Chih-Hui (John) Ho

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Google Scholar

Education

Sep. 2019 - Mar. 2024 **University of California San Diego, La Jolla, CA**.
PhD in Electrical Computer Engineering
Advisor: Professor Nuno Vasconcelos

Sep. 2017 - Jun. 2019 **University of California San Diego, La Jolla, CA**.
M.S. in Computer Science, GPA: 3.87/4.0

Sep. 2012 - Jun. 2016 **National Chiao Tung University, Hsinchu, Taiwan**.
B.S. in EECS Honor Program, GPA: 4.15/4.3

Research Interest

Deep Learning & Computer Vision & GenAI: Publication in top-tier conferences across broad topics, including visual language model, self-supervised learning, anomaly detection, and model robustness

Publication and Patent

2024 **Chih-Hui Ho**, Kuan-Chuan Peng, Nuno Vasconcelos, "Long-Tailed Anomaly Detection with Learnable Class Names", In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024

2024 **Chih-Hui Ho**, and Kuan-Chuan Peng, "Long-Tailed Anomaly Detection in Images", US Patent Application 18/590210, Feb. 28, 2024.

2024 **Chih-Hui Ho***, Tz-Ying Wu*, Nuno Vasconcelos, "ProTeCt: Prompt Tuning for Taxonomic Open Set Classification", In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024

2023 **Chih-Hui Ho**, SungBal Seo, NaYeon Kim, Pin-Ying Wu, YouSuk Bae, Nuno Vasconcelos, "Unsupervised PCB Anomaly Segmentation with Foundational Model", Electronic Imaging (EI), Intelligent Robotics and Industrial Applications using Computer Vision, **Oral**, 2024.

2023 **Chih-Hui Ho***, Yuwei Zhang*, Nuno Vasconcelos, "Toward Unsupervised Realistic Visual Question Answering", In *International Conference on Computer Vision (ICCV)*, 2023, *[Paper]*

2023 Simeng Zheng, **Chih-Hui Ho**, Paul H Siegel, "Modeling Flash Memory Channels Using Conditional Generative Nets", Design Automation and Test in Europe, 2023, *[Paper]*

2023 **Chih-Hui Ho**, Ziheng Huang, NaYeon Kim, YouSuk Bae, Nuno Vasconcelos, "Tire Defect Detection with Limited Annotation", Electronic Imaging (EI), Intelligent Robotics and Industrial Applications using Computer Vision, **Oral**, 2023. *[Paper]*

2022 **Chih-Hui Ho**, Nuno Vasconcelos, "DISCO: Adversarial Defense with Local Implicit Functions", In *Neural Information Processing Systems (NeurIPS)*, 2022 *[Paper]*

2022 **Chih-Hui Ho**, Srikar Appalaraju, Bhavan Jasani, R. Manmatha, Nuno Vasconcelos, "YORO - Lightweight End to End Visual Grounding", In *European Conference On Computer Vision Workshop (ECCVW)*, 2022 *[Paper]* *[Blog]*

2022 Brandon Leung, **Chih-Hui Ho**, Nuno Vasconcelos, "Black-Box Test-Time Shape REFINEment for Single View 3D Reconstruction", In *IEEE Conference on Computer Vision and Pattern Recognition Workshop (CVPRW)*, 2022 *[Paper]*

2020 **Chih-Hui Ho**, Nuno Vasconcelos, "Contrastive Learning with Adversarial Examples", In *Neural Information Processing Systems (NeurIPS)*, 2020

2020 Tz-Ying Wu, Pedro Morgado, Pei Wang, **Chih-Hui Ho**, Nuno Vasconcelos, "Solving Long-tailed Recognition with Deep Realistic Taxonomic Classifier", In *European Conference on Computer Vision (ECCV)*, 2020

2020 **Chih-Hui Ho**, Bo Liu, Tz-Ying Wu, Nuno Vasconcelos, "Exploit Clues from Views: Self-Supervised and Regularized Learning for Multiview Object Recognition", In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020

2020 Jen-Hui Chuang, **Chih-Hui Ho**, Ardian Umam, HsinYi Chen, Mu-Tien Lu, Jenq-Neng Hwang, Tai-An Chen, "Geometry-Based Camera Calibration Using Closed-Form Solution of Principal Line" , IEEE Transaction on Image Processing (TIP) 2020. *[Paper] [ArXiv]*

2019 **Chih-Hui Ho**, Pedro Morgado, Amir Persekian, Nuno Vasconcelos, "PIEs: Pose Invariant Embeddings", In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019

2019 **Chih-Hui Ho***, Brandon Leung*, Erik Sandstrom, Yen Chang, Nuno Vasconcelos, "Catastrophic Child's Play: Easy to Perform, Hard to Defend Adversarial Attacks", In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019

2019 Brandon Leung, **Chih-Hui Ho**, Amir Persekian, David Orozco, Yen Chang, Erik Sandstrom, Bo Liu, Nuno Vasconcelos, "OOWL500: Overcoming Dataset Collection Bias in the Wild", *[ArXiv]*

2018 Yu-Shiuan Tsai, Yi-Yu Hsieh, **Chih-Hui Ho**, Ya-Ching Chang, Yao-Yuan Chang, Heng-Jyun Lin, Han-Yang, Wang; Yu-Chen Chou, Jen-Hui Chuang, "Rule-Based Optical Character Recognition for Serial Number on Renminbi Banknote", In *IS&T Electronic Imaging 2018 (EI)* (**oral** presentation)

Professional Experience

Jan. 2018 - Mar. 2024 **Graduate Student Researcher, Statistical Visual Computing Lab, UCSD**.
- Working on large foundational models, self-supervised learning, defect detection, and long-tail recognition
- Collaborating with Korean Polytechnic University and PCB/Tire company for defect detection research

Jun. 2023 - Sept. 2023 **Mitsubishi Electric Research Lab (MERL) Research Intern**.
- Conducted research on industrial anomaly detection using visual language foundational model
- One paper in submission

Jun. 2021 - Sept. 2021 **Amazon AWS Applied Scientist Intern**.
- Developed a visual grounding transformer model with 1.3x smaller size and 3x faster speed
- Published a paper in ECCV2022 Workshop

Sep. 2017 - Dec. 2017 **Research Volunteer, San Diego Supercomputer Center**.
Reduced error of large scale operational facility data (200 GB) in scientific workflow by 23%

Nov. 2016 - Jun. 2017 **Research Assistant, NCTU Computer Vision Research Center**.
- Developed deep learning model for human activity analysis in aerial images
- Designed bill serial number recognition system with more than 99 % accuracy
- Developed camera calibration algorithm and implemented the algorithm into prototype
- Developed algorithm for automated optical inspection (AOI) for bobbin defects

Jan. - Dec. 2015 **Software Engineer Internship, Industrial Technology Research Institute**.
- Developed a prototype to calibrate robotic arm with an industrial camera
- Represented ITRI to attend 2015 Taiwan Automation Intelligence and Robot Show
- Received Mechanical and Systems Research Lab Prospective Project Excellence Award

Jul. - Aug. 2014 **Research Internship, Cornell University Advanced Multimedia Lab**.
Design algorithm to generate image collage based on emotional ROIs

Academic Services

Reviewer NeurIPS, CVPR(**Outstanding Reviewer** for 2021), ECCV, ICCV, TPAMI, ICML (**Outstanding Reviewer** for 2022), ICLR, ACCV, WACV, CVPR Learning with Limited Labelled Data for Image and Video Understanding Workshop, ECCV Imbalance Problems in Computer Vision Workshop, ICIP

Program Committee ECCV2020 Imbalance Problems in Computer Vision Workshop, CVPR2022 Learning with Limited Labelled Data for Image and Video Understanding Workshop

Volunteer CVPR 2020 Area Chair Meeting, San Diego

Teaching Experience

UCSD ECE 175A Elements of Machine Intelligence [Discussion Lead](Recording), ECE 271A Statistical Learning I, ECE 271B Statistical Learning II, ECE 271C Deep Learning and Applications, CSE166 Image Processing

Selected Projects

Jan. 2021 - Mar. 2024 **Defect Detection**, *Pytorch*.
- Collaborating with Korea Polytechnic University to detect tire and pcb defects
- 2 paper published in EI conference about defect detection using self-supervised learning techniques and segment anything model (SAM)

Jan. - Mar. 2018 **2018 Kaggle data science bowl**, *Keras*.
- Implemented image segmentation deep learning models for medical images
- Ranked top 18% in the competition

Nov. 2016 - Jun. 2017 **Deep learning based human activity analysis for aerial images**, *C*.
- Trained convolutional neural network to detect human with more than 91%
- Analyzed human behavior with principle component analysis and vanishing point

Nov. 2016 - Jun. 2017 **Assignment design for UIUC CS543 computer vision course**, *Matlab*.
- Implemented example code and designed example architecture to train Cifar 100
- Wrote deep learning tutorials and assignment walkthrough instructions on Kaggle

Jul. - Dec. 2013 **Human tracking mobile robots with Kinect**, *C++*.
- Identified user patterns with SIFT and GMM background subtraction algorithms
- Integrated depth sensor information, target user features and mobile robot control

Skills

Languages Python, C/C++ , MATLAB, C#

Library Pytorch, Numpy, Pandas, OpenCV, Docker, Kubernetes, AWS, Keras, Matlab, LaTeX

Leadership

2018-2023 **Summer Research Internship Program, UCSD**.
- Mentored students in the Spring/Summer Research Intern Program (SRIP) in computer vision research.
- **2018-2020** Collected a large-scale dataset, Objects Obtained With fLight (OOWL), with a drone. Published 3 papers using the collected dataset. *[Webpage]*
- **2021** Collected a large-scale self-driving dataset with the explanation of the driving action. *[Webpage]*
- **2022** Collected a large-scale visual language dataset that contains unanswerable questions. One paper accepted in ICCV23.

2019-2020 **GEAR Research Mentor, UCSD**.
- Mentored students in Guided Engineering Apprenticeship in Research (GEAR) program in computer vision research.

2018-2019 **ENLACE bi-national summer research program, UCSD**.
- Mentored students in ENLACE, a high school outreach program promoting diversity in research, especially in Hispanic communities.

2013-2014 **President of Student Association of EECS Department, NCTU**.
- Organize student events and invite speakers from the industry for tech talk

Award

Nov 2022 NeurIPS 2022 Scholar Award

June 2022 Amazon Post-Internship Fellowship

May 2021 2021 Qualcomm Innovation Fellowship Finalist [link]

Spring 2019 UCSD graduate student association travel grant award

Jan. 2016 - May 2016 Full Scholarship as exchange student at UIUC

Jul. - Aug. 2014 Full Scholarship for an internship in Cornell University

Sep. 2012 - Jun. 2016 National Chiao Tung University scholarship

Exchange Experience

Jan. - Jun. 2016 Exchange student at University of Illinois at Urbana-Champaign

Jul. - Aug. 2014 Short term internship in Advanced Multimedia Lab in Cornell University

Language

Mandarin, English