



**AALBORG UNIVERSITY**  
DENMARK

**Aalborg Universitet**

## **Public Relation Robots - An Overview**

Hansen, Søren Tranberg; Hansen, Karl Damkjær

*Published in:*

HAI '20: Proceedings of the 8th International Conference on Human-Agent Interaction

*DOI (link to publication from Publisher):*

[10.1145/3406499.3418757](https://doi.org/10.1145/3406499.3418757)

*Creative Commons License*

Unspecified

*Publication date:*

2020

*Document Version*

Version created as part of publication process; publisher's layout; not normally made publicly available

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*

Hansen, S. T., & Hansen, K. D. (2020). Public Relation Robots - An Overview. In *HAI '20: Proceedings of the 8th International Conference on Human-Agent Interaction* (pp. 284-286). Association for Computing Machinery. <https://doi.org/10.1145/3406499.3418757>

### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

### **Take down policy**

If you believe that this document breaches copyright please contact us at [vbn@aub.aau.dk](mailto:vbn@aub.aau.dk) providing details, and we will remove access to the work immediately and investigate your claim.

# Public Relation Robots - An Overview

Søren Tranberg Hansen

Department of Electronic Systems, Aalborg University  
Aalborg, Denmark  
sth@es.aau.dk

Karl Damkjær Hansen

Department of Electronic Systems, Aalborg University  
Aalborg, Denmark  
kdh@es.aau.dk

## ABSTRACT

In recent years, there has been an increasing interest in robots designed to assist with information, communication and way-finding at airports, hospitals, shops and other public areas. This poster includes an overview of available commercial-off-the-shelf robot platforms designed for public relation tasks. The physical and technical attributes of the identified robot platforms are described and compared, along with a short analysis of the applications proposed by the vendors. The platforms can potentially be used to accelerate HRI research and the implementation of robot applications for public relation tasks.

## CCS CONCEPTS

• **Information systems** → *Information systems applications; Computing platforms*; • **Social and professional topics** → *Automation*; • **Computer systems organization** → *Robotic autonomy*.

## KEYWORDS

public relation robots, service robots, hospitality, mobile robot, autonomy, human-robot-interaction, robot applications

## ACM Reference Format:

Søren Tranberg Hansen and Karl Damkjær Hansen. 2020. Public Relation Robots - An Overview. In *Proceedings of the 8th International Conference on Human-Agent Interaction (HAI '20), November 10–13, 2020, Virtual Event, NSW, Australia*. ACM, New York, NY, USA, 3 pages. <https://doi.org/10.1145/3406499.3418757>

## 1 PUBLIC RELATION ROBOT PLATFORMS

Public relation robots are a subset of the broader term "service robot", which is defined as a robot that performs useful tasks for humans or equipment excluding industrial automation applications [24]. According to this standard, robots require a degree of autonomy, which is defined as the ability to perform intended tasks based on current state and sensing, without human intervention. For public relation robots, autonomy is mostly related to autonomous robot navigation; meaning that the robot is able to plan its path and execute its plan without human intervention.

In recent years, there has been a substantial increase in the number of public relation robots sold worldwide. According to the International Federation of Robotics, almost 10.000 units were sold in 2017, which is 56 % more than in 2016. In the same period,

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

HAI '20, November 10–13, 2020, Virtual Event, NSW, Australia

© 2020 Copyright held by the owner/author(s).

ACM ISBN 978-1-4503-8054-6/20/11.

<https://doi.org/10.1145/3406499.3418757>

the total value of public relation robots sales increased by 41 % to USD 177 million. Most of these robots were for mobile guidance, information and entertainment. A forecast by IFR claims that more than 40.000 robots will be sold in 2022 [25]. However, at the time of writing it is unclear how the COVID-19 outbreak will impact this forecast. This paper gives an overview of commercial-off-the-shelf (COTS) robots that are currently available on the market. The list of COTS robot has been assembled using desk research. It is not exhaustive but provides good coverage of the area.

Table 1 describe each of the identified COTS robot platforms.

As can be seen in Table 1, vendors of COTS public relation robot are globally distributed. In total, seven robot platforms are from China, eight are from the EU (including the UK), four from the US, two from Japan and two from Korea. China is a relatively new player as a robot producing country, but the region has rapidly entered the market with several new platforms within the last 2-3 years. A few robots vendors also address the fact that their robots can be used for research, and are somewhat hybrids between commercial platforms designed with a specific business purpose and more opened ended research platforms. This includes the platforms REEM, Scitos, Pepper and Socibot. Only 10 of the robots platforms have been identified to be open an open application programming interface, however this specific piece of information is often not available.

Although all the identified robots are designed for public relation tasks, there are some fundamental differences in their physical design and their technical specifications. A common configuration is a combination a laser scanner, RGB-Camera, Depth Camera (RGB-D), Infrared or ultrasound sensors, Microphone (array), Bump sensor(s) and touch sensors and touch screen. Some robots are equipped with more exotic devices, e.g. the robot Furo-D which is equipped with a receipt printer, bar code scanner and a credit card reader. The robot Socibot has a built-in projector for displaying images on external surfaces and the robot XR-1 has a smoke detection sensor. Less than half of the robots have been designed without any limbs (arms or legs).

In order to do a systematic analysis of the applications proposed by the vendors, description text about use cases, features and applications have been scraped from vendors' web pages, resulting in 6.020 word document. Product names and high-frequency words ("user", "customer", "robot") have been removed, resulting a 5.598 word text document. This document has been visualized using a word cloud (see Figure 1) displaying the most frequent words as large and more centrally placed than less frequent words.

By manual analyzing the text, is possible to filter out a total of 81 different application areas. The most frequent words are thematically related and can be ordered in the following 5 word clusters.

- **Retail:** Stores (5), shopping centers (5), shopping mall (2), supermarkets (2), retail (2)



## REFERENCES

- [1] Accessed August, 2020. botsandus.com. <https://www.botsandus.com/solutions/bo>
- [2] Accessed August, 2020. care-o-bot.de. <https://www.care-o-bot.de/en/care-o-bot-4.html>
- [3] Accessed August, 2020. chuangze.com.cn. <http://www.chuangze.com.cn/attached/chuangchuang.pdf>
- [4] Accessed August, 2020. cloudminds.com. <https://www.en.cloudminds.com/home-new/cloud-robots/xr-1/>
- [5] Accessed August, 2020. cybedroid.com. [https://www.cybedroid.com/?page\\_id=893&lang=en](https://www.cybedroid.com/?page_id=893&lang=en)
- [6] Accessed August, 2020. en.csjbot.com. <https://en.csjbot.com/content/12/1289.html>
- [7] Accessed August, 2020. engineerdarts.co.uk. <https://www.engineerdarts.co.uk>
- [8] Accessed August, 2020. en.sanbot.com. <http://en.sanbot.com/product/sanbot-max/specification>
- [9] Accessed August, 2020. followinspiration.pt. <http://followinspiration.pt/>
- [10] Accessed August, 2020. futurerobot.com. <http://www.futurerobot.com/default/>
- [11] Accessed August, 2020. gblrobotics.com. <http://www.gblrobotics.com/index.html>
- [12] Accessed August, 2020. metralabs.com. <https://www.metralabs.com/en/service-robot-scitos-a5/>
- [13] Accessed August, 2020. padbot.com. <https://www.padbot.com/padbotp3>
- [14] Accessed August, 2020. pal-robotics.com. <http://pal-robotics.com/robots/ari/>
- [15] Accessed August, 2020. promo-bot.ai. <https://promo-bot.ai/>
- [16] Accessed August, 2020. robotemi.com. <https://www.robotemi.com/>
- [17] Accessed August, 2020. saviok.com. <https://www.saviok.com/>
- [18] Accessed August, 2020. softbankrobotics.com. <https://www.softbankrobotics.com/emea/en/pepper>
- [19] Accessed August, 2020. ubtrobot.com. <https://www.ubtrobot.com/products/cruzr?ls=en>
- [20] Accessed August, 2020. www.cmcm.com. <https://www.cmcm.com/en/ai-business#aiServiceRobot>
- [21] Accessed August, 2020. www.hitachi.com. [https://www.hitachi.com/rd/research/mechanical/robotics/emiew3\\_01/index.html](https://www.hitachi.com/rd/research/mechanical/robotics/emiew3_01/index.html)
- [22] Accessed August, 2020. www.hrgrobotics.cn. [http://www.hrgrobotics.cn/en/Industrial\\_platform/Index#cy103](http://www.hrgrobotics.cn/en/Industrial_platform/Index#cy103)
- [23] Accessed August, 2020. www.lg.com. <https://www.lg.com/uk/lg-magazine/tech-story/ifa-2018-your-ultimate-guide-to-lg-cloi-robots>
- [24] International Organization for Standardization. 2012. *Robots and robotic devices (ISO 8373:2012)*. Technical Report. International Organization for Standardization.
- [25] World Robotics. 2018. *World Robotics 2018 – Service Robots*. Technical Report. The IFR Statistical Department.