YUBIN KIM

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RESEARCH INTERESTS

Personalized Long-term HRI;   Multi-Modal Learning;   LLMs with Wearable Sensor;

EDUCATION

Massachusetts Institute of Technology (MIT)   *Sep. 2023 - Present*
M.S. Media Arts and Sciences

Massachusetts Institute of Technology (MIT)   *July. 2022 - May. 2023*
Visiting Student/Researcher at Media Lab

Yonsei University   *Mar. 2014 - Feb. 2022*
B.S. in Computer Science and Mechanical Engineering
- **Magna Cum Laude**
- **2-year absence to fulfill military duty (2016 - 2017)**

PUBLICATION

Published
- <u>Y.Kim</u>, S.Algohwinem, H.Park, "Explainable Representations of Human Interaction: Engagement Recognition model with Video Augmentation" (NeurIPS HCAI Workshop, 2022)
- <u>Y.Kim</u>, H.Chen, S.Algohwinem, C.Breazeal, H.Park, "Joint Engagement Classification using Video Augmentation Techniques for Multi-person Human-robot Interaction" (AAMAS 2022)
- D.Lee, <u>Y.Kim</u>, R.Picard, C.Breazeal, H.Park, "Multipar-T: Multiparty-Transformer for Capturing Contingent Behaviors in Group Conversations" (IJCAI 2023)

Under Review
- <u>Y.Kim</u>, D.Lee, P.Liang, S.Algohwinem, C.Breazeal, H.Park, "HIINT: Historical, Intra- and Inter- personal Dynamics Modeling with Cross-person Memory Transformer" (ICMI 2023)

RESEARCH EXPERIENCE

Personal Robots Group (PRG), MIT Media Lab
Advisor: Prof. Cynthia Breazeal
Graduate Research Assistant   *July. 2022 - Present*

- **Family Early Literacy Education using Social AI Agents**
  - Developed a personalized social robot system that supports the co-reading between a parent and a child
  - Implemented human engagement recognition model that predicts the affective states from videos

Machine Learning and Control System (MLCS) Lab, Yonsei University
Advisor: Prof. Jongeun Choi
Undergraduate Researcher   *Dec. 2019 - Nov. 2020*

- **Obstacle-Dependent Mixed Gaussian Potential Field (ODMG-PF)**
  - Proposed a Real-Time Obstacle Avoidance Method for Mecanum wheel-based Mobile Robot
  - Won 1st place in undergraduate thesis from the Department of Mechanical Engineering

Technology and Design Research Center (TDRC), Yonsei University
Advisor: Prof. Da Young Ju
Undergraduate Researcher   *Apr. 2018 - Dec. 2018*

- **Development of a Digital Companion Robot for Elders**
  - Conducted living-lab experiment on older adults with Digital Social Robot "DORI" in order to collect the data from their lives and analyze their life cycle pattern to develop social robot's functionality
  - Designed the UX of the Digital Social Robot "DORI" for elderly people in a VR Environment to increase their social ability within their social community and manage their lives

WORK EXPERIENCE

Bear Robotics, CA
Supervisor: Dr. Jeongki Yoo
Software Engineer Intern   *Dec. 2021 - Mar. 2022*

- **Development of Food Service Delivery Robot, "Servi"**

- Developed Graph-based Simultaneous Localization and Mapping (SLAM) algorithm to generate robust maps and improved the computational burden
- Conducted unit tests with sensors (LiDAR, 3D-RGBD Camera) to improve and evaluate robot performance

Supervisor: Dr. Henry Leinhos
Robotics Engineer Intern *Mar. 2019 - Sep. 2019*

- Development of Food Service Delivery Robot, "Pennybot"
  - Analyzed the robot data collected from diverse environments and developed the SLAM tuning process
  - Sensor fusing (IMU, LiDAR, 3D-RGBD Camera) into Robot algorithms to improve SLAM performance

Deep Machine Lab, Seoul
Supervisor: Dr. Jeongmin Bae
Research and Development *July. 2020 - Apr. 2021*

- Development of Screen-based Human-Interactive AI Avatar
  - Developed AI avatar along with real-time human recognition and response to a natural-language input
  - Implemented Chatbot model in the Emotion-Wellness domain

TEACHING EXPERIENCE

YSC1003-01 Understanding and Using AI
Tutor *Sep. 2020 - Dec. 2020*
- Conducted coding session with an introduction to Tensorflow
- Assisted students to implement Deep Q-Network (DQN) algorithm in "Flappy Bird" environment

YCS1002-03 SW Programming
Teaching Assistant (TA) *Mar. 2020 - Dec. 2020*
- Conducted coding session with an introduction to Python programming and Algorithms
- Assisted students in achieving completion of homework, projects and evaluated their work

PROJECT EXPERIENCE

Software Capstone Project, Yonsei University
Advisor: Prof. Seongbae Jo
Team Leader *Sep. 2021 - Dec. 2021*

- Developed Interpretable Imitational Learning algorithm using Human Demonstrations in MineRL env
- Won 1st place and Popularity Prize from the Department of Computer Science

2019 ICRA Robomaster AI Challenge
Advisor: Prof. Byungkwan Min
Team Member *Dec. 2018 - May. 2019*

- Trained DQN and DDPG algorithm for robots to collaborate on a battlefield
- Built simulation and real-world environment and implemented SLAM and navigation algorithm for testing
- Won 3rd Prize in the Final Competition in which 39 university teams around the world participated

AWARDS AND SCHOLARSHIPS

2022 Samsung $\times$ MIT Hackathon, 2nd place in WJM Design Award	*Sep 23. 2022 - Sep 25. 2022*
Global Industrial Talent Scholarship, Korea Institute for Advanced Technology	*Sep. 2022 - Apr. 2023*
Light-Up Scholarship, Institute for Higher Education Innovation	*Feb. 2020 - Feb. 2022*
Dong-Kyo Talent Award, Surim Foundation	*Nov. 2020*
Social Innovation Scholarship, Yonsei University	*Mar. 2019 - Mar. 2020*
High Honor (3%), Yonsei University	*Dec. 2019*
Global ICT Scholarship, Ministry of Science and ICT	*Mar. 2019 - Aug. 2019*

SKILLS

AI framework	Tensorflow, PyTorch
Programming tools	Python, C++, C#, Shell
Simulation tools	CoppeliaSim, Gazebo, Unity, OpenAI gym
Robotics tools	ROS, Rviz, MoveIt
Languages	Korean (Native), English (Proficient), Japanese (Basic)

REFERENCES

Prof. Cynthia Breazeal	Dr. Hae Won Park	Prof. Jongeun Choi
Media Arts and Sciences	Media Arts and Sciences	School of Mechanical Engineering
MIT Media Lab	MIT Media Lab	Yonsei University
cynthiab@media.mit.edu	haewon@media.mit.edu	jongeunchoi@yonsei.ac.kr