

Designing Group Fitness Swimming Exergames

A Case Study

Woohyeok Choi, Joohyeon Kim, Jeungmin Oh, Uichin Lee, Darren Edge*
Korea Advanced Institute of Science and Technology, * Microsoft Research Asia

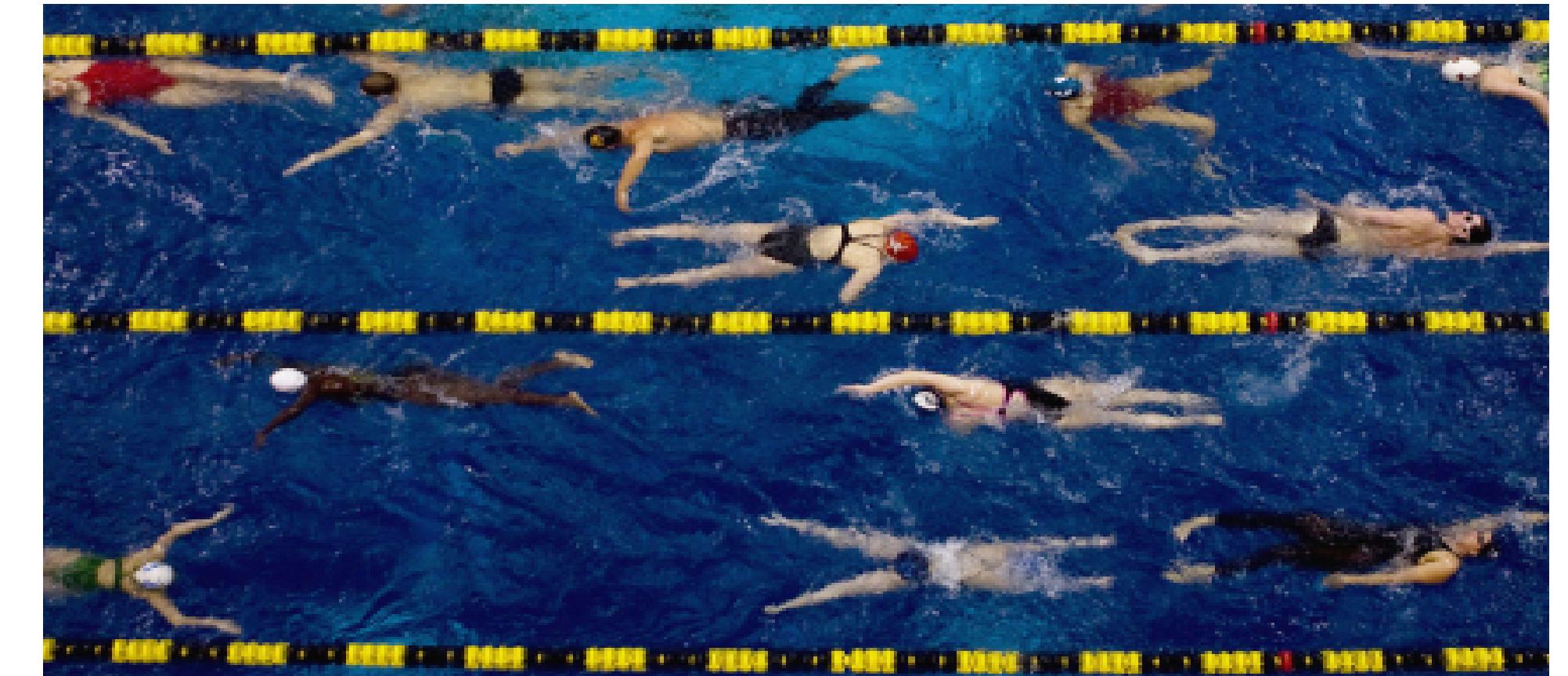
Group Fitness Swimming

GROUP FITNESS SWIMMING?

- Swimming with a group of people, which is guided by an instructor (e.g., swimming lessons).
- Swimmers are allocated to different classes with their own skill levels, schedules, or workout goals.

OBSERVATION

- When swimming in a lane, each swimmer maintains an appropriate distance from those nearby (e.g., swimmers behind or ahead).
- One person's swimming pace influences the swimming pace of all swimmers sharing that lane.



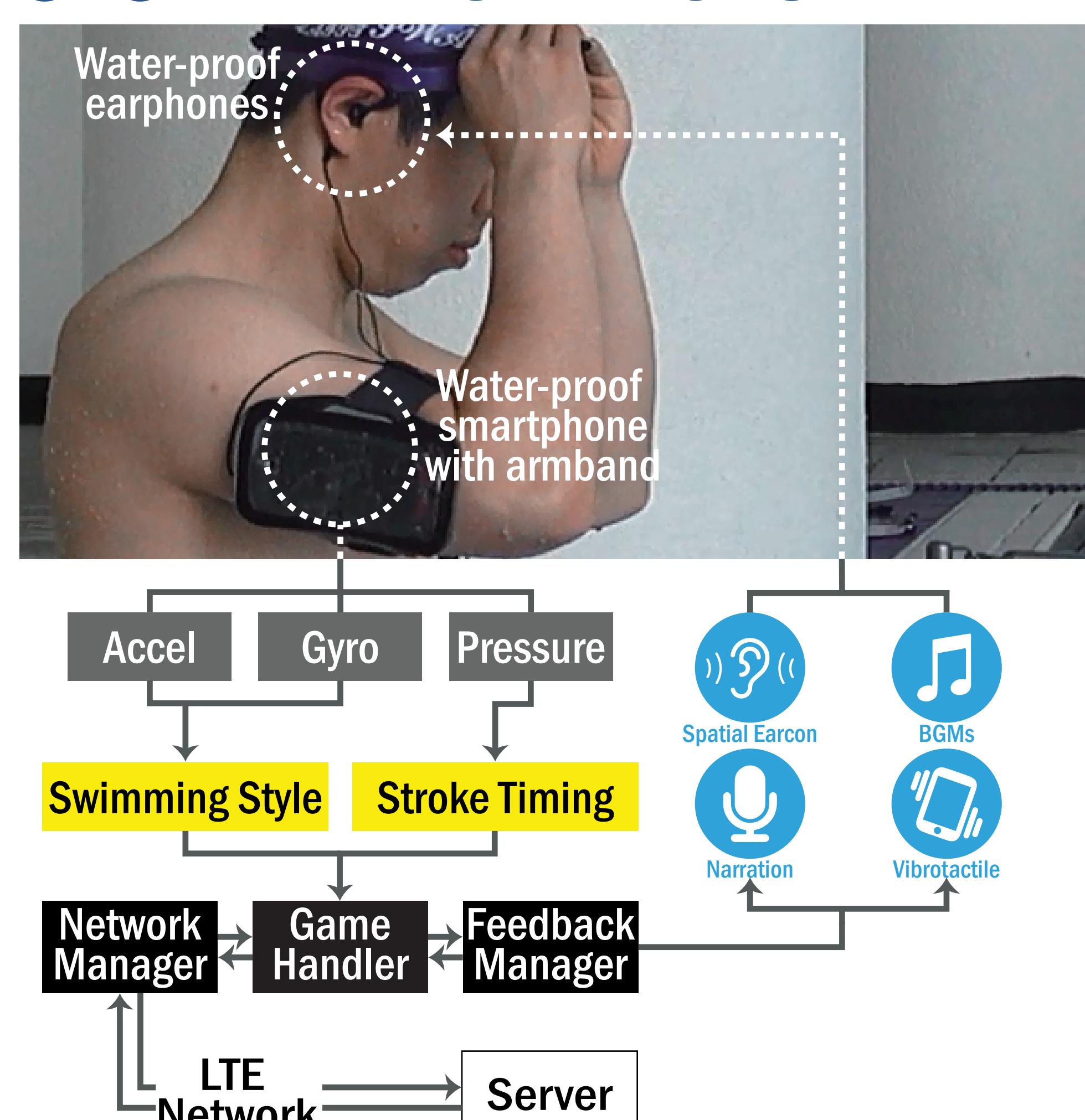
⟨ Group fitness swimming ⟩

SwimTrain

DESIGN RATIONALE

- Mapping each swimmer to a compartment of a virtual train from the observation of 'swimming in a lane.'
- Supporting voluntary adjustment of physical intensity with different skill levels.
- Incorporating competitive and collaborative aspects into the game.

SYSTEM ARCHITECTURE



GAME SCENARIO

- Real Space
Virtual Space
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- A swimmer plays a role to move a compartment of a virtual long train.
 - Each compartment is maneuvered with a swimmer's stroke rate.
 - A goal is to maintain one's own compartment without collisions against adjacent compartments.

- SwimTrain is comprised of multiple rounds, where each round consists of three phases.



- TRAIN STOP COMPARTMENT ORDERING TRAIN RUNNING
- A game narrates the final rankings of a previous round and information of a next round (e.g., target stroke type, the duration of each phase).
 - A compartment is ranked based on a user's average stroke rate, which is used as a target stroke rate during the train running phase.
 - The current position of a compartment is determined with differences between target and current stroke rate.
 - Each compartment should travel without crashes into adjacent compartments.

Preliminary User Study

PROCEDURE

- Interviews with participants (n=4) after the game play for 40 minutes.

RESULTS

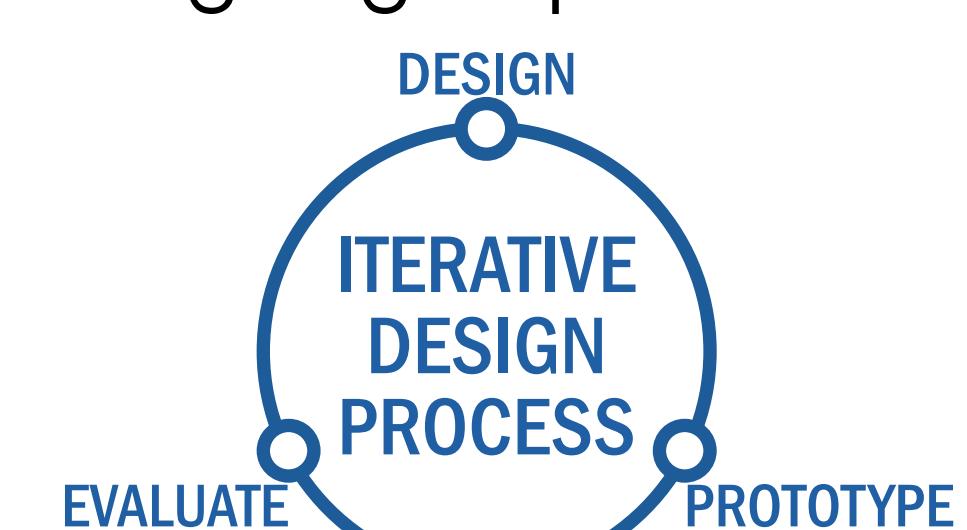
- Social awareness through auditory feedback.
“Although [SwimTrain] did not provide any visual feedback, I felt like swimming with others.” [P2]
- Limited human sensory capability during swimming.
“I did not even recognize the change of BGM.” [P4]

“I could recognize spatialized sound effect when I heard it outside of the pool. However, I would not hear spatialized sound while I was swimming.” [P2]

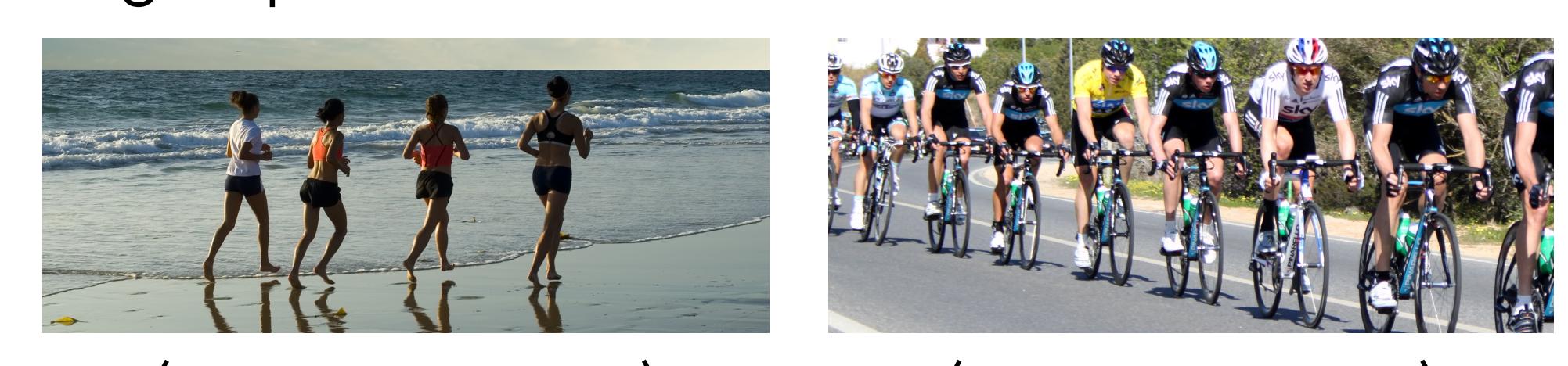
*– Strategic exertion level adjustment.
“...I realized that I would not be possible to keep up with my compartment ordering phase speed in a train running phase. So I tried to stay in top tier in a compartment ordering phase, then do better in a train running phase using slightly slower pace than my personal best.” [P1]*

*– High intensity of physical exertion.
“It was really intense workout. I think that this game is good for training purposes.” [P4]*

- Performing more iterations, including user study with larger groups of swimmers.



- Applying a proposed game design to other group exercises.



⟨ Group jogging ⟩

⟨ Group cycling ⟩