[CLASS 05 Monday]

Healthcare, Safety, and HCI

Learning Agenda

- How HCI system works?
- HCI examples in hospital, healthcare, and safety
- What are positive values of HCI in health and safety areas?

How HCI system works? [1] A smartwatch example

Computer

Human Activities

Human

- Sitting
- Walking
- exercise

How HCI system works? [1] A smartwatch example

Computer

IoT
IoE
(Internet of Everything)

① data gathering

- human physical activity log

Human Activities

Human

- Sitting
- Walking
- exercise

How HCI system works? [1] A smartwatch example

Computer

<Server>

IoT
IoE
(Internet of Everything)

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Cloud Server

② data transferring

Data Processing

<Device>

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Understanding how much human moves

Human

Human Activities

- Sitting
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Data Processing

<Device>

Understanding how much human moves

④ applying analyzed data

Output System

Smart watch services/functions

Human

Human Activities

- Sitting
- Walking
- exercise

How HCI system works? [1] A smartwatch example

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Output System

Smart watch services/functions

Human

Human Activities

- Sitting
- Walking
- exercise

daily log

Recommendation for healthcare

How HCI system works? [1] A smartwatch example

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Understanding how much human moves

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Output System

Smart watch services/functions

Human Activities

Moment of H-C Interaction

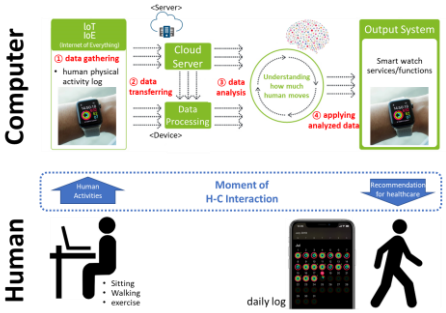
Recommendation for healthcare

Human

- Sitting
- Walking
- exercise

daily log

Sequence Diagram?



user

Smart Watch

Cloud Server

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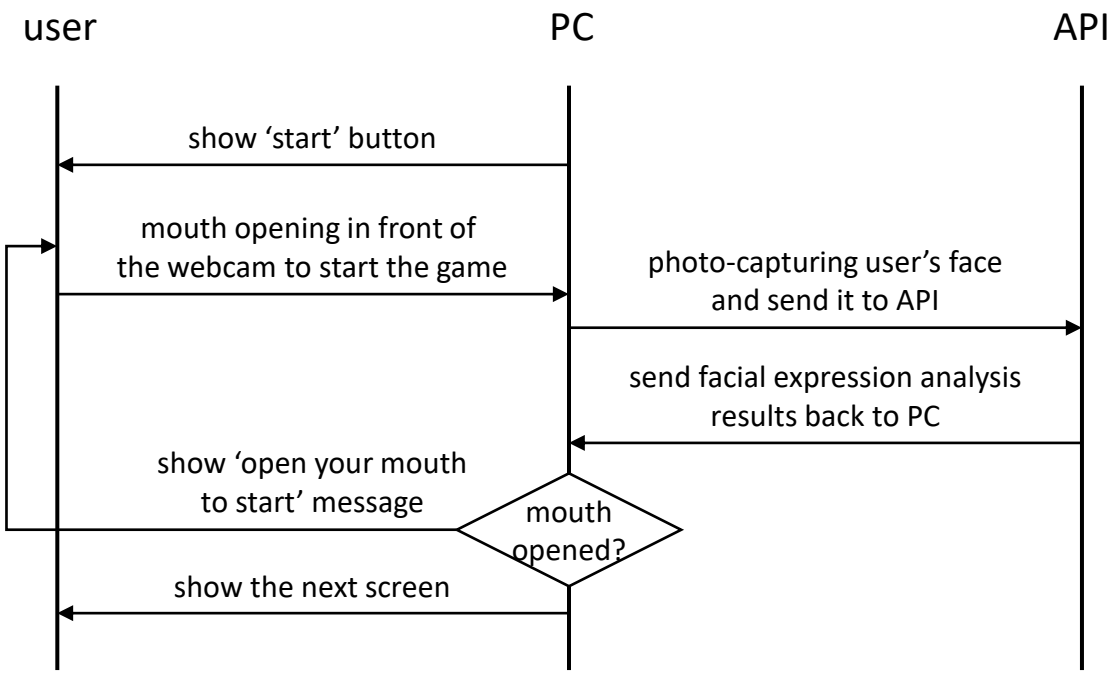
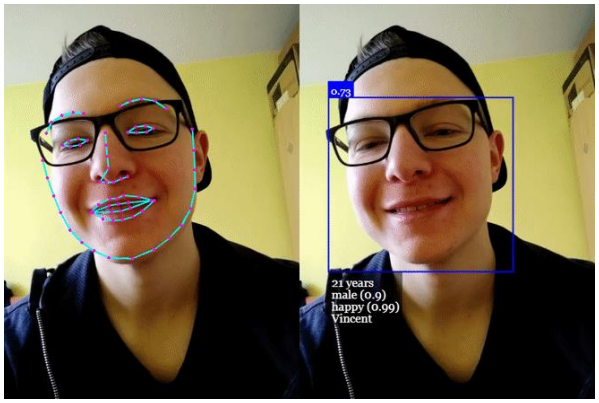
?

Sequence Diagram Examples

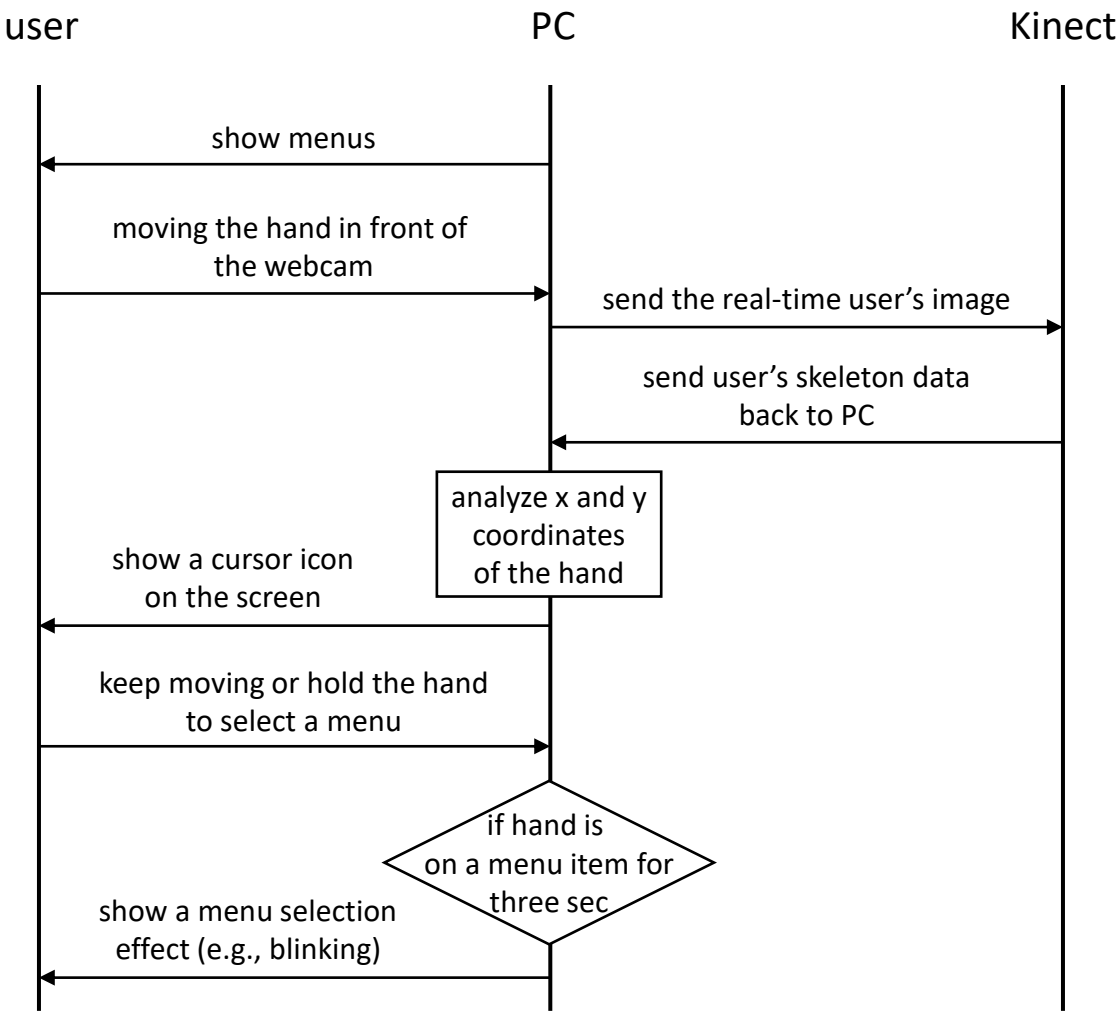
[Example]
Mouth opening interaction to **start a game**

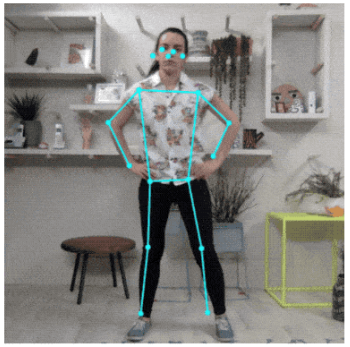


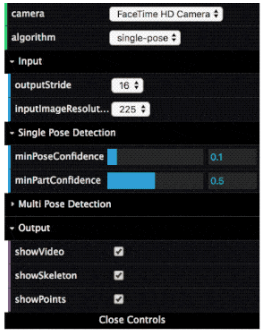


Sequence Diagram Examples

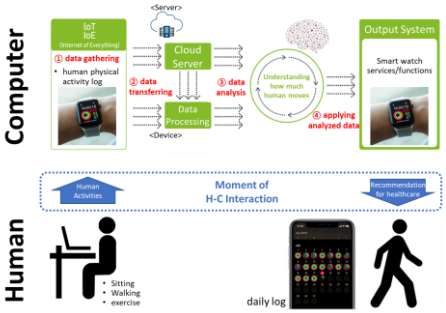
[Example]
Hand gesture interaction to **select a menu**







Practice 1: Sequence Diagram



user

Smart Watch

Cloud Server

?

?

Practice 2: Sequence Analysis of Healthcare HCI

1. Select one of the health-related services

Examples

- Run/exercise app
- ECG (heart signal) detection app
- Sleep management app
- Apps for nutrition check, diet check, water-drinking, …
- (what else?)
- …

Practice 2: Sequence Analysis of Healthcare HCI

2. Try to use the app, see how human and computer interacts in between.

3. Decompose the interaction between human and computer

<Example: Nike Run Club App for Watch>

Interaction #1. User starts Exercise
Interaction #2. Watch records data while running
Interaction #3. User stops/pauses exercise and resumes
Interaction #4. Watch shows results (graph, numbers, …)
Interaction #5. User shares data to an SNS

4. Draw a sequence diagram for **each specific interactions**

HCI for Value Creation in Healthcare/Safety Domain

- What are <u>important factors</u> to increase value of healthcare and safety services?
  - <u>On-time & on-demand</u> (e.g., tele-operation, remote healthcare, data-driven risk estimation for pre-emptive action)
  - <u>Reliability & accuracy</u> (e.g., IB Watson, AI diagnosis)
  - <u>Elimination of mistake, miscommunication, risk factors, and fatal accidents</u> ← by supporting user-centered UI/UX
  - <u>Immediate</u> problem-handling




HCI for Value Creation in Healthcare/Safety Domain

- What are important factors to increase value of healthcare and safety services? (continued)
  - Effective communication in complex system among stakeholders: doctors, patients, guardians, family members, therapist, insurance sectors, government sectors, …
  - Satisfactory experiences (worthwhile as people paid for)

Practice 3: Human Data and Interaction Ideas

1. Select one of the **health-related human data**
   - Behavior data: walking, exercising, taking pills, sleeping
   - Human bio-data: heart signal, blood pressure, …
   - Cognitive data: memorability, calculation performance, quality of decision making, …
   - Emotional data: happiness, depression, …
   - Medical-care-related: hospital visit information, doctor's records to a patient
   - Disease-related: diabetes, dementia, …
   - Special needs: data of elderly people, data of the disabled

Practice 3: Human Data and Interaction Ideas

2. **Make an idea** of a new service/product/app/function for healthcare/safety

3. **Propose values/benefits** that people can earn

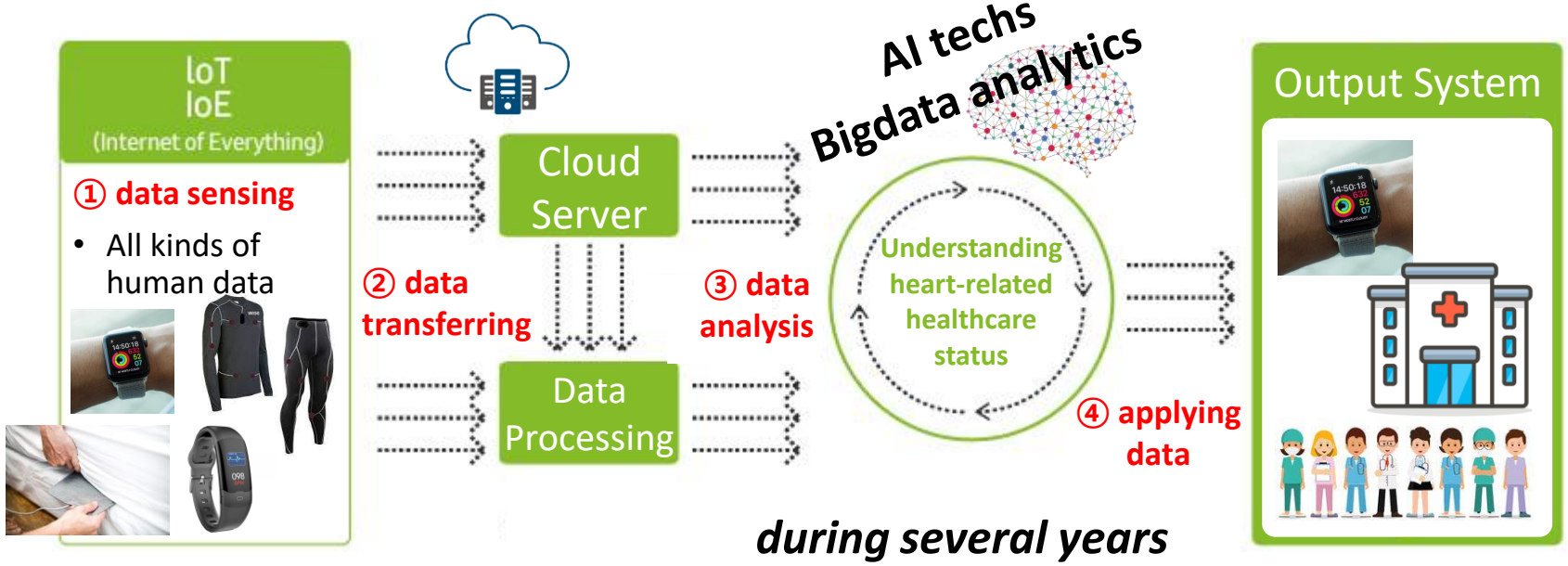
4. Provide **detailed ideas** of interaction(s)

5. Fill the form

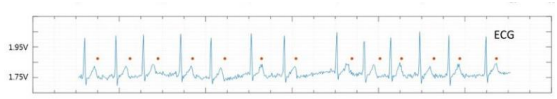
https://docs.google.com/spreadsheets/d/19P47Rp2WDGCXKXImfZ_ARTUxPo3I3VuVhOCht2JyWqo/edit?usp=sharing

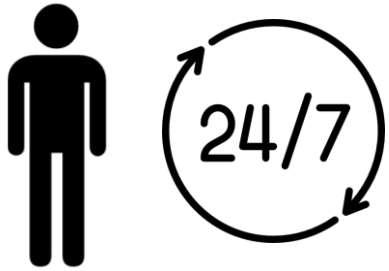
[2] Long-Term and Invisible Interaction

Computer



Human

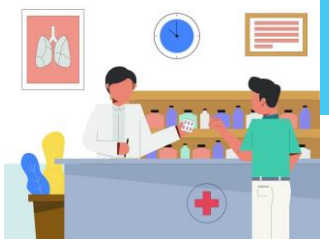




Human data

Long-term
H-C Interaction

Recommendation for healthcare



See a doctor
Go to a pharmacy

[3] Indirect Interactions

Computer

Individual or Society

IoT
IoE
(Internet of Everything)

① data sensing

- CCTV image data

Cloud Server

② data transferring

③ data analysis

Data Processing

Understanding risk factors

④ applying data

Output System

Security System

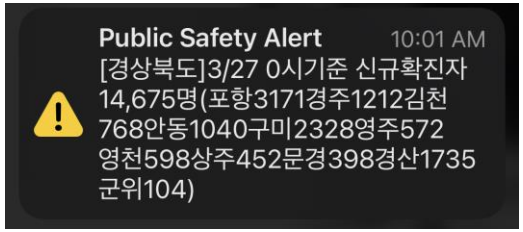
SECURITY OFFICE

CCTV Recording

invisible, indirect, one-way

Recommendation for safety

Street, public space, …
(social-level data)



The security system makes someone/something react to handle the security/safety problem.

Examples of social-level data that can be used for services.

- CCTV data
- Location data
- Car traffic data
- Traveler data
- National-wide patient data
- Personal information for checking who entered a building, shop, or restaurant for COVID-19 tracking
- SNS data
- Online behaviors

Summary: Systems-Perspective about HCI

<Individual Level>

[1] Simple interactions between human and computer device (VISIBLE)

[2] By doing this, long-term/life-time interaction could be available (INVISIBLE)

<Social/Public Level>

[3] Meta-interactions between individuals, companies, organizations, through meta systems that supports networking and communications (INVISIBLE)

Practice 4: Social-Level Data and Interaction Ideas

1. Select one of the health-related human data

2. Make an idea of a new service/product/app/function for healthcare/safety

3. Propose values/benefits that people can earn

4. Decompose the idea of interactions between human and computer

5. Fill the form

https://docs.google.com/spreadsheets/d/1rrxJ-DHmC0M2l0w4PDGSx514k0GozAiGvt3gyw6-br8/edit#gid=1751390612