

# Chanyou HWANG

[chanyouhwang@gmail.com](mailto:chanyouhwang@gmail.com)  
[chanyou.github.io](http://chanyou.github.io)

## 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    7<sup>th</sup> Place (Team: Bruteforce), 2011 ACM-ICPC Asia Daejeon Regional Contest
- 9<sup>th</sup> 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. For example, an inference of MobileNet-SSD model (300x300) takes 1-2GFLOPs and Qualcomm Adreno 530 (GPU in Snapdragon 820) can compute 500GFLOPS. Theoretically, a system with the Adreno 530 GPU is affordable to run 4 distinct object detection service 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. However, the bandwidth is not considered as a schedule-able resource in schedulers of mobile operating systems for practical reasons (e.g., lack of HW performance counter). 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.

- Role: Principal investigator

### **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.

- Role: Principal investigator
- 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.

- Role: Principal investigator
- 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.

- Role: 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.

- Role: Participated in the system design, development and experiment
- Developed and implemented volume topography based real-time conversational turn monitoring technique
- Implemented the comparison methods of SocioPhone (speaker recognition logics using GMM)
- Implemented SocioPhone library for Android

## **PROJECTS EXPERIENCED**

---

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.

- Role: Co-founder

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.

- Role: Advisor
- Advised for every process in the development
- Designed the front-end (Web and Android application) and back-end system architecture
- Designed the item recommendation logic of ShortPing

## **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
Parallel Computing Framework	Hadoop, OpenCL, TensorFlow
Computer Vision Framework	OpenCV