

Chanyou HWANG

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EDUCATION

- 2014 - 2018 Ph.D. Student in COMPUTER SCIENCE, **KAIST**, Daejeon, Republic of Korea
(Advisor: Prof. Junehwa Song)
- 2012 - 2014 M.S. in COMPUTER SCIENCE, **KAIST**, Daejeon, Republic of Korea
(Advisor: Prof. Junehwa Song)
- 2008 - 2012 B.S. in COMPUTER SCIENCE, **KAIST**, Daejeon, Republic of Korea
(*Magna cum laude*, GPA: 3.62/4.3)

HONORS AND AWARDS

- 2014 Graduate Student Scholarship, Korea Foundation for Advanced Studies
Best Paper Award, ACM CSCW 2014
- 2013 Best Demo Award, ACM HotMobile 2013
- 2011 7th Place (Team: Bruteforce), 2011 ACM-ICPC Asia Daejeon Regional Contest
9th Place (Team: ForTheBuffet), 2010 ACM-ICPC Asia Daejeon Regional Contest

PUBLICATIONS

Conferences

- 2017 **RAVEN: Perception-aware Optimization of Power Consumption for Mobile Games** [C.05]
Chanyou Hwang, Saumay Pushp, Changyoung Koh, Jungpil Yoon, Yunxin Liu, Seungpyo Choi, Junehwa Song
In Proceedings of ACM **MobiCom 2017**, Snowbird, Utah, USA, October, 2017
- 2014 **TalkBetter: Family-driven Mobile Intervention Care for Children with Language Delay** [C.04]
Inseok Hwang, Chungkuk Yoo, **Chanyou Hwang**, Dongsun Yim, Youngki Lee, Chulhong Min, John Kim, Junehwa Song
In Proceedings of ACM **CSCW 2014**, Baltimore, USA, February, 2014 (**Best Paper Award**)
- 2013 **SocioPhone: Everyday Face-To-Face Interaction Monitoring Platform Using Multi-Phone Sensor Fusion** [C.03]
Youngki Lee, Chulhong Min, **Chanyou Hwang**, Jaeung Lee, Inseok Hwang, Younghyun Ju, Chungkuk Yoo, Miri Moon, Uichin Lee, Junehwa Song
In Proceedings of ACM **MobiSys 2013**, Taipei, Taiwan, June, 2013

2012 **RubberBand: Augmenting Teacher's Awareness of Spatially Isolated Children on Kindergarten Field Trips [C.02]**

Hyukjae Jang, Sungwon Peter Choe, Inseok Hwang, **Chanyou Hwang**, Lama Nachman, Junehwa Song

In Proceedings of **UbiComp 2012**, Pittsburg, USA, Sep. 2012

Leveraging Children's Behavioral Distribution and Singularities in New Interactive Environments: Study in Kindergarten Field Trips [C.01]

Inseok Hwang, Hyukjae Jang, Taiwoo Park, Aram Choi, Youngki Lee, **Chanyou Hwang**, Yanggui Choi, Lama Nachman, Junehwa Song

In Proceedings of **Pervasive 2012**, Newcastle, UK, June, 2012

Adjunct (Demos and Posters)

2018 **A Mobile System for Investigating the User's Stress Causes in Daily Life [A.04]**

Chanyou Hwang, Saumay Pushp

In Proceedings of **ACM UbiComp 2018**, Singapore, October, 2018

2017 **Demo: FROG: Optimizing Power Consumption of Mobile Games Using Perception-Aware Rendering Rate Scaling [A.03]**

Chanyou Hwang, Saumay Pushp, Changyoung Koh, Jungpil Yoon, Yunxin Liu, Seungpyo Choi, Junehwa Song

In Proceedings of **ACM MobiCom 2017**, Snowbird, Utah, USA, October, 2017

2013 **Demo: bringing in-situ social awareness to mobile systems: everyday interaction monitoring and its applications [A.02]**

Chulhong Min, Inseok Hwang, Jaeung Lee, **Chanyou Hwang**, Chungkuk Yoo, Miri Moon, Taiwoo Park, Changhoon Lee, Haechan Lee, Yuhwan Kim, Younghyun Ju, Youngki Lee, Uichin Lee, and Junehwa Song

In Proceedings of **ACM HotMobile 2013**, Georgia, USA, February, 2013 (**Best Demo Award**)

2011 **Toward Delegated Observation of Kindergarten Children's Exploratory Behaviors in Field Trips [A.01]**

Inseok Hwang, Hyukjae Jang, Taiwoo Park, Aram Choi, **Chanyou Hwang**, Yanggui Choi, Lama Nachman, Junehwa Song

In Proceedings of **ACM UbiComp 2011**, Beijing, China, September, 2011

PATENTS

[P.05] **Mobile Apparatus Executing Face to Face Interaction Monitoring, Method of Monitoring Face to Face Interaction Using the Same, Interaction Monitoring System Including the Same and Interaction Monitoring Mobile Application Executed on the Same**

U.S. Patent No. 9813879 (Filing date: 06/12/2014, Issue date : 11/07/2017)

Korea Patent No, 10-1559364 (Filing date: 04/17/2014, Issue date: 10/05/2015)

- [P.04] Language Delay Treatment System and Control Method for the Same
U.S. Patent pending, 14/047,177 (Filing date: 10/07/2013)
Korea Patent No. 10-1478459 (Filing date: 09/05/2013, Issue date: 12/24/2014)
- [P.03] System and Method for Monitoring Behavior of Students in Field Trips
U.S. Patent No. 9218749 (Filing date: 06/17/2013, Issue Date: 12/22/ 2015)
Korea Patent No. 10-1436235 (Filing Date: 02/05/ 2013, Issue Date: 08/25/ 2014)
- [P.02] System and Method for Perceiving Spatially-isolated Person from Group on Field Trips
Korea Patent No. 10-1429222 (Filing Date: 11/28/ 2012, Issue Date: 08/05/ 2014)
- [P.01] System and Method for Perceiving Outcast in Group
U.S. Patent No. 9792586 (Filing date: 06/17/2013, Issue Date: 10/17/2017)
Korea Patent No. 10-1428227 (Filing Date: 11/28/ 2012, Issue Date: 08/01/2014)

RESEARCH PROJECT

Mobile Platform for Supporting Concurrent Neural Network Model Execution

Executing multiple neural network models is hard in mobile devices practically. However, modern mobile application processors have enough computing power (i.e. FLOPS) to run multiple DNNs concurrently. Theoretically, a system with the Adreno 530 GPU (500GFLOPS) is affordable to concurrently run 4 MobileNet-SSD models in 60FPS if we consider only computation. As we all know, it is impossible in practice (at least until 2019). The hidden bottleneck is memory bandwidth. Thus, for seamless concurrent NN model execution, mem bandwidth should be considered as a first-class resource. To mitigate this problem, we have designed a new profiling and scheduling method, and system for orchestrating the memory bandwidth usage of applications to enable seamless concurrent NN execution.

- Led the research team

RAVEN: Perception-aware Optimization of Power Consumption for Mobile Games [C.05] [A.03]

RAVEN is a novel on-the-fly rendering rate optimizing system for mobile games. This system makes use of human visual perception and scales rendering rate to reduce energy consumption without degrading user experience. In this project, we overcame three major challenges: processing high-resolution game graphics in hard real-time, with low overhead, and supporting commercial games and devices.

- Led the research team
- Developed Perception-Aware Rate Scaling method that scales rendering rate by leveraging human perception
- Developed Y-Diff based perceptual similarity measurement method for comparing frames
- Implemented the system components: add-ons for Android graphics architecture, Android system service for scaling rendering rate, and application for user-configuration

StressWatch: Smartwatch-based Everyday Stress Monitoring System using HRV Analysis [A.04]

StressWatch is project for making use of smartwatches to monitor stress by leveraging Heart Rate Variability. We tackled the challenges in measuring stress through smartwatch: limited opportunity to measure, very limited resource, and need for reasonably high accuracy.

- Led the research team
- Implemented smartwatch (Tizen) application for its preliminary study
- Developed light-weight HRV signal processing logic

TalkBetter: Everyday Intervention Care for Children with Language Delay Using Face-to-Face Interaction Monitoring Mobile Platform [C.04] [P.04]

TalkBetter project is research for designing and implementing an application which helps children with language delay. Through interviews and scenario-driven user study, we carefully designed prototype of TalkBetter.

- Participated in the system development and experiment
- Developed visualization and analysis tool for making easier to tune the parameters of TalkBetter system
- Implemented data collector and the prototype of TalkBetter system

SocioPhone: Everyday Face-To-Face Interaction Monitoring Platform Using Multi-Phone Sensor Fusion [C.03] [A.02] [P.05]

Sociophone enables mobile devices to understand real-time conversations that are an important part of people's daily lives efficiently and robustly. The system provides meta-linguistic contexts such as conversation turn, dominance, and prosodic features, in the current conversation.

- Participated in the system design, development and experiment
- Developed and implemented volume topography based real-time conversational turn monitoring technique
- Implemented a speaker recognition logic using GMM
- Implemented the SocioPhone library for Android

PROJECTS

2019 TRAIN - The Riiid Artificial Intelligence eNgin

TRAIN is a fully scalable and highly available data-flow execution engine for serving the AI services of Riiid. It reduces the overall operation cost of AI services by leveraging preempt-able cloud resources with adaptive batching and profile-based resource allocation methods. The system will be rolled out at the end of 2019. Currently, I am leading this project.

2018 Jaaem - K-Pop Contents and Shopping Platform (start-up project)

Jaaem is a video-commerce platform targeting K-Pop fans in the Middle East. The platform enables shopping while watching. As a co-founder, I have developed the app and server of the service.

2015 Shortping – Taste-aware search system for fashion items (start-up project)

Shortping is smart search system for fashion items such as cloths and accessories. The system reflects preferred styles of users in search results by applying machine learning techniques.

TEACHING EXPERIENCES

2017 CS330 Operating Systems and Lab (Pintos project), TA

2016 CS330 Operating Systems and Lab (Pintos project), TA

2015 CS330 Operating Systems and Lab (Pintos project), TA

CS492 Special Topics in Computer Science
(Platform and Design: New paradigms for mobile IoT and Ubiquitous computing), TA

2014 CS330 Operating Systems and Lab (Pintos project), TA

CS530 Advanced Operating Systems, TA

2012 CS330 Operating Systems and Lab (Pintos project), TA

CS372 Natural Language Processing with Python, TA

SKILLS

Programming Language	C (Expert level), Java (Expert level), C++, C#, JavaScript, PHP, Python
Hardware Description Language	Verilog
Mobile Framework	Android (Expert level), Tizen
Mathematical Framework	MATLAB, R
Embedded Framework	Arduino
Machine Learning Framework	TensorFlow, Pytorch
Parallel Computing Framework	Hadoop, OpenCL
Computer Vision Framework	OpenCV