

PAPER

Robotics

J. SEBASTIAN, Y-L. HSU. *Talking to the home: IT infrastructure for a cloud-based robotic home smart-assistant.* *Gerontechnology* 2018;17(Suppl):102s; <https://doi.org/10.4017/gt.2018.17.s.099.00>

Purpose Dialog with robots using natural language has becoming an important trend of the development of companion robots. A 2017 study by Google and Peerless Insights showed how users feel comfortable to include a smart assistant in their home¹. In this study, participants also manifested that having a cloud-based smart assistant system integrated to their homes allowed them to ease their daily tasks. Even more insightful is the fact that users felt that they were talking to a “friend” or “another person” while interacting with the smart assistant. The 2018 consumer electronics show (CES) showcased a long variety of robots², many that offered a cloud-based smart assistant system integrated in them. There are 3 possible types of dialogs, information based, task based and chatting. The purpose of this paper is to describe the design of an effective IT infrastructure that allows a robot to interact with the older adults and receive control home environments. Furthermore, such IT structure should be easily installed in existing home environments. **Method** The core concept of the design is, the entire home as a robotic platform. The integration of a robotic user interface with cloud-base smart assistants at home allows users to have a focal point of interaction when interacting with the entire home. *Figure 1* presents the overall infrastructure of an IoT home ecosystem. The IoT home ecosystem consists of a team of devices that interact by listening and communicating with each other. Whilst the team of devices works together, the robotic user interface is a gate of interaction to the users. This companion robot embodies an IoT ready system, which uses the Google APK as the main brain for interaction. The information based and chatting are solely based on current Google technology. *Figure 2* shows how task based on dialog is achieved. Users first state the command recognized by the API-AI agent created for the robot. This agent has been set to interact with users through natural language. This specific behavior creates the “illusion of life” in which users can command their tasks in their own speech pattern. The natural language programming is scripted to sound and feel like a natural conversation whilst it waits for the specific command of the user to be spoken. Such command is converted to a web-hook, which now can be sent to either the Google home control center or the server in which the IoT devices are connected to (in this case AWS). These IoT devices via the robotic user interface are now able to “listen” to voice commands and perform the tasks users request through the robot. **Results & Discussion** In this research, the role of a companion robot is linked to the IoT ecosystem that allows current and future devices to be controlled via voice commands. A prototype companion robot was built and linked to an IoT living lab to demonstrate the feasibility. Initial user experience experiment was conducted. To make the task based dialog even more natural, each set of commands can have hundreds or thousands of iterations. Google’s APK for smart assistants also allows robots to do machine learning and pairs specific commands to specific accounts based on location, user preferences and more allowing each home to be unique.

References

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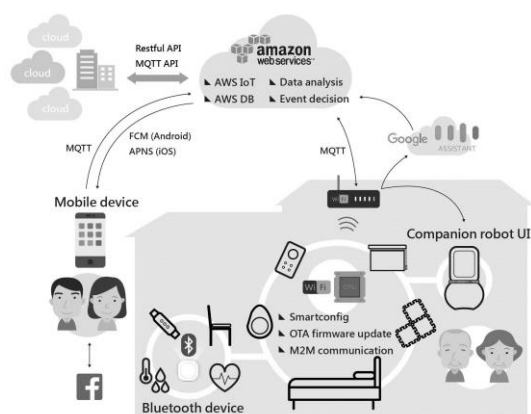


Figure 1. Overall IT infrastructure of an IoT Home

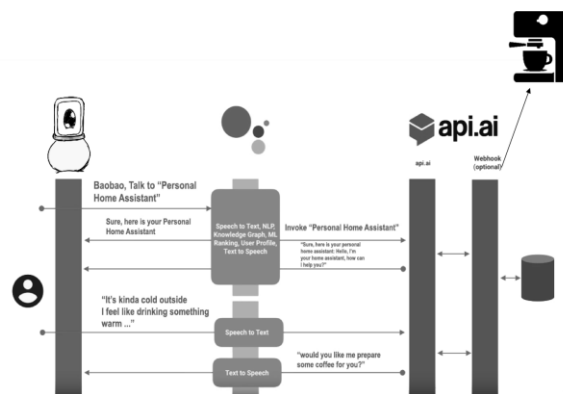


Figure 2. IT structure of a natural language processing system for an IoT home Ecosystem through a Robot