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   *Orlando, FL, USA*

PhD student in Computer Science,   anticipated graduation in Dec. 2020   *Aug. 2015 - PRESENT*

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

University of North Carolina   *Chapel Hill, NC, 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

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   *Orlando, FL, USA*

Research Assistant   *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 obtain sub-sentences for summarization. (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)

Adobe Research   *San Jose, CA, USA*
Research Intern   *May. 2020 - Sep. 2020*
- Developed a supervised and unsupervised summarization system based on transcripts of live streaming videos (Pytorch)

SRI International   *Princeton, NJ, USA*
Research Intern   *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   *Mountain View, CA, 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)

University of North Carolina   *Chapel Hill, NC, USA*
Research Assistant   *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   *Suwon, S. Korea*
Research Engineer   *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)   *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 Infantry Division   *Uijeongbu, S. Korea*
Production Control Operator, KATUSA (Korean Augmentation To the U.S. Army)   *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, LaTeX
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**	*Orlado, FL, USA*
2018, 2019	**UCF Graduate Presentation Fellowship**	*Orlado, FL, USA*