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A trial of prevention of physical and social frailty for older people via chatting bot installation on moving stall

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Short resume of the presenter

- Name: Yoko Nishihara
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Topics of research interest of our group

- Human-Computer Interaction: https://tinyurl.com/2mnxhbmw (demo)
- Natural Language Processing: https://tinyurl.com/2yspn5k8 (slides)
- Comic Computing
- Edutainmeint
- Entertainment: https://tinyurl.com/r49366sb (demo)
- Multimedia on Cooking and Eating Activities: https://tinyurl.com/8vend223 (slides)

Research background

- Japan is facing an aging society with a low birthrate.
- People request to prevent older people's physical and social frailty.
- It is difficult for older people to maintain awareness continuously due to their physical constraints and low communication with neighbor.
- We use an approach of information science to try to increase the intention of older people's physical activity and sociable communication.

Targeted field

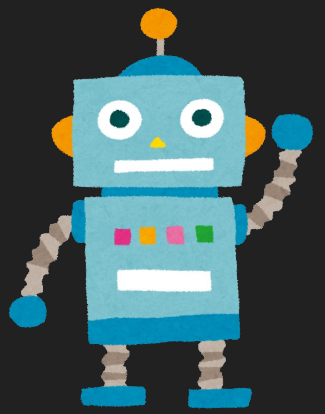
- This study is conducted in Yogo Town in Shiga Prefecture in Japan as an area of an aging community with a low density.
  - The percentage of residents aged 65 years and older is 43.1%.
  - The problem of frailty has become more severe due to Covid-19 infection control.

Moving stall in Yogo town

- Yogo Town provides a moving stall for older people to assist them in purchasing daily necessities.
  - Though the residents in the town use automobiles every day, the older people have returned their driving licenses due to their low physical and cognitive ability.
- The moving stall carries foods and daily necessities and goes to community meeting space and doorsteps of individuals.
- The older people can conduct a walking exercise and conversation with others around the moving stall.

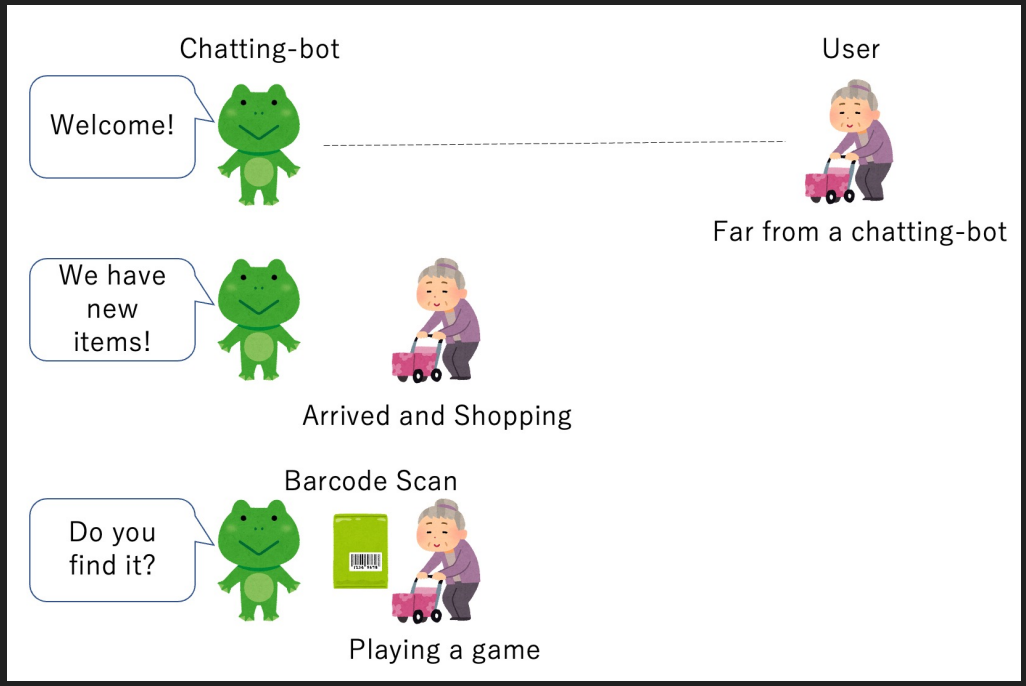
Our approach for frailty prevention

- We hypothesize that physical activity and sociable communication will increase if older people have more interactions with others and the outside environment.
- We believe that by raising their interest in the surrounding daily activities could help improve their interaction with the outside society.
- To achieve the above, we install a chatting bot in the moving stall.



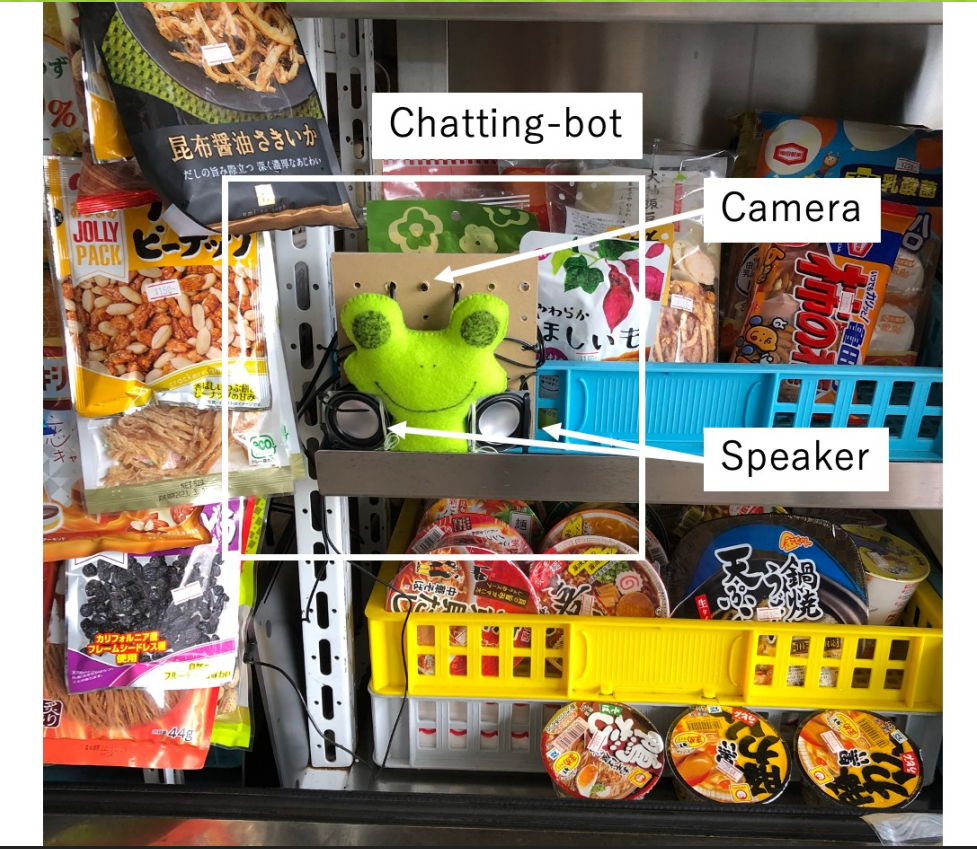
Interaction pattern between chatting-bot and older people

- Figure illustrates the interaction pattern between our chatting bot and older people.
- The chatting bot changes its behavior according to the distance from older people to attract them closer to the chatting bot.



Developed chatting bot

- Figure shows the appearance and construction of the chatting bot.
- The chatting bot mainly has two functional components: (a) human and object detection by a camera and (b) a speech function using a pair of speakers.



Human and object detection

- The chatting bot uses a camera to capture real-time frames.
  - YOLOv5 is used for human detection.
- For human detection, **the chatting bot will first detect whether a person is in the frame.**
  - If a human is found, the chatting bot will estimate the distance from the human to determine whether the older person is far from or close to him.
- In object detection, **the chatting bot recognizes the barcode of items to judge whether they are newly listed.**
  - If a recognized barcode is included in the new-item list, the item is judged as a listed new good.

Speech according to detection result(1/2)

- **The chatting bot gives speech responses depending on the human and object detection result.**

Chatting-bot

User

Result 1

Far from a chatting-bot

Result 2

Arrived and Shopping

Speech according to detection result(2/2)

- **The chatting bot gives speech responses depending on the human and object detection result.**

Result 3

You got it! Congratulations!

That's not a new one. Please try it again.

Barcode Scan

Playing a game

Conclusion and future work

- **This paper proposes a method to utilize a chatting bot** on a moving stall to prevent the physical and social frailty of older people living in an aging community with a low density.
- The chatting bot attempts to interact and make conversations with older people.
- If older people are interested in the chatting bot, the chance of physical exercises and sociable communication will increase, which prevents physical and social frailty.
- We will survey the effect of the installation of the chatting bot for the prevention of frailty.