CONNOR HASHEMI

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RESEARCH INTEREST

My main research is in computational imaging, which combines signal processing, optics, and computer vision together to surpass imaging limitations set by previous conventional methods.

EDUCATION

University of Minnesota, Minneapolis   Expected Oct 2023
Doctor of Philosophy, Electrical Engineering   Cumulative GPA: 3.875/4.0

University of Minnesota, Minneapolis   April 2020
Master of Science, Electrical Engineering   Cumulative GPA: 3.857/4.0

University of Minnesota, Minneapolis   May 2018
Bachelor of Science, Electrical Engineering   Cumulative GPA: 3.923/4.0

RELEVANT SKILLS

Software   MATLAB, Python, PyTorch, Photoscan, Metashape, Telesculptor, Blender
Skills   computer vision, inverse problems, machine learning, photogrammetry, physical optics, optimization

RESEARCH

Thesis: Robust Passive Non-Line-of-Sight Imaging   Expected Oct 2023
Electrical and Computer Engineering Lab   *University of Minnesota*
· Focusing on how to use high-dimensional visual information to "look around corners" in adversarial environments
· Utilizing parallax information in the 4D scattered light field to denoise weak reflected thermal scattered light
· Utilizing spectral information in the scattered light to separate and discriminate between desired and undesired signals
· Publishing created code and datasets for public use

REVEAL Project for Passive Non-Line-of-Sight Imaging   Aug 2016 - Aug 2021
Electrical and Computer Engineering Lab   *University of Minnesota*
· Collaborated on a DARPA project to use passively-scattered light to image around corners at an unknown scene
· Developed physics-based modeling of 4D light fields to obtain robust reconstructions in very noisy scenarios
· Designed and constructed life-sized experiments to collect datasets and validate the proposed theories with MATLAB
· Performed photogrammetry for calibration and material-reflectance extraction with Agisoft Photoscan

WORK EXPERIENCE

Applied Scientist Intern   May 2021 - January 2022
Amazon.com   *Seattle, Washington*
· Utilized computer vision and anomaly detection to automatically analyze and classify counterfeit documents
· Implemented self-supervised contrastive learning for robust representation learning of document templates
· Collected and processed new datasets from scratch for training and testing proposed model
· First-authored an internal conference workshop submission detailing the model we put into production

Systems Engineer Intern   May 2020 - Aug 2020
Black River Systems Inc   *Lakeville, Minnesota*
· Collected and analyzed I/Q data captured from a software defined radio (SDR) in urban settings
· Researched different band-agnostic feature extraction methods to reduce 32,000 complex I/Q samples to 26 features
· Implemented Affinity Propagation clustering to perform unsupervised learning and separate signals of interest

TEACHING EXPERIENCE

TA for EE 3011 Circuits Laboratory   Fall 2022
TA for EE 3015 Signals and Systems   Fall 2021
TA for EE 5621 Physical Optics   Spring 2020

LEADERSHIP

Leader at English Club Sep 2018 - Present
· Organizing biweekly meetings to connect international and American students with 40-50 students each meeting
Student Leader in Bridges International May 2017 - January 2022
· Coordinated alongside other leaders to develop a community for international students
Science for All Leader Sep 2020 - Jan 2021
· Performed and lead physics demonstrations to students around Minneapolis to foster interest in STEM careers
IEEE UMN Student Branch President May 2016 - May 2017
· Scheduled information sessions, presided over weekly meetings, and led the officer team

PRESENTATIONS/PUBLICATIONS

Connor Hashemi, Rafael Avelar, and James R. Leger. "Isolating Signals in Passive Non-Line-of-Sight Imaging using Spectral Content." Transactions on Pattern Analysis and Machine Intelligence (TPAMI) Special Issue. IEEE, 2023.

Connor Hashemi, Takahiro Sasaki, and James R. Leger. "Parallax-Driven Denoising of Passive Non-Line-of-Sight Thermal Imagery." International Conference of Computational Photography (ICCP). IEEE, 2023.

Connor Hashemi, Rafael Avelar, and James R. Leger. "Blind Unmixing of Passively-Scattered Multispectral Light." Computational Optical Sensing and Imaging Congress (COSI). Optica, 2023.

Connor Hashemi, Yang Liu, Yifei Sun, and Vincent Gao. "Extracting Robust Representations of Invoice Images for Automated Forgery Detection." Amazon Machine Learning Conference (AMLC) Computer Vision in Customer Trust Workshop, 2022.

Connor Hashemi and James R. Leger. "Exploiting the Visible Spectrum to Look Around Corners." Computational Optical Sensing and Imaging Congress (COSI). Optica, 2020.

Takahiro Sasaki, **Connor Hashemi**, and James Leger. "Passive 3D Location Estimation of Non-Line-of-Sight Objects from a Scattered Thermal Infrared Light Field." Optics Express, 2021.

Di Lin, **Connor Hashemi**, and James R. Leger. "Passive Non-Line-of-Sight Imaging using Plenoptic Information." Journal of the Optical Society of America A (JOSA A), 2020.

Tianqi Luo, Di Lin, Merlin Mah, **Connor Hashemi**, James R. Leger, and Joey Talghader. "Photography-Based Real-Time Long-Wave Infrared Scattering Estimation Technique ." Journal of the Optical Society of America A (JOSA A), 2021.

ACADEMIC AWARDS

NSF Travel Grant for ICCP	July 2023
Naval Horizons Challenge Winner	Jan 2021
Summa Cum Laude Graduation Honors	May 2018
CSE Fellowship	Feb 2018
Undergraduate Research Opportunity Program (UROP) Award	June 2017
Undergraduate Research Opportunity Program (UROP) Award	Dec 2016
Robert E Rice Scholarship	May 2014