Sangwoo **Cho**

PhD Student

HEC 215, 4000 Central Florida Blvd, Orlando FL 32816, USA

1-919-360-8133 | sangwoo3.cho@gmail.com | sangwoo3.github.io | chosangwoo | Google Scholar

Research Interests

Computer Vision, Natural Language Processing, Machine Learning, Deep Learning, Action Recognition, Text Summarization

Education

University of Central Florida
Orlando, Florida, USA

PhD student in Computer Science — *Aug. 2015 - PRESENT*

- Advisors: Hassan Foroosh and Fei Liu

University of North Carolina
Chapel Hill, North Carolina, USA

M.S in Computer Science — *Dec. 2014*

- Advisor: Jan-Michael Frahm

Korea University
Seoul, S. Korea

M.E in Electronics and Computer Engineering — *Feb. 2007*

- Thesis: Generating 2D and 3D indoor environment models for enabling interactive robot service
- Advisors: Yong-Moo Kwon and Hanseok Ko

Sogang University
Seoul, S. Korea

B.E in Electronic Engineering — *Feb. 2005*

- Thesis: Height measurement of arbitrary objects using a single image

Computing Skills

Programming Language C/C++, Python, Matlab, MFC, Android, Java, LaTeX

Framework and Library Pytorch, Tensorflow, Keras, Spacy, MatConvNet, NLTK, OpenCV, OpenGL, Eigen, Qt, Protocol Buffers, Git

Experience

University of Central Florida
Orlando, Florida, USA

Research Assistant — *Aug. 2015 - PRESENT*

- **Human action recognition**: Temporal CNN and self-attention network are used to retrieve temporal context from videos. Images, optical flows, and joints of a body are employed for the recognition. (Pytorch, Keras, Tensorflow, Matlab)
- **Text summarization**: A mathematical optimization technique, *Determinantal Point Processes (DPP)*, is utilized in summarization. A Capsule Network and fine-tuned BERT models are used to compute sentence similarity and sentence importance scores for DPP. (Pytorch, Keras, Tensorflow, Matlab)
- **3D reconstruction of aerial objects**: 3D location or trajectory of target aerial objects are obtained by using images and IMU data taken from an airplane. Two methods are implemented: temporal stereo reconstruction; and a target trajectory reconstruction with a parametric temporal polynomial. (C++, Python, OpenCV, Eigen, Qt)

SRI International
Princeton, NJ, USA

Research Intern — *Jun. 2019 - Aug. 2019*

- Developed a Visual Question Answering (VQA) system based on a hierarchical BERT model for explaining relations of a question text and objects in an image. (Pytorch)

Google
Mountain View, California, USA

Software Engineer Intern — *May. 2017 - Aug. 2017*

- Developed a prototype software that calibrates between eyes (a stereo camera) and a VR/AR device in order to render proper images from the point of view of two eyes. (C++, Python, OpenCV, Bash, Eigen, Ceres, Tango)

Samsung Electronics *Suwon, S. Korea*

Research Engineer *Feb. 2009 – Jun. 2012*

- Developed a stereo camera rectification software. (C++, OpenGL)
- Developed an intermediate viewpoint image generation software using stereo images for reducing stereo fatigue. (C++, MFC)
- Developed a stereoscopic image generation software based on 2D street-view image. (C++, MFC, Android)

Associate Research Engineer *Feb. 2007 – Jan. 2009*

- Developed a LTE network connection software module for a dongle device. (C, C++)
- Developed a 3D *Scratch* using VRML. (C++, MFC)

Korea Institute of Science and Technology (KIST) *Seoul, S. Korea*

Student Researcher *Feb. 2005 – Jan. 2007*

- Implemented an indoor 3D reconstruction software and designed an apparatus for data gathering consisting of a wide-view camera and a laser scanner. (C++, MFC)
- Implemented an eye gaze tracking system software. (C++, MFC)

602d Aviation Support Battalion, 2nd ID *Uijeongbu, S. Korea*

Production Control Operator, KATUSAs (Korean Augmentation to U.S. Army) *Nov. 2000 – Jan. 2003*

- Honor Graduation (9th place) of Primary Leadership Development Course (PLDC)

Publications

Sangwoo Cho, Muhammad Hasan Maqbool, Fei Liu, and Hassan Foroosh. "Self-Attention Network for Skeleton-based Human Action Recognition." In Proceedings of the *2020 IEEE Winter Applications of Computer Vision Conference* ***(WACV)***, Aspen, CO, USA, 2020

Sangwoo Cho, Chen Li, Dong Yu, Hassan Foroosh, and Fei Liu. "Multi-Document Summarization with Determinantal Point Processes and Contextualized Representations." In Proceedings of the *2019 Empirical Methods in Natural Language Processing* ***(EMNLP)****, Workshop*, Hong Kong, China, 2019

Sangwoo Cho, Logan Lebanoff, Hassan Foroosh, and Fei Liu. "Improving the Similarity Measure of Determinantal Point Processes for Extractive Multi-Document Summarization." In Proceedings of the *2019 Association for Computational Linguistics* ***(ACL)***, Florence, Italy, 2019. (Oral)

Sangwoo Cho and Hassan Foroosh. "Spatio-Temporal Fusion Networks for Action Recognition." In Proceedings of the *2018 Asian Conference on Computer Vision* ***(ACCV)***, Perth, Australia, 2018

Sangwoo Cho and Hassan Foroosh. "A Temporal Sequence Learning for Action Recognition and Prediction." In Proceedings of the *2018 IEEE Winter Applications of Computer Vision Conference* ***(WACV)***, Lake Tahoe, NV/CA, USA, 2018

Sangwoo Cho, Enrique Dunn, and Jan-Michael Frahm. "Rotation Estimation from Cloud Tracking." In Proceedings of the *2018 IEEE Winter Conference on Applications of Computer Vision* ***(WACV)***, Steamboat Springs, CO, USA, 2014

Patents

Korean

Sangwoo Cho, Yong-Moo Kwon, Sung-Kyu Kim, Jeon Kyeong Won, Ki Jeongseok, "System And Method For 3-Dimensional Interaction Based On Gaze System And Method For Tracking 3-Dimensional Gaze.", Patent No. 1008206390000, 2008

Sangwoo Cho, Yong-Moo Kwon, "Apparatus And Method For Creating A Circumstance Map Of An Indoor Circumstance.", Patent No. 1007577510000, 2007

Sangwoo Cho, Yong-Moo Kwon, Sung-Kyu Kim, Jai Kyung Shul, Jinwoo Park, "Gaze-based Computer Interface Apparatus and Method of Using the Same.", Patent No. 100651104000, 2006

Awards

2018	**Graduate Presentation Fellowship,** University of Central Florida	*USA*
2006	**Brain Korea 21 Program Scholarship,** Korean Research Foundation	*S. Korea*
2004	**1st Place,** Grand Award for Micromouse Competition at Sogang University	*S. Korea*
2003	**1st Place,** Grand Award for Academic Competition at Sogang University (Autonomous Mobile Robot)	*S. Korea*
2000	**3rd Place,** 1st National Intelligent Robot Competition	*S. Korea*