

# Sangwoo Cho

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## Research Interests

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

## Education

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### University of Central Florida

PHD IN COMPUTER SCIENCE

[Orlando, FL, USA](#)

May 2021

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

### 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

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**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

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### University of Central Florida

RESEARCH ASSISTANT

[Orlando, FL, USA](#)

Aug. 2015 - PRESENT

- **Text summarization:** Researched summarization methods that combine mathematical optimization, [Determinantal Point Processes \(DPP\)](#), and deep neural models, [Capsule Network](#) and [BERT](#), for better context information retrieval. Experienced a variety of pre-trained language models, [BERT](#), [XLNet](#), and [BART](#); and different types of document data, [news](#), [transcript](#), and [book](#). (Pytorch, Keras, Tensorflow, Matlab)
- **Human action recognition:** Researched [Temporal CNN](#) and [Self-Attention network](#) to retrieve short and long term temporal context from videos. Developed 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: temporal stereo reconstruction, and 3D trajectory reconstruction of target objects. (C++, Python, Matlab, OpenCV, Eigen, Qt)

## Tencent AI Lab

NLP RESEARCH INTERN

- [Long document summarization](#)

[Seattle, WA, USA](#)

*Jun. 2020 - Present*

## Adobe Research

RESEARCH INTERN

- Developed a [unsupervised summarization](#) system for [live streaming videos](#): a Vector Quantized Variational AutoEncoder (VQVAE) with Transformer encoder and decoder to summarize transcripts of streaming videos, which contain many chit-chats and dialogues unrelated to topics (Pytorch)

[San Jose, CA, USA](#)

*May. 2020 - Sep. 2020*

## SRI International

RESEARCH INTERN

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

[Princeton, NJ, USA](#)

*Jun. 2019 - Aug. 2019*

## Google

SOFTWARE ENGINEER INTERN

- 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)

[Mountain View, CA, USA](#)

*May. 2017 - Aug. 2017*

## University of North Carolina

RESEARCH ASSISTANT

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

[Chapel Hill, NC, USA](#)

*Aug. 2013 - Jul. 2014*

## Samsung Electronics

RESEARCH ENGINEER

- 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)

[Suwon, S. Korea](#)

*Feb. 2007 - Jun. 2012*

## Korea Institute of Science and Technology (KIST)

STUDENT RESEARCHER

- 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)

[Seoul, S. Korea](#)

*Feb. 2005 - Jan. 2007*

## 602d Aviation Support Battalion, 2nd Infantry Division

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

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

[Uijeongbu, S. Korea](#)

*Nov. 2000 - Jan. 2003*

## Computing Skills

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**Programming Language** C/C++, Python, Matlab, Git, Java, Android, ReactJS,  $\LaTeX$

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

## Patents

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**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

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2019 **ACL Student Volunteer**

[Florence, Italy](#)

2019 **UCF Doctoral Research Support Award**

[Orlando, FL, USA](#)

2018, 2019 **UCF Graduate Presentation Fellowship**

[Orlando, FL, USA](#)