Sharedo:
To-Do List Interface for Human-Agent Task Sharing

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Background

Sharedo: To-Do List Interface for Human-Agent Task Sharing

Agents are Smart

- Task Coordination e.g. Electric Elves [Scerri et al., AAMAS '03]
  - Tasks are **automatically** assigned to appropriate agents
  - The user just needs to confirm the execution

- Task Execution e.g. Roomba
  - Agents can **automatically** handle tasks instead of users
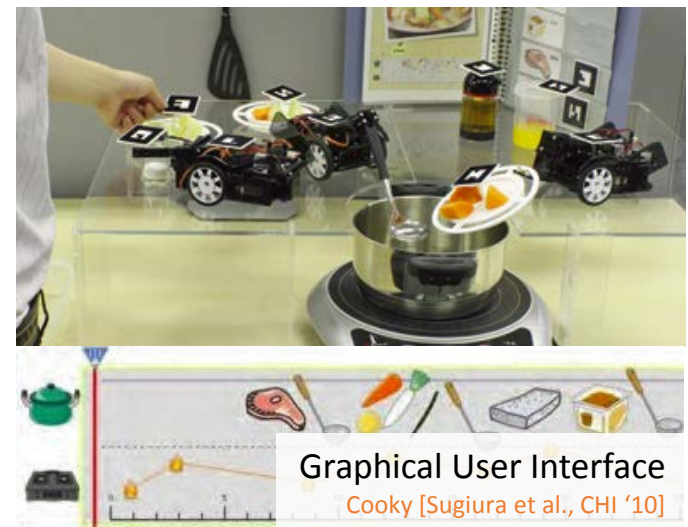 - The user is relieved from tedious tasks

How should the task be completed?

↓

User Interface is Important

User Interface is Important

- User Interfaces for Task Execution
  - The user can intuitively specify the task details

Joystick

Augmented Reality
TouchMe [Hashimoto et al., ICAT '11]

Printed Marker
Magic Cards [Zhao et al., CHI '09]

Vacuum
this room

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Graphical User Interface
Cooky [Sugiura et al., CHI '10]

How about Task Coordination?

Who should handle it?

- Do you always want **Roomba** to clean your room?
- Do you always want **Amazon** to deliver products?
- Do you want **PCs** to watch movies instead of you?
- There are always **good** and **bad** things about automation – we should always have **choices**.
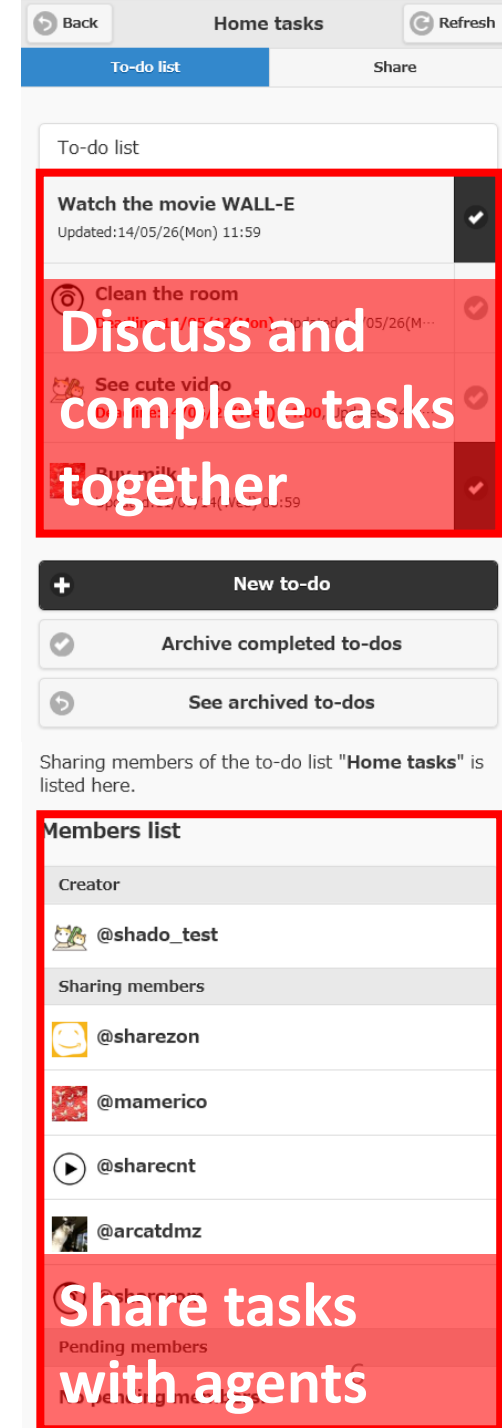
Share, Discuss, and Complete Tasks Together.

Sharedo

- **To-Do List** Interface that allows to
  - **Share** tasks with agents
  - **Discuss** task details with agents
  - **Complete** tasks together

- A platform for **both task coordination and execution**

- Tested with **three** agents to share **both physical and digital tasks**

http://www.sharedo.info/ (requires 🐦 account)

Sharedo: http://junkato.jp/sharedo/

Back Home tasks Refresh

To-do list | Share

To-do list

Watch the movie WALL-E
Updated:14/05/26(Mon) 11:59 ✔

Clean the room
~~05/26(M···~~

See cute video

Buy milk
:59 ✔

Discuss and complete tasks together

+ New to-do

✔ Archive completed to-dos

See archived to-dos

Sharing members of the to-do list "**Home tasks**" is listed here.

Members list

Creator

@shado_test

Sharing members

@sharezon

@mamerico

▶ @sharecnt

@arcatdmz

Share tasks with agents

Pending members

Use of Human-Human Interfaces as Human-Agent Interfaces
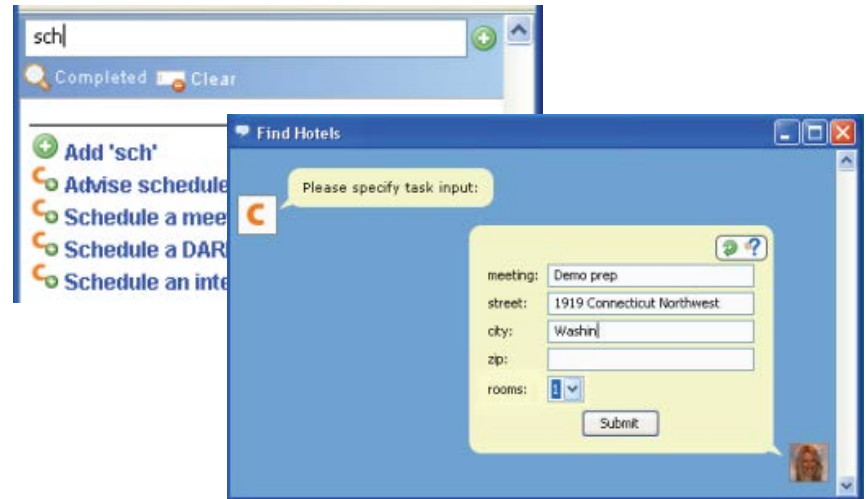
Social media
Robots in my Contact List
[Ma et al., APCHI '12]
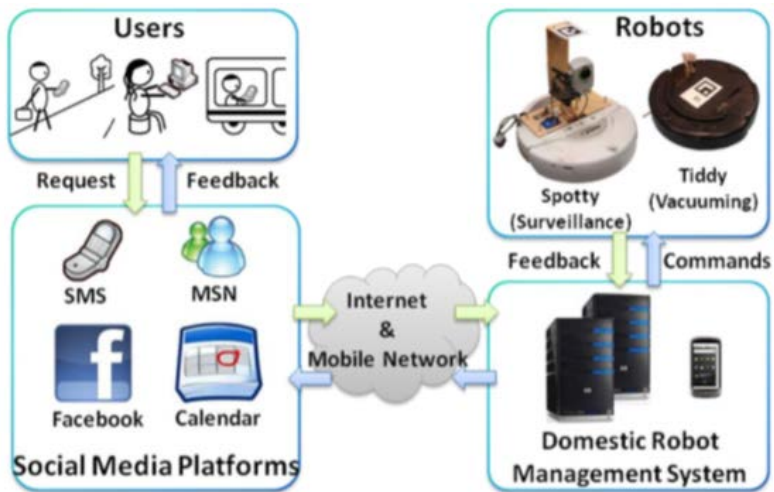
To-do list with chat
Towel
[Conley et al., AAAI Spring Symp. '06]

One-to-one communication   **Single agent for digital tasks**

All tasks assigned by human users to agents

Interaction Design

Sharedo: To-Do List Interface for Human-Agent Task Sharing

Interaction Design of Sharedo

- **Share** tasks with agents

- **Discuss** task details with agents

- **Complete** tasks together

Share to-do lists

- Each user and agent is represented by 🐦 account
- Each to-do list can be shared with others

Currently available agents and their features	Home Cleaning	Shopping	Media Content
Share add user tasks	✓	-	✓
Discuss clarify details	✓	✓	-
Discuss notify progress	✓	-	✓
Complete tasks by itself	✓	✓	-
Tasks are…	**Physical**	**Both**	**Digital**

To-do list | Share

Sharing members of the to-do list "**Hobby**" is listed here. Since you are the creator of this list, you can accept or decline permission requests. You can also purge already accepted members.

Members list

Creator

🐱 @arcatdmz

Sharing members

🙂 @sharezon   Purge

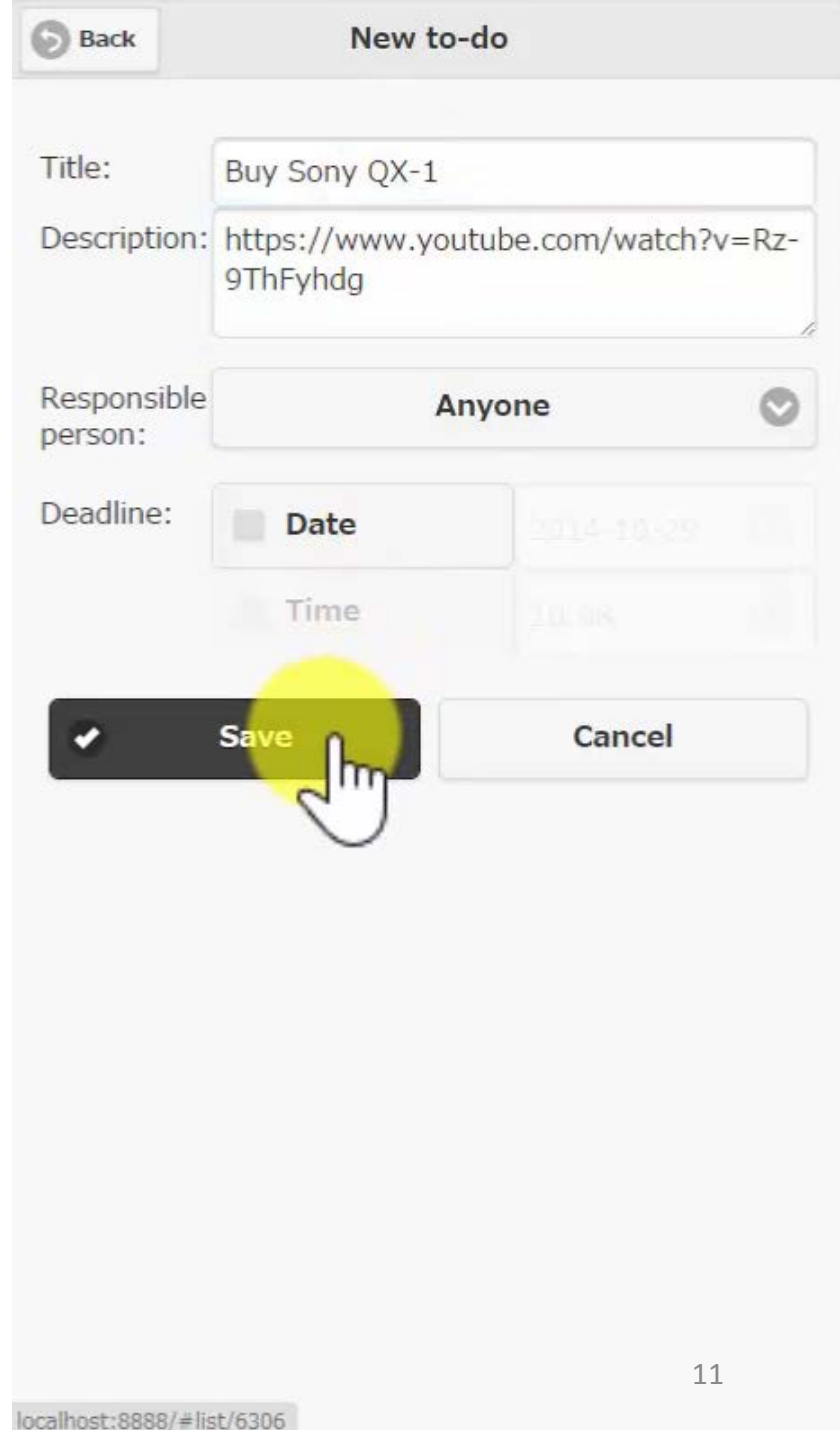▶ @sharecnt   Purge

Pending members

No pending members.

Add new sharing members

Let your friends know the URL of this to-do list and ask him/her to request sharing permission. The URL for the to-do list "**Hobby**" is shown below:

http://localhost/#list/6306

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Share tasks

- Either a **user** or agent can add tasks on a to-do list
- Members sharing the list are notified by 🐦 messages or web hook calls
  - ◉ Look for the word "clean"
  - ☺ Look for the word "buy"
  - ▶ Look for media URLs

Sharedo: http://junkato.jp/sharedo/

Back   **New to-do**

Title: Buy Sony QX-1

Description: https://www.youtube.com/watch?v=Rz-9ThFyhdg

Responsible person: Anyone

Deadline: ■ Date   2014-10-29

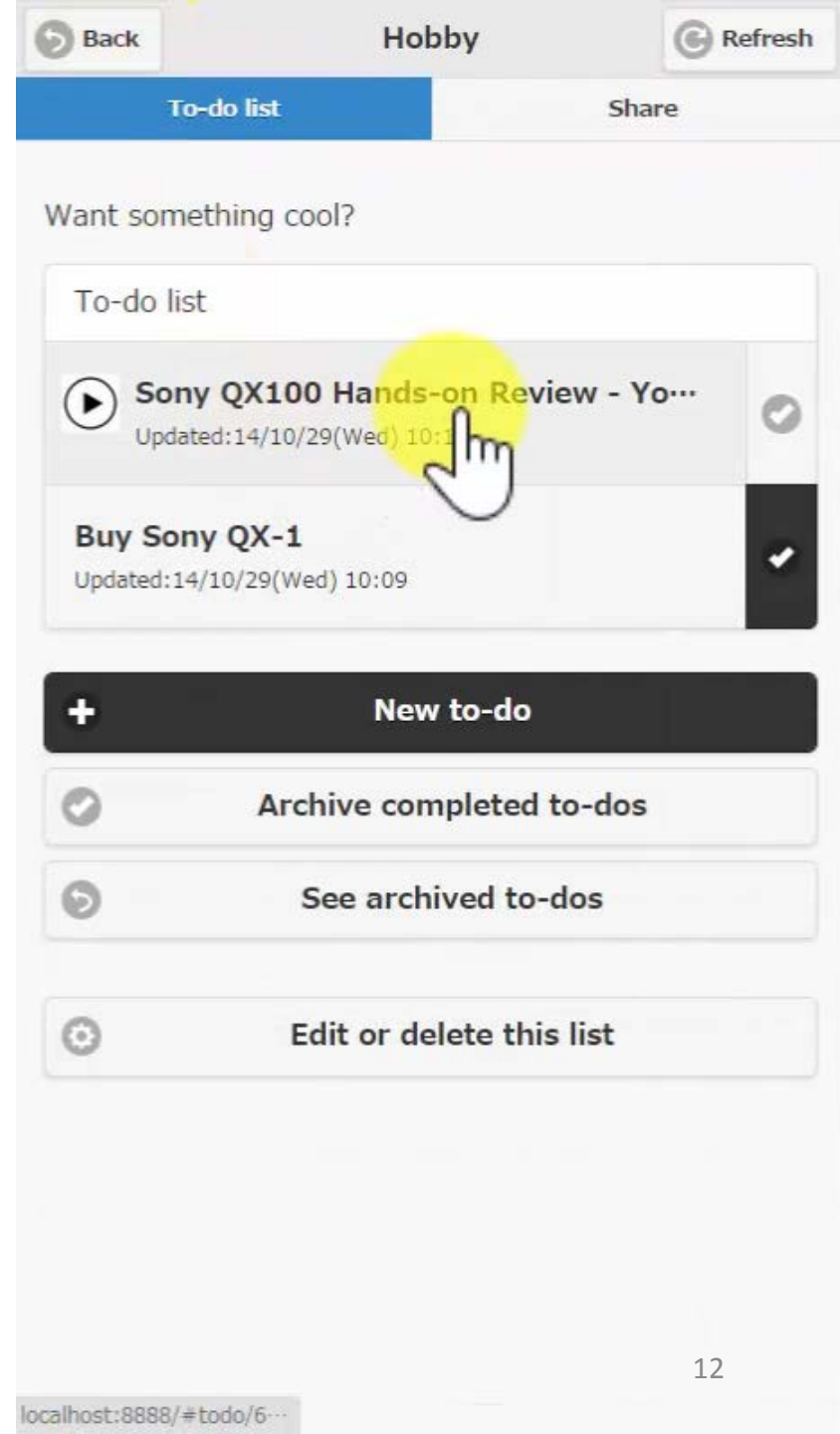■ Time   16:48

✔ Save   Cancel

localhost:8888/#list/6306

Share tasks

- Either a user or **agent** can add tasks on a to-do list
  - ◉ Ask for help to recover from fatal errors

  - ◉ Suggest running routine tasks
  - ▷ Suggesting watching relevant media URLs

Sharedo: http://junkato.jp/sharedo/

Discuss details

- Discussion board helps removing task ambiguity
  - ◉ When and how many times should the room be cleaned?
  - ☺ Which product should the agent buy?
  - ▶ Who has viewed the media?

- Discussion board also works as a reminder

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Complete tasks

- Tasks can be completed by anyone regardless of the current assignment

- Task completion or deletion prevents from further agent actions
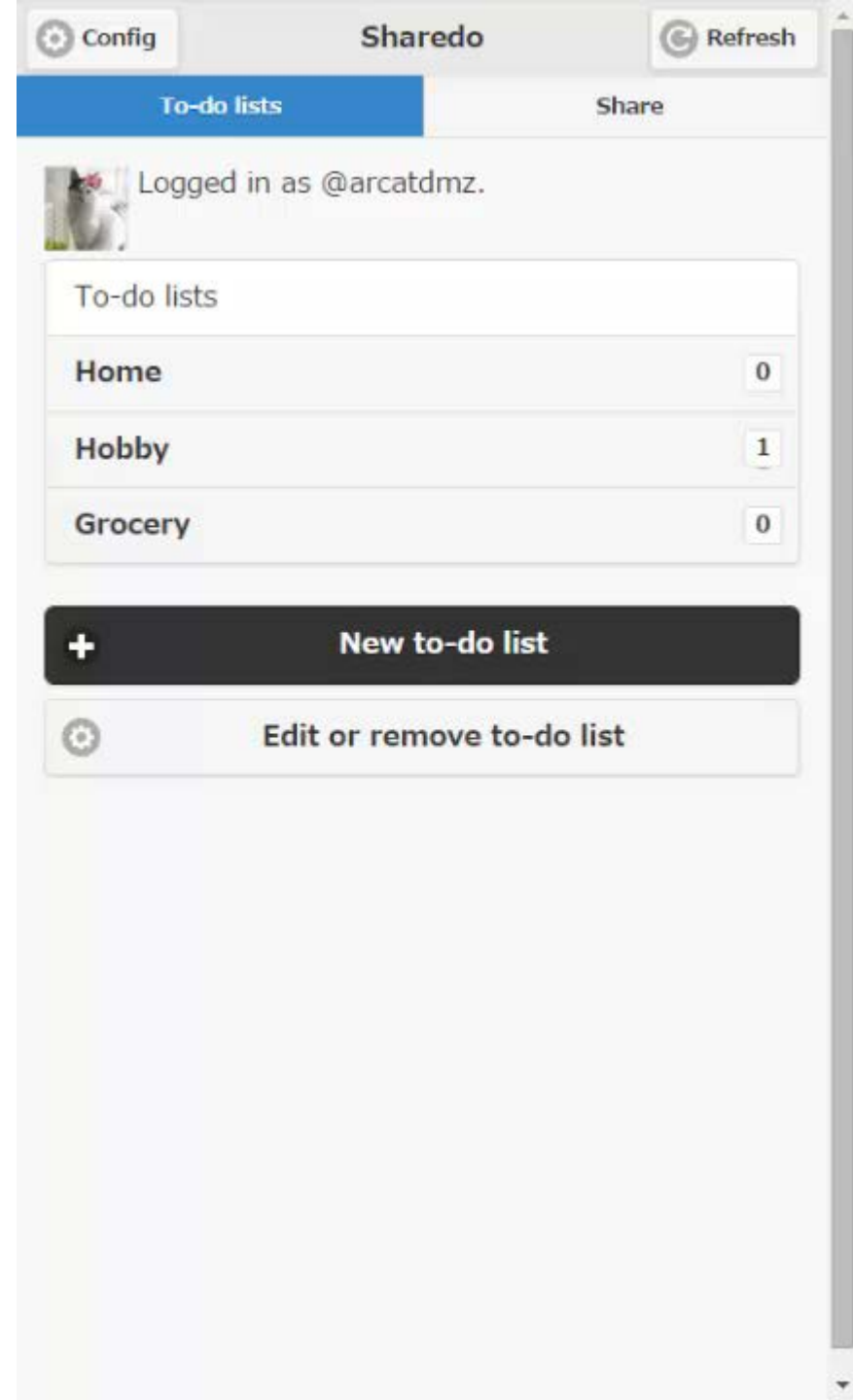
Sharedo: http://junkato.jp/sharedo/

Interaction Design of Sharedo

- **Share** tasks with agents

- **Discuss** task details with agents

- **Complete** tasks together

⬇

Our social interaction strategy:

Each operation on the to-do list makes each agent interpret new information

Implementation
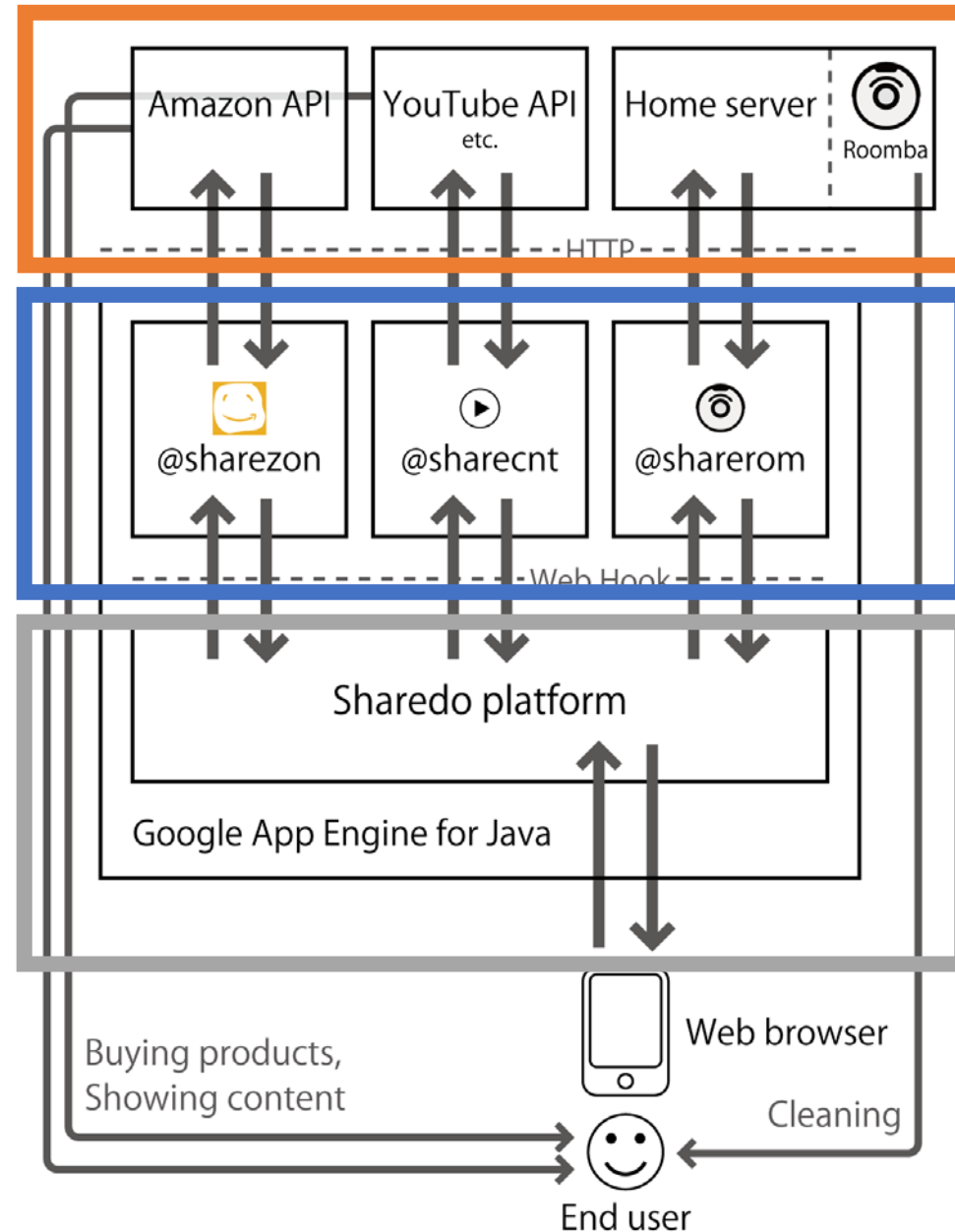
Agents for Task Execution

Hardware and software that provides actual service

Agents for Task Coordination

Software that specifies task details

Sharedo platform

Platform connecting agents and users

Discussion and Conclusion

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Preliminary User Study

- Deploy Sharedo to observe its real use
  - **4** participants in **2** families
  - **2** months with home cleaning and shopping agents

- The system was used well for the targeted purpose
  - **179** tasks with **111** comments in **15** to-do lists
  - **61** tasks were created by agents

- Collected comments: *"I worried about the cleaning robot **even when I didn't get messages** while I was out." "We felt like **the shopping agent was a friend**. (...) The feeling was very different compared to the website."*

Discussion and Future Work

- The Sharedo platform is proved to work stably

- More interactive UI for task specification is **desired**

- 🐦 account makes the agent more **familiar**

- More variety of more sophisticated agents can be implemented on top of the current platform

  - Agent-agent collaboration e.g. **cooking agent** asks to buy grocery; **shopping agent** delivers the grocery; the **cooking agent** waits for the delivery to start cooking

  - (We welcome collaborations!)

Sharedo (Conclusion)

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