Brevin Tilmon

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Education

University of Florida 2019 - 2023 (expected)
Ph.D. Electrical and Computer Engineering
Advised by Dr. Sanjeev Koppal

Murray State University 2015 - 2019
B.S. Engineering Physics

Experience

Meta 2021
Research Intern, Reality Labs, Advised by Shuochen Su and Michael Hall
Developed an efficient stereo-based machine learning depth estimation algorithm for dynamic occlusion on augmented and virtual reality devices. Filed patent based on internship results. Scaled and shipped the algorithm into production machine learning infrastructure for more compute and to benchmark on internal datasets and competing depth algorithms. Collaborated across computer vision and computer graphics organizations within Reality Labs.

National Aeronautics and Space Administration (NASA) 2021
Research Intern, Intelligent Robotics Group, Advised by Uland Wong
Developed a simulator with NVIDIA OptiX ray tracer in C++ and CUDA to simulate an internal computational imaging device. The computational imaging device was capable of modulating illumination for photometric stereo and modulating viewing direction with a synthetic aperture for multi view stereo. Developed neural rendering algorithms with data from my simulator to estimate the geometry and reflectance of complex materials more effectively than the existing photometric stereo and multi view stereo algorithms.

University of Florida 2019 - Present
Graduate Research Assistant, FOCUS Lab, Advised by Sanjeev Koppal
Developed differentiable computational imaging devices capable of adaptively distributing resolution at capture to improve computer vision algorithms. Developed high performance software for my computational imaging devices including porting machine learning models to microcontroller environments and synchronizing hardware within the device for real time demonstrations. Developed computer vision and machine learning algorithms with an emphasis on geometric computer vision including calibration, depth estimation, structured light, 3D reconstruction and unsupervised learning.

Publications

SaccadeCam: Adaptive Visual Attention for Monocular Depth Sensing
B. Tilmon and S. J. Koppal
International Conference on Computer Vision (ICCV), 2021

Fast Foveating Cameras for Dense Adaptive Resolution
B. Tilmon, E. Jain, S. Ferrari and S. J. Koppal
Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2021

FoveaCam: A MEMS Mirror-Enabled Foveating Camera
B. Tilmon, E. Jain, S. Ferrari and S. J. Koppal.
International Conference on Computational Photography (ICCP), 2020

Towards a MEMS-based Adaptive LIDAR
F. Pittaluga, Z. Tasneem, J. Folden, B. Tilmon, A. Chakrabarti and S. J. Koppal.
International Conference on 3D Vision (3DV), 2020

Design and Calibration of a Fast Flying-Dot Projector for Dynamic Light Transport Acquisition
K. Henderson, X. Liu, J. Folden, B. Tilmon, S. Jayasuriya and S. J. Koppal.
Transactions on Computational Imaging 2020

Novel Approach of Wavelet Analysis for Nonlinear Ultrasonic Measurements and Fatigue Assessment of Jet Engine Components
G. Bunget, B. Tilmon, A. Yee, D. Stewart, J. Rogers, et al.
American Institute of Physics 2018

Patents

Efficient Dynamic Occlusion based on Stereo Vision
B. Tilmon, S. Su, M. Hall
under review, 2022

Fast Foveation Camera and Controlling Algorithms
S. J. Koppal, Z. Tasneem, D. Wang, H. Xie, B. Tilmon
US16844597, 2020

Awards

National Science Foundation Graduate Research Fellowship - Honorable Mention 2021

Graduate School Preeminence Award, University of Florida 2019-2024
Guaranteed Graduate Research Assistantship for duration of PhD financed by the Graduate School for top PhD applicants.

Jesse & Deborah Jones Endowment Scholarship, Murray State University 2015-2019
Merit scholarship covered housing and partial tuition.