

Sangwoo Cho

PH.D. STUDENT

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Research Interests

Natural Language Processing, Computer Vision, Machine Learning, Deep Learning, [Text Summarization](#), [Action Recognition](#)

Education

University of Central Florida

PHD STUDENT IN COMPUTER SCIENCE, ANTICIPATED GRADUATION IN MAY 2021

[Orlando, FL, USA](#)

Aug. 2015 - PRESENT

- Dissertation: Contextual Understanding of Sequential Data Cross Multi-Modalities
- Advisors: Hassan Foroosh and Fei Liu

University of North Carolina

M.S IN COMPUTER SCIENCE

[Chapel Hill, NC, USA](#)

Dec. 2014

- Advisor: Jan-Michael Frahm

Korea University

M.E IN ELECTRONICS AND COMPUTER ENGINEERING

[Seoul, S. Korea](#)

Feb. 2007

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

Sogang University

B.E IN ELECTRONIC ENGINEERING

[Seoul, S. Korea](#)

Feb. 2005

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

Publications

Sangwoo Cho, Kaiqiang Song, Chen Li, Dong Yu, Hassan Foroosh, and Fei Liu. “[Better Highlighting: Creating Sub-Sentence Summary Highlights.](#)” In Proceedings of the 2020 Empirical Methods in Natural Language Processing (**EMNLP**), 2020

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

Experience

University of Central Florida

RESEARCH ASSISTANT

[Orlando, FL, USA](#)

Aug. 2015 - PRESENT

- **Text summarization:** A mathematical optimization technique for an extractive summarization method, [Determinantal Point Processes \(DPP\)](#), requires similarity and importance metric for pairs. [Capsule Network](#) and [fine-tuned BERT](#) models are used to compute better sentence similarity and importance scores for DPP. Also, [XLNet](#) is used to generate sub-sentence segments. (Pytorch, Keras, Tensorflow, Matlab)
- **Human action recognition:** [Temporal CNN](#) and [Self-Attention network](#) are used to retrieve short and long term temporal context from videos. Methods are based on different modalities: Images, optical flows, and joints of a human body. (Pytorch, Keras, Tensorflow, Matlab)
- **3D reconstruction of aerial objects:** 3D locations of target aerial objects in video frames are reconstructed with visual and sensor data. (Camera, IMU, GPS) Two methods are developed: A temporal stereo reconstruction, and a trajectory reconstruction of target objects. (C++, Python, Matlab, OpenCV, Eigen, Qt)

Adobe Research

RESEARCH INTERN

[San Jose, CA, USA](#)

May. 2020 - Sep. 2020

- Developed supervised and unsupervised summarization systems based on [transcripts](#) of live streaming videos: a sentence-based Transformer model and a Transformer model with Vector Quantized Variational AutoEncoder (VQVAE) (Pytorch)

SRI International

RESEARCH INTERN

[Princeton, NJ, USA](#)

Jun. 2019 - Aug. 2019

- Developed a [Visual Question Answering \(VQA\)](#) system based on a hierarchical Transformer model for explaining relations of text and image. (Pytorch)

Google

SOFTWARE ENGINEER INTERN

[Mountain View, CA, USA](#)

May. 2017 - Aug. 2017

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

University of North Carolina

RESEARCH ASSISTANT

[Chapel Hill, NC, USA](#)

Aug. 2013 - Jul. 2014

- Camera orientation estimation based on cloud image tracking (C++, Android)
- Query-based large scale image retrieval system: FINDER (C++, Python)

Samsung Electronics

RESEARCH ENGINEER

[Suwon, S. Korea](#)

Feb. 2007 - 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)

Korea Institute of Science and Technology (KIST)

STUDENT RESEARCHER

[Seoul, S. Korea](#)

Feb. 2005 - Jan. 2007

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

602d Aviation Support Battalion, 2nd Infantry Division

PRODUCTION CONTROL OPERATOR, KATUSA (KOREAN AUGMENTATION TO THE U.S. ARMY)

[Uijeongbu, S. Korea](#)

Nov. 2000 - Jan. 2003

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

Computing Skills

Programming Language C/C++, Python, Matlab, Git, Java, Android, ReactJS, ㅁㅅㅅ

ML Tools / Library Pytorch, Tensorflow, Keras, Spacy, NLTK, MatConvNet, OpenCV, OpenGL, Eigen, Qt

Patents

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

2019 **ACL Student Volunteer**

[Florence, Italy](#)

2019 **UCF Doctoral Research Support Award**

[Orlando, FL, USA](#)

2018, 2019 **UCF Graduate Presentation Fellowship**

[Orlando, FL, USA](#)