芝浦工業大学とDePauw大学とのオンラインgPBL

芝浦工業大学　SIT総研特任教授　大倉典子

Agenda

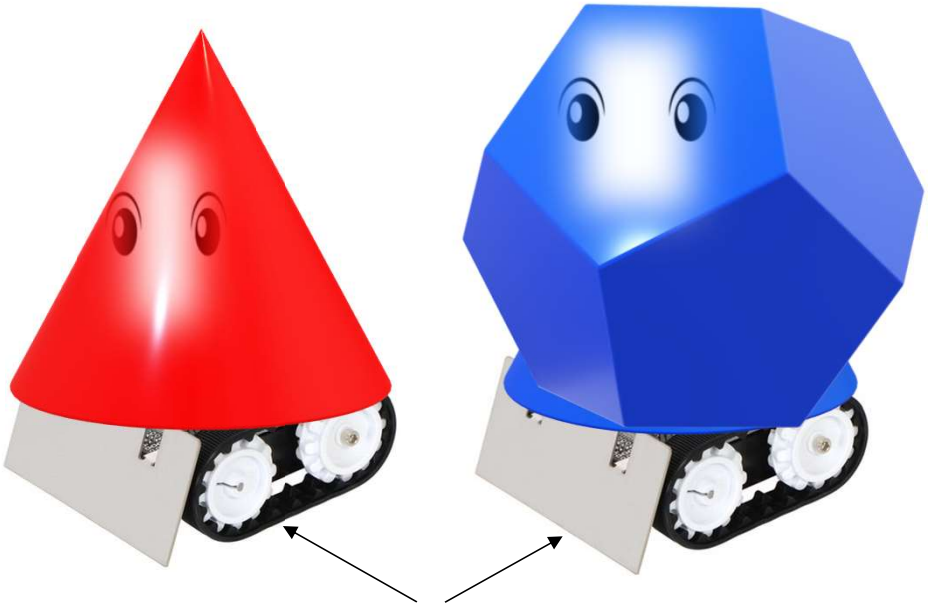
1. Introduction
2. Activities
3. What we could do and what we couldn't do
4. Acknowledgement

1. Introduction

- 米国DePauw Universityと芝浦工業大学とのNSFへの IRES (International Research Experiences for Undergraduates) プロポーザル (**Research on Design and Cross-Cultural Perceptions of Cuteness in Robotic Gadgets**) が採択され、2019年8月から共同研究を開始した。
- これに基づき、2020年6月1日から7週間の学生の共同作業プロジェクトを本学豊洲キャンパスで実施する計画を立てた。
- ところが、COVID-19 パンデミックのため、アメリカの教員・学生の来日が不可能となり、芝浦工大の学生もキャンパスに入れなくなった。
- そこで、新しいリモート共同作業プロジェクトを急遽設計し実施した。

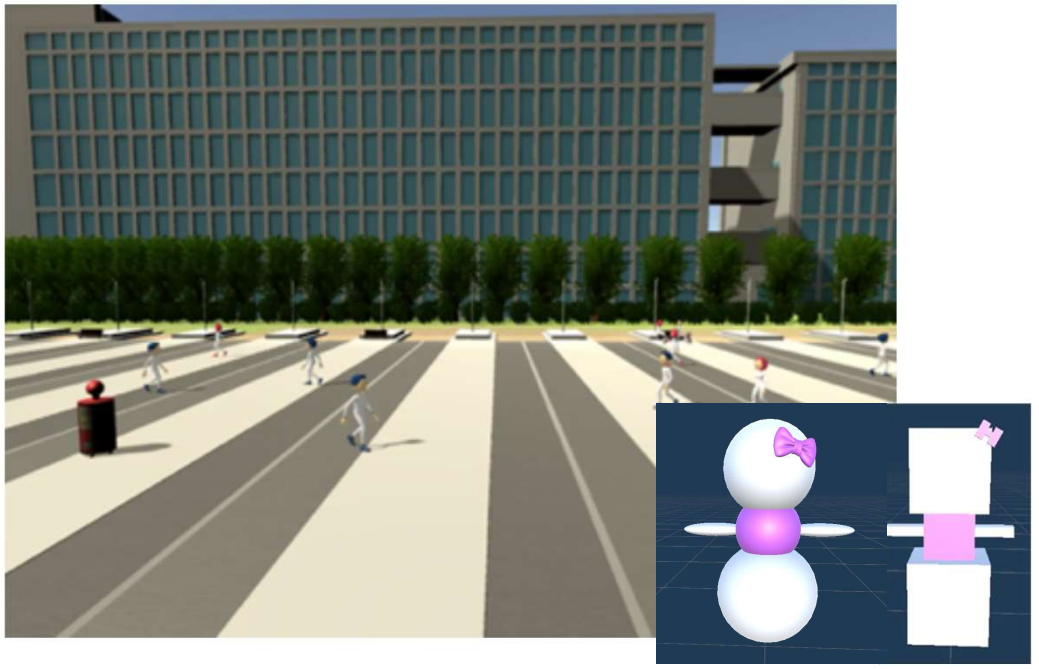
1. Introduction

- 実施予定だったプロジェクト：
  Cross-cultural teams to design, build and evaluate robotic gadgets



Arduino用Zumo追跡ロボットキット（ロボショップのウェブサイトより）

- リモート共同作業プロジェクト：
  Constructing virtual spaces with kawaii robots

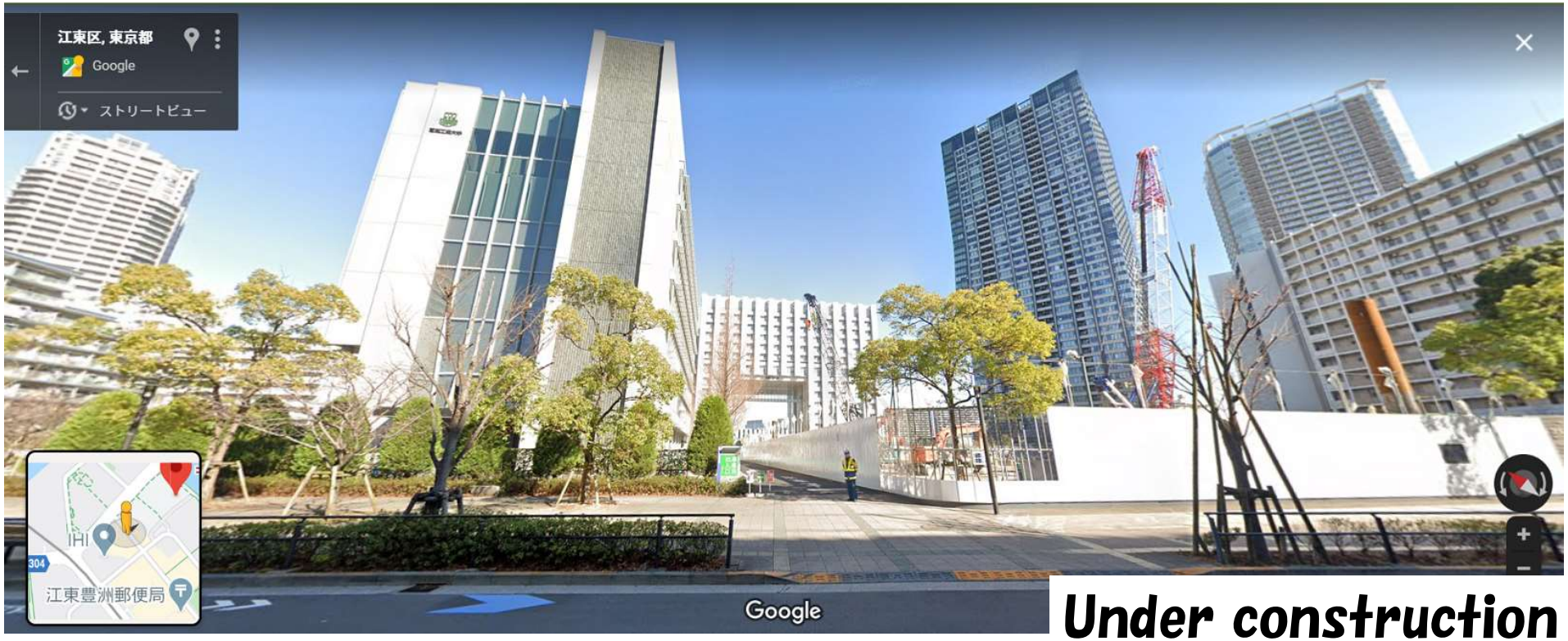


Welcome to Shibaura Institute of Technology (SIT)

June 1st 2020 (JST), May 31st (EDT)

Michiko OHKURA, Midori SUGAYA,
Peeraya SRIPIAN, Tipporn LAOHAKANGVALVIT

(1) Introduction (Toyosu Campus in 2020)



Under construction of a new building

(1) Introduction (Opening remarks)

(1) Introduction (Organizers)

Shibaura Institute of Technology

National Institute of Advanced Industrial Science and Technology (AIST)

DePauw University

Prof. Midori SUGAYA

Prof. Michiko OHKURA

Dr. Gift in Bangkok for childcare leave

Dr. Tip in Tokyo Waterfront, AIST

Vice President, Prof. Dave BERQUE

Prof. Hiroko CHIBA

(1) Introduction (Toyosu Campus, open in 2006)

Virtual Toyosu Campus created in 2004 (by OmegaSpace)

(2) Outline of the collaborative work

- Title of collaborative research between DePauw Univ. and SIT: Research on Design and Cross-Cultural Perceptions of Cuteness in Robotic Gadgets
- Title of the activity: Constructing virtual spaces with kawaii robots by distance collaborative work
- Examples of virtual spaces



(3) Why robots? Human-Robot Society is coming!
Expectation for the Future Robot
Fields expected to be robots from now on

(4) Schedule

	CONTENT
1	Introduction, Introducing each other, Begin design of a virtual space with robots
2	Regular meeting (Continue designing)
3	Presentation of virtual space with robots. Begin development
4 5	Regular meeting (Continue development, Discuss evaluation questionnaire items) + Lecture by Dr. Tip
6	Presentation of evaluation questionnaire items (Continue development)
7	Presentation of virtual space with robots and evaluation of spaces and robots. Begin summarizing the evaluation results, and discussion
8	Presentation of discussion of evaluation results. Sum-up
9	Farewell meeting

(5) Tools and Materials

- For virtual space and objects development Unity (Personal Version or Student Version)
  - Create a virtual space, robots, and other objects by yourselves
  - Can import from Unity Asset Store and/or various Unity communities websites
- Requirements for a pair of robots
  - Should be created by yourself (Do not import from somewhere)
  - Visible, Can move, With sound or voice
  - The first one should be very Kawaii (Based on your opinion)
  - The second robot is different from the first one in only one attribute such as body color or shape of head, which makes the second one much less kawaii.

(6) Other activities

- Lecture of Prof. Nittono (The author of a book entitled “The power of Kawaii” in Japanese)
- Lecture of Dr. Tipporn Laohakangvalvit (Kawaii model by deep learning using eye tracking)

(7) Team members

日米2名ずつ計4名のチームが2つ

(8) Announcement

- Be in contact with your team members every day at least on weekdays using Slack and/or Zoom.

2. Activities

	CONTENT
1	Introduction, Introducing each other, Begin design of a virtual space with robots
2	Regular meeting (Continue designing)
3	Presentation of virtual space with robots. Begin development
4 5	Regular meeting (Continue development, Discuss evaluation questionnaire items) + Lecture by Dr. Tip
6	Presentation of evaluation questionnaire items (Continue development)
7	Presentation of virtual space with robots and evaluation of spaces and robots. Begin summarizing the evaluation results, and discussion
8	Presentation of discussion of evaluation results. Sum-up
9	Farewell meeting

2. Activities(1) Design of a virtual space with robots

	CONTENT
1	Introduction, Introducing each other, Begin ***design of a virtual space with robots***
2	Regular meeting (Continue designing)
3	Presentation of ***virtual space with robots***. Begin development
4 5	Regular meeting (Continue elopment, Discuss evaluation questionnaire items) + Lecture by Dr. Tip
6	Presentation of evalu ue development)
7	Presentation of virtua n of spaces and robots. Begin summarizing the evaluation results, and discussion
8	Presentation of discussion of evaluation results. Sum-up
9	Farewell meeting

チームA：Station in future
チームB：Toyosu Campus in future

2. Activities(2) Development of a virtual space with robots

	CONTENT
1	Introduction, Introducing each other, Begin design of a virtual space with robots
2	Regular meeting (Continue designing)
3	Presentation of virtual space with robots. Begin ***development***
4 5	Regular meeting (Continue development, Discuss eva tion questionnaire items) + Lecture by Dr. Tip
6	Presentation of evaluation questionnaire items (C
7	Presentation of virtual space with robots and evalu ts. Begin summarizing the evaluation results, and dis
8	Presentation of discussion of evaluation results. S
9	Farewell meeting

開発ツール：Unity
スペースは共同作業
ロボットペアは個人
コミュニケーション：
SlackとZoom

2. Activities(3) Discuss evaluation questionnaire items

	CONTENT
1	Introduction, Introducing each other, Begin design of a virtual space with robots
2	Regular meeting (Continue designing)
3	Presentation of virtual space with robots. Begin development
4 5	Regular meeting (Continue development, Discuss ***evaluation questionnaire items***) + Lecture by Dr. Tip
6	Presentation of ***evaluation questionnaire items*** (Continue development)
7	Presentation of virtual space with robots and evaluation of spaces and robots. Begin summarizing the evaluation results, and discussion
8	Presentation of discussion of evaluation results. Sum-up
9	Farewell meeting

Evaluation questionnaire items

- **チーム**A：
- **スペース**（Station）
  - Realistic - Unrealistic
  - Innovative - Simple
  - Modern - Futuristic
- **ロボットペア**
  - Friendly - Unfriendly
  - Lovely - Unlovely
  - Dexterous - Clumsy

2. Activities(4) Presentation and evaluation

	CONTENT
1	Introduction, Introducing each other, Begin design of a virtual space with robots
2	Regular meeting (Continue designing)
3	Presentation of virtual space with robots. Begin development
4 5	Regular meeting (Continue development, Discuss evaluation questionnaire items) + Lecture by Dr. Tip
6	Presentation of evaluation questionnaire items (Continue development)
7	***Presentation* of *virtual space with robots* and *evaluation of spaces and robots***. Begin summarizing the evaluation results, and discussion
8	Presentation of discussion of evaluation results. Sum-up
9	Farewell meeting

Presentation and evaluation

- チームB：動画

Team B Environment Evaluation

Check one button for each adjective pair.

*必須

メールアドレス *

メールアドレスは事前入力できません。

a: 1: Cramped 3: Neutral 5: Spacious (狭い一広い) *

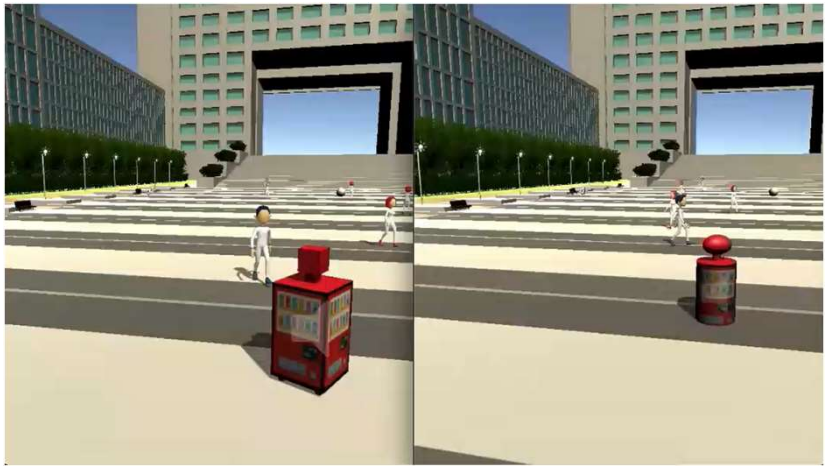
1	2	3	4	5
○	○	○	○	○

b: 1: Contemporary 3: Neutral 5: Futuristic (現代的一未来的) *

1	2	3	4	5
○	○	○	○	○

Presentation and evaluation

- チームB：動画



Team B: Robot Pair Evaluation

*必須

メールアドレス *

メールアドレスは事前入力できません。

Robot pair comparison 1

Evaluate the right robot (B) compared with the left robot (A) and check one button for each adjective pair.

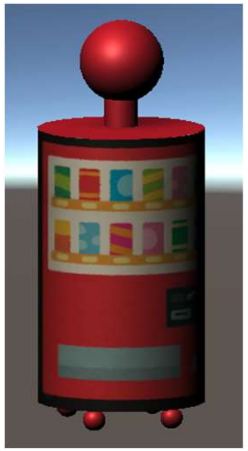
a: 1: Unapproachable 3: Same 5: Approachable (近づきにくい一近づきやすい) *

1	2	3	4	5
○	○	○	○	○

2. Activities(5) Reporting evaluation results

	CONTENT
1	Introduction, Introducing each other, Begin design of a virtual space with robots
2	Regular meeting (Continue designing)
3	Presentation of virtual space with robots. Begin development
4 5	Regular meeting (Continue development, Discuss evaluation questionnaire items) + Lecture by Dr. Tip
6	Presentation of evaluation questionnaire items (Continue development)
7	Presentation of virtual space with robots and **evaluation of spaces and robots**. Begin summarizing the evaluation results, and discussion
8	Presentation of discussion of ***evaluation results***. Sum-up
9	Farewell meeting

Evaluation results



図は、S. Imura, et al.：Kansei Evaluation for Robots in Virtual Space －The impression toward different robot shape－, Proc. ADADA+CUMULUS 2020 から転載

1: Not Kawaii - 3: Same - 5: Kawaii
Average: 4.20

1: Unfriendly - 3: Same - 5: Friendly
Average: 4.13

1: Unlovely - 3: Same - 5: Lovely
Average: 3.67

1: Untrustworthy - 3: Same - 5: Trustworthy
Average: 3.40

1: Rude - 3: Same - 5: Respectful
Average: 3.40

2. Activities(6) Farewell meeting

	CONTENT
1	Introduction, Introducing each other, Begin design of a virtual space with robots
2	Regular meeting (Continue designing)
3	Presentation of virtual space with robots. Begin development
4 5	Regular meeting (Continue development, Discuss evaluation questionnaire items) + Lecture by Dr. Tip
6	Presentation of evaluation questionnaire items (Continue development)
7	Presentation of virtual space with robots and evaluation of spaces and robots. Begin summarizing the evaluation results, and discussion
8	Presentation of discussion of evaluation results. Sum-up
9	***Farewell meeting***

Farewell meeting

3. できたこととできなかったこと

- できたこと
  - 日米の学生の共同作業によるバーチャル空間とロボットペアの作成
  - バーチャル空間とロボットの感性評価項目の作成と評価
  - Slackと週報による学生のフォロー

- できなかったこと（今年、リベンジ）
  - 作成したバーチャル空間への没入
  - バーチャル芝浦工業大学でのミーティングや共同作業
  - 日米文化交流

4. Acknowledgement

- This material is based upon work supported by the National Science Foundation under Grant No. OISE-1854255. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.
- We thank all the participating students: K. Bautista, J. Blakey, C. Feng, W. Huang, S. Imura, K. Murayama, E. Spehlmann, and C. Wright.

ご清聴ありがとうございました。

