? The gesture control is the set of messages that manages the robot's movement. One message is about posing the robot. Another message covers moving the robot. When the robot gets to the proper location, then it needs to be able to move its arm in a specified pitch, yaw, and roll direction. Now with the robot in the right location with the arm correctly placed, it needs to be able to grab items. All of this is done with the set of gesture control messages.

Tadashi Furuhata (right) visits with Pepper during the 2016 Smarter Retailing Forum.

- Power Management – Device monitoring allows one to monitor the state of the various components of the robot. One can identify which device to monitor and query it for its status.


Business Process Robot Architecture

2D & 3D Computer Vision
- Capture Only Mode
- Photo Shooting Mode
- Movie Shooting Mode
- Video Capture V1.16
- Individual Recognition V1.16
- Graphic Display V1,16

Control Software

Gesture Control V1.16

Power Management
- Device Monitor V1.16

Autonomous Mobile Robot

Language Perception

Semantic Understanding of Commands
- Sound Player V1.16
- Sound Recorder V1.16
- Speech Synthesis V1.16
- Voice Recognition V1.16

The advantage of these standards is that they allow other applications to interact with the robot without knowing anything about the robot and vice versa. That is a critical requirement in the modern microservices world.

How can robots be used in the normal retail process automation?

Business Process Robotic Automation Interfaces
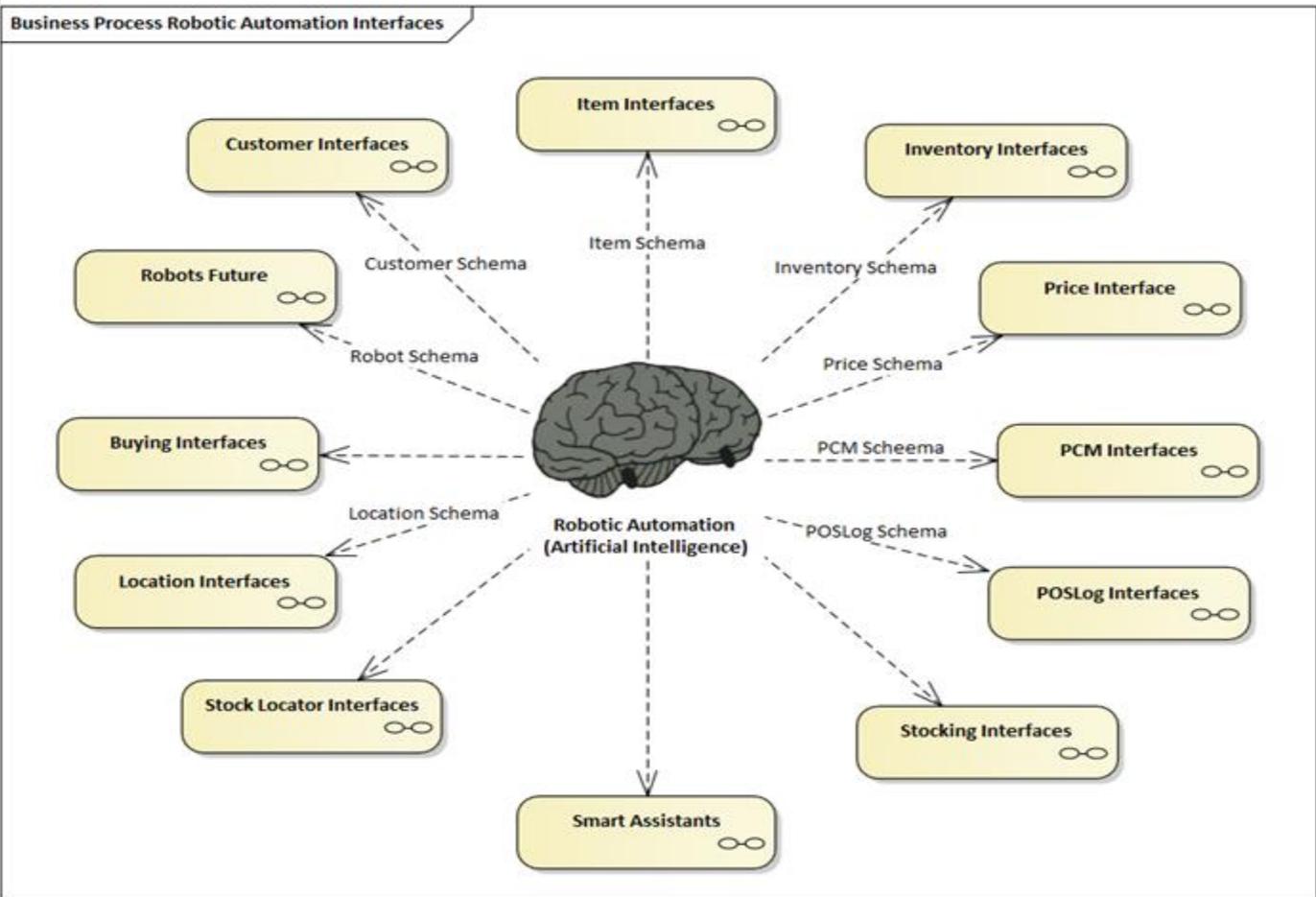
Now that one can control the robot, how can the robot be used within a retail environment? As the Business Process Robotic Automation Interfaces diagram above illustrates, with these standard messages, a robot can be used to:

- Get information about customer requirements.
- Identify the various items, evaluate if they are in inventory, and determine where they are located in the store.
- Go to the location of each item following an optimized path.
- Retrieve the items and put them into a shopping cart.
- Charge the purchase to the customer's debit/credit card and create a receipt for the customer.
- Direct an autonomous driving car to a predetermined parking place.
- Take the purchased shopping basket to the autonomous driving car for delivery to the customer.

Robots are rapidly being deployed in retail. As the above illustrates, this is just one potential scenario that demonstrates the need for standards that enable the robot to interface with other retail systems. This interaction only works if all of the technology components involved speak a standard language.