Charlie K. Lehman

CONTACT
INFORMATION

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EDUCATION

Georgia Institute of Technology, Atlanta, GA

Ph.D. Machine Learning, In Progress
M.S. Electrical and Computer Engineering, May 2018

The Citadel, Charleston, SC

B.S. Electrical and Computer Engineering, May 2009

INTERESTS

Confidence Measures   ML Model Failure Modes   AI Safety & Reliability

RESEARCH
EXPERIENCE

Georgia Institute of Technology

Deep Learning for Perception - Advisor: Ghassan AlRegib, Ph.D.   Sep 2016 - Present
- Developing methods for interpreting and improving robustness of deep models used in image related tasks.
- Developed a method for detecting out-of-sample inputs to machine learning models that rejects Adversarial Examples, Random Noise, and classes of images for which the model is not trained.
- Developed system for detecting parking spots using on-board cameras and telemetry on a vehicle.
- Studied unsupervised learning techniques for predicting action and characterizing the behavior of arbitrary classes in video.
- Designed a classifier for pigmented skin lesions utilizing convolutional neural networks and a novel multi-basis input approach, which yielded 98% accuracy, ~4% greater than similar models published in 2016.

Robotics - Advisor: Aaron Ames, Ph.D.   Aug 2016 - Dec 2016
- Designed and installed a computer vision system for the DURUS bipedal robot for use in estimating translations and heading.

George Mason University, Fairfax, VA

Robotics - Advisor: Daniel Lofaro, Ph.D.   Feb 2016 - Apr 2016
- Utilized the simulation OpenDRC-Hubo to perform IK utilizing Hubo Motion-RT
- Simulated teleoperation of quadrotors in Gazebo to perform SLAM
- Set up and maintained the operation of Baxter and Pioneer P3DX in support of four undergraduate senior design teams.
- Developed tutorials for the lab in the operation of the Stratasys BST 768 3D Printer and the Pioneer P3DX.

The Citadel, Charleston, SC

Wavelet Receiver Design - Advisor: Robert Barsanti, Ph.D.   May 2007 - Mar 2009
- Evaluated the performance of a wavelet domain correlation (WDC) receiver compared to a time domain correlation (TDC) receiver in the coherent detection of frequency shift keying (FSK) communication signals in an additive white Gaussian noise (AWGN) channel.
- Implemented Monte Carlo simulations in MATLAB to compare the bit-error rate (BER) of WDC and TDC receiver to the theoretical BER calculated from AWGN and bit energy.

- Experimental results revealed that a WDC receiver is more efficient in terms of processing speed compared to the TDC receiver because the WDC receiver utilized only 32 coefficients compared to the 128 coefficients in the TDC receiver to achieve similar BER results.

IEEE Robotics Competition - Advisor: Ronald Hayne, Ph.D.　　　　Aug 2007 - Apr 2008
- Designed and constructed a robot to compete in the IEEE SouthEastCon 2008 in Huntsville, AL

PUBLICATIONS &
PRESENTATIONS

C. Lehman, D.Temel, and G.AlRegib, "Implicit Background Estimation for Semantic Segmentation" Submited to IEEE International Conference on Image Processing (ICIP), Taipei, Taiwan, Sep. 22-25 2019.

G. AlRegib, C. Lehman, and D. Temel, "Adaptive Thresholding for Hyperpolar Classification," invention disclosure (GTRC ID: 7846) filed with Georgia Tech in March 2018.

G. AlRegib, C. Lehman, and D. Temel, "Vision System for Context-Aware Parking Detection," invention disclosure (GTRC ID: 7844/7845) filed with Georgia Tech in March 2018.

G. AlRegib, C. Lehman, and D. Temel, "Hyperpolar Labels and Classification," invention disclosure (GTRC ID: 7831) filed with Georgia Tech in February 2018.

R. Barsanti, C. Lehman *Detection of M-ary FSK Signals in the Wavelet Domain*, Abstract published in the Proceeding of IEEE SoutheastCon 2009, Atlanta, GA, March 2009

R. Barsanti, C. Lehman *Application of a Wavelet-Based Receiver for the Coherent Detection of FSK Signals*, Proceedings of IEEE 40th Southeastern Symposium on Systems and Technology 2008, New Orleans, LA, April 2008

PROGRAMMING
LANGUAGES AND
FRAMEWORKS

Proficient: Python, C#, C++, TensorFlow, MATLAB, BASH, LaTeX

PROFESSIONAL
EXPERIENCE

ConvexMind
Co-founder　　　　　　　　　　　　　　　　　　　　　　Aug 2017 - Present
- ConvexMind develops educational video games for pre-reading age children that provide developmental feedback to parents and educators.

US Navy Reserves
Engineering Duty Officer　　　　　　　　　　　　　　　　Oct 2015 - Present
- Officer in the United States Navy responsible for the design, acquisition, construction, repair, maintenance, conversion and overhaul of ships, submarines, aircraft carriers and their respective systems.

US Naval Ship Repair Facility and Japan Regional Maintenance Center, Yokosuka
Engineering Duty Officer　　　　　　　　　　　　　　　Nov 2011 - Sep 2016
- Top ranked lieutenant of 11 at SRF-JRMC.

Deputy Waterfront Operations Officer　　　　　　　　　May 2014 - Mar 2015
- Led 130 multinational employees in a matrix organization to provide project management for ship repair and maintenance of 11 forward deployed navy ships.

Command Docking Officer　　　　　　　　　　　　　　May 2013 - Dec 2014

- Provided technical oversight, planning, and operation of all U.S. dry docks in Japan.
- Stream-lined the training program to put equal emphasis on technical proficiency and operational excellence resulting in 5 qualified Docking Officers and 18 Docking Team Members.
- Successfully oversaw 14 docking and undocking evolutions of U.S. Navy and Japanese Maritime Self Defense Force ships and craft with zero incidents.

USS BLUE RIDGE (LCC 19)
Electronics Warfare Division Officer   May 2009 - Nov 2011
- Led a division of 24 sailors in the maintenance and operation of Electronic and Cryptologic Warfare equipment.
- Top ranked Junior Officer onboard.

REFERENCES   **Prof. Ghassan AlRegib**, Professor, Georgia Institute of Technology, (404) 894-7005, alregib@gatech.edu

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