

SANG HO YOON

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RESEARCH INTERESTS

Human-Computer Interaction (HCI), Input Device, Sensing Technique, Wearables/Tangible Interface, Mechatronics

EDUCATION

PURDUE UNIVERSITY, School of Mechanical Engineering AUG 2013 - PRESENT
Ph.D. Candidate in Mechanical Engineering, *GPA: 3.91/4.0*
C Design Lab. Advisor: *Karthik Ramani*

CARNEGIE MELLON UNIVERSITY AUG 2004 - DEC 2008
M.S. Mechanical Engineering
B.S. Mechanical Engineering, Minor in Robotics
Graduating with College and Department Honors & Honors Research

RESEARCH EXPERIENCE

PURDUE UNIVERSITY, School of Mechanical Engineering AUG 2013 - PRESENT
Graduate Research Assistant (*Advisor: Karthik Ramani*)

- Promoting natural human-computer interaction (HCI) through wearables and tangible media.
- Applying novel sensing techniques to bring the new forms of input metaphor for HCI.
- Implementing input interface using flexible/stretchable materials including textiles and polymers.
- Research on embedded 3D mobile input and customizable interactions using magnetic sensing technique.
- Research on various form factors of input device including smart textile, accessories, and soft sensor.
- Design and utilize user-friendly input modalities based on human's somatosensory system to improve the upcoming interfaces (Mobile & AR/VR).

CARNEGIE MELLON UNIVERSITY, Department of Mechanical Engineering JUN 2007 - DEC 2008
Undergraduate/Graduate Research Assistant (*Advisor: Metin Sitti*)

- Research on 'Water-Running Robot' where 'Amphibious Foot' was designed and fabricated based on mechanical analysis. A novel foot design was applied for robot to walk on both on the water and the ground.
- Research on foot pad of 'Waalbot' (wall climbing robot) using Gecko Adhesive. Design and prototype a measurement platform to test the adhesiveness of newly developed materials

WORK EXPERIENCE

APPLE SUMMER 2016
Graduate Research Intern. Manufacturing Group. Supervisor: Brian Bolton.
Investigation on defect detections in laminated layers through opaque films using non-destructive test (NDT). Test and analyze with emerging NDT techniques including ultrasonic imaging, thermography, and radiography.

LG ELECTRONICS SEP 2010 - JUL 2013
Research Engineer. Convergence Research Center.
Prototype smart car cockpit embedded with gesture and bio-signal (ECG, EMG) based input. Research on 2-DOF upper limb exoskeleton using strain gauge sensors to support real-time human motions for rehabilitation purpose. Design prototype of rehabilitation robot with hall-sensor embedded adaptive input controller.

LG DISPLAY DEC 2008 - SEP 2010
Research Engineer. Research Center.
Research on 'Transparent Display' module to entitle transparency in daily used LCD panel. Design cooling system for 'Public Display' module using carbon thermal pad. Design backlight module using structure and thermal simulation.

TEACHING EXPERIENCE**Teaching Assistant**, Purdue UniversityME263, Mechanical Engineering Design, Innovation and Entrepreneurship (*Undergraduate*)

FALL 2015

ME444, Computer Aided Design and Rapid Prototyping (*Undergraduate*)

FALL 2014

Teaching Coach, Purdue University

SPRING 2015

ME553, Product and Process Design Innovation (*Graduate*)**JOURNAL ARTICLES & MAJOR CONFERENCE PUBLICATIONS (Peer-reviewed)**

- [C.7] **Yoon, S. H.**, Huo, K., & Ramani, K. 2016. Wearable Textile Input Device with Multimodal Sensing for Eyes-Free Mobile Interaction during Daily Activities, *Pervasive Mobile Computing* (Elsevier), 33, 17-31, 2016. (5-Years SCI Impact Factor: 2.874)
- [C.6] **Yoon, S. H.**, Zhang, Y., Huo, K., & Ramani, K. 2016. TRing: Instant and Customizable Interactions with Objects Using an Embedded Magnet and a Finger-Worn Device, *In the Proceedings of the 29th annual ACM symposium on User interface software and technology* (UIST'16). pp. 169-181. (Acceptance Rate: 20.6%)
- [C.5] **Yoon, S. H.**, Huo, K., & Ramani, K. 2016. TMotion: Embedded 3D Mobile Input using Magnetic Sensing Technique, *In the Proceedings of the 10th International Conference on Tangible, Embedded, and Embodied Interaction* (TEI'16). pp. 21-29. (Acceptance Rate: 25.3%, 18.5% for oral presentation)
- [C.4] **Yoon, S. H.**, Verma, A., Pepler, K., & Ramani, K. 2015. HandiMate: Exploring a Modular Robotics Kit for Animating Crafted Toys, *In the Proceedings of the 14th International Conference on Interaction Design and Children* (IDC'15). pp. 11-20. (Acceptance Rate: 23%)
- [C.3] **Yoon, S. H.**, Huo, K., Nguyen, V. P., & Ramani, K. 2015. TIMMi: Finger-worn Textile Input Device with Multimodal Sensing in Mobile Interaction, *In the Proceedings of the Ninth International Conference on Tangible, Embedded, and Embodied Interaction* (TEI'15). pp. 269-272. (Acceptance Rate: 28.4%)
- [C.2] Nguyen, V. P., **Yoon, S. H.**, Verma, A., & Ramani, K. 2014. BendID: Flexible Interface for Localized Deformation Recognition, *In the Proceedings of the ACM International Conference on Ubiquitous Computing* (UbiComp'14). pp. 553-557. (Acceptance Rate: 20.7%)
- [C.1] **Yoon, S. H.**, Jun, H. G., Dan, B. J., Jo, B. R., & Min, B. H. 2012. Hidden Marker Position Estimation During Sit-To-Stand with Walker, *34th International Conference of the IEEE Engineering in Medicine and Biology Society* (EMBC '12). pp. 1940-1943.

MAGAZINE & CONFERENCE ADJUNCT PUBLICATIONS (Peer-reviewed)

- [c.9] **Yoon, S. H.**, Tan, Y., Ramani, K. 2017. BikeGesture: User Elicitation and Performance of Micro Hand Gesture as Input for Cycling, *In Proceedings of Extended Abstracts of the 35th Annual ACM Conference on Human Factors in Computing Systems* (CHI'17 EA). pp. 2147-2154.
- [c.8] **Yoon, S. H.** 2016. Promoting Natural Interactions Through Embedded Input Using Novel Sensing Techniques. *In Proceedings of the 29th Annual Symposium on User Interface Software and Technology* (UIST '16 Adjunct). pp. 5-8.
- [c.7] **Yoon, S.H.**, Huo, K. and Ramani, K. 2016. Demo Hour. *Interactions*, 23(5), 8-11, 2016
- [c.6] **Yoon, S. H.**, Huo, K., & Ramani, K. 2015. TMotion: Embedded 3D Mobile Input using Magnetic Sensing Technique, *In the Adjunct Proceedings of the 28th annual ACM symposium on User interface software and technology* (UIST'15 Adjunct). pp. 71-72. **People's Choice Best Poster Award (1st Place)**

- [c.5] Nguyen, V., Kumar, P., **Yoon, S. H.**, Verma, A., & Ramani, K. 2015. SOFTii: Soft Tangible Interface for Continuous Control of Virtual Objects with Pressure-based Input, *In the Proceedings of the Ninth International Conference on Tangible, Embedded, and Embodied Interaction (TEI'15)*. pp. 539-544.
- [c.4] **Yoon, S. H.**, Huo, K., & Ramani, K. 2014. Plex: Finger-Worn Textile Sensor for Mobile Interaction during Activities, *In the Adjunct Proceedings of the ACM International Conference on Ubiquitous Computing (UbiComp Adjunct'14)*. pp. 191-194.
- [c.3] **Yoon, S. H.** 2014. Designing new input modalities for wearables & digitized home, *In the Proceedings of the ACM International Symposium on Wearable Computers: Adjunct Program (ISWC Adjunct '14)*. pp. 151-154.
- [c.2] Park, K.Y., Park, H.S., **Yoon, S. H.** 2013. Development of 2-DOFpowered exoskeleton for upper limb rehabilitation, *10th International Conference on Ubiquitous Robots and Ambient Intelligence, (URAI '13)*. pp. 550-551.
- [c.1] Park, K.Y., Park, H.S., **Yoon, S. H.** 2013. Development of 2-DOF Robotic Exoskeleton for Upper Limb Rehabilitation after Stroke, *22nd IEEE International Symposium on Robot and Human Interactive Communication*. pp. 366-367.

PATENTS

- [P.10] US #9433552B2, *Electric walking assistant device*, Granted, 9/2016
- [P.9] US #8993196B2 *Fuel cell system having fuel circulation structure, method of operating the same, and electronic apparatus including the fuel cell system*, Granted, 3/2015
- [P.8] US #8713748B2, RU #2533676C2, KR #101555589B1, *Autonomous mobile cleaner and method of moving the same*, Granted, 5/2014
- [P.7] KP #1013152200000, *Apparatus for processing motion of body and method thereof*, Granted, 9/2013
- [P.6] KP #1020140110402, *Control device using sensor and move assist system having the same*, Published, 9/2014
- [P.5] KP #1020140109721, *Move Assist System*, Published, 9/2014
- [P.4] KP #1020140102938, *Control device for controlling rehabilitation equipment and control system for rehabilitation equipment*, Published, 8/2014
- [P.3] KP #1020130071175, *A control apparatus for grasping the intents to move using hall sensor and an electronic moving vehicle thereof*, Published, 6/2013
- [P.2] KP #1020130040063, *A Folding Structure of an Electronic Moving Vehicle*, Published, 4/2013
- [P.1] KP #1020130003483, *Control sensor system*, Published, 1/2013

RELEVANT SKILLS

Hardware & Fabrication

Rapid Prototyping: Hardware I/O, Embedded Systems, Wireless Communication, Signal Processing

Fabrication: 3D Printing (FDM and SLA), Laser Cutting, Manual Milling, Standard Machine Shop Tools, PCB Design, Sensor Fabrication (carbon elastomer & PDMS)

Software and Systems

Applied Machine/Deep Learning (Weka & Caffe), UNITY, Processing, Arduino, OpenCV, AutoCAD, Eagle, SolidWorks, Creo, ANSYS, MATLAB, LabVIEW, VICON, Java, Android, C\C++, C#

User-Centered Design

Usability Testing, Rapid Prototyping of Software and Hardware System, Comparative Performance Analysis, Statistical Analysis, Survey Design, Qualitative & Quantitative Evaluation with Input Devices

ACADEMIC SERVICES

Program Committee

[UI 16,17]

Reviewers

[CHI 15,17 | TEI 15-17 | HRI 17 | DIS 17 | UbiComp 14-15 | ISWC 15 | SUI 15-16 | IDC 15 | VRST 16]

HONORS AND AWARDS

People's Choice Best Poster Award (1 st Place), UIST '15	2015
International Design Excellence Awards in Transportation section with <i>Smart Walker</i> , Silver Medal	2012
Graduating with College and Department Honors	2008
Graduating with College Honors Research	2008
Dean's List, Spring	2007 - 2008
Beta Theta Pi Academic Scholarship	2006
The Canadian National Mathematics League Award	2004