Tyler L. Hayes

Personal Data

Phone: (603) 380-0205
Email: tlh6792@rit.edu
Citizenship: United States of America

Research Interests

Lifelong Machine Learning, Computer Vision, Deep Learning

Education

Aug. 2016 - Dec. 2021 — Doctor of Philosophy in Imaging Science
Rochester Institute of Technology, Rochester, NY
Advisor: Dr. Christopher Kanan
GPA: 3.81/4.0

Jan. 2015 - Mar. 2017 — Master of Science in Applied and Computational Mathematics
Rochester Institute of Technology, Rochester, NY
Advisor: Dr. Nathan Cahill
GPA: 4.0/4.0

Sept. 2011 - May 2014 — Bachelor of Science in Applied Mathematics
Rochester Institute of Technology, Rochester, NY
GPA: 3.65/4.0, *Magna Cum Laude*
Alpha Sigma Lambda Honorary Society

Peer-Reviewed Conference Papers

T.L. Hayes, N.D. Cahill, and C. Kanan. Memory efficient experience replay for streaming learning. *In: Proc. IEEE International Conference on Robotics and Automation (ICRA)*, 2019

N.D. Cahill, **T.L. Hayes**, R.T. Meinhold, and J.F. Hamilton. Compassionately conservative balanced cuts for image segmentation. *In: Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018

R. Kemker, M. McClure, A. Abitino, **T.L. Hayes**, and C. Kanan. Measuring catastrophic forgetting in neural networks. *In: AAAI*, 2018

Conference Papers

T.L. Hayes, R.T. Meinhold, J.F. Hamilton, and N.D. Cahill. Piecewise flat embeddings for hyperspectral image analysis. *In: Proc. SPIE DCS Defense and Security: Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXIII*, 2017

R.T. Meinhold, **T.L. Hayes**, and N.D. Cahill. Efficiently computing piecewise flat embeddings for data clustering and image segmentation. *In: Proc. IEEE MIT Undergraduate Research and Technology Conference*, 2016

Workshop Papers

T.L. Hayes, R. Kemker, N.D. Cahill, and C. Kanan. New metrics and experimental paradigms for continual learning. *CVPR Workshop: Real-World Challenges and New Benchmarks for Deep Learning in Robotic Vision, Salt Lake City, UT*, 2018

Thesis

T.L. Hayes. Compassionately conservative normalized cuts for image segmentation. *M.S. Thesis, Rochester Institute of Technology*, 2017

Research Experience

Aug. 2017 - Present
Graduate Research Assistant
Machine and Neuromorphic Perception Laboratory (kLab)
Rochester Institute of Technology, Rochester, NY
Topics: Lifelong Machine Learning, Deep Learning, Continual Learning

June 2017 - Aug. 2017
Graduate Research Intern
Naval Research Enterprise Internship Program (NREIP) by the American Society for Engineering Education (ASEE)
U.S. Naval Research Laboratory (NRL), Washington, DC
Tasks: Assessed the validity of the manifold hypothesis within deep neural networks. Utilized dimensionality reduction and intrinsic dimension estimation techniques to characterize feature manifolds.

Jan. 2016 - May 2017
Graduate Research Assistant
Image Computing and Analysis Laboratory (ICAL)
Rochester Institute of Technology, Rochester, NY
Tasks: Developed a new cut cost and optimization algorithm for graph-based image segmentation with ties to manifold learning.

Work Experience

June 2015 - Aug. 2015
Image Science Intern
UTC Aerospace Systems, Westford, MA
Tasks: Implemented Non-Linear Least Squares optimizer to fit functions to edge spread data. Derived metrics from fitted edge data to evaluate resolution sharpness metrics of airborne sensors and quantified confidence estimates using bootstrap resampling.

Oct. 2014 - Jan. 2015
Staffing Coordinator
Durham Staffing, Depew, NY
Tasks: Contacted employees regarding job opportunities and answered employee and client questions via phone. Administered and organized application materials. Maintained notes on applicants in database.

June 2014 - Sept. 2014
IT Analyst - Technical Development Program
Liberty Mutual Insurance, Portsmouth, NH
Tasks: Led case study presentation on gamification of roadway safety. Coordinated process improvement project to improve productivity trackers. Created workflow diagrams and traceability matrices for process improvement projects.

May 2013 - Aug. 2013 | Information Technology Intern
Liberty Mutual Insurance, Portsmouth, NH
Tasks: Researched and compiled presentations on statistical models and statistical software used for predictive analytics. Developed use cases involving loss triangling methods and fraud detection techniques.

Teaching Experience

Aug. 2016 - May 2017 | Graduate Teaching Assistant
Chester F. Carlson Center for Imaging Science
Rochester Institute of Technology, Rochester, NY
Classes: Deep Learning for Vision (Grad.), Image Processing and Computer Vision (Grad.)
Tasks: Completed and held office hours to help with homework assignments. Graded and offered suggestions on homework, proposals, projects, and presentations.

Jan. 2015 - May 2016 | Graduate Teaching Assistant
School of Mathematical Sciences
Rochester Institute of Technology, Rochester, NY
Award: Student Achievement Honors for Outstanding Teaching Assistant, *April 2016*
Classes: Calculus (B, C, I, II)
Tasks: Assisted students with in-class workshops and graded homework assignments.

Jan. 2014 - May 2014 | Learning Assistant
School of Mathematical Sciences
Rochester Institute of Technology, Rochester, NY
Class: Mathematics of Graphical Simulation
Tasks: Created notes and graded group worksheets. Held recitation sessions for assistance with homework and class concepts.

Sept. 2012 - Dec. 2013 | Grader
School of Mathematical Sciences
Rochester Institute of Technology, Rochester, NY
Award: Student Achievement Honors for the Best Grader, *April 2013*
Classes: Multivariable Calculus, Differential Equations, Probability and Statistics
Tasks: Graded homework assignments.

Interns Supervised

July 2018 - Aug. 2018 | Michael Geraci - co-supervised with Kushal Kafle
Lifelong Learning and Visual Question Answering

Skills

Deep Learning Packages:	TensorFlow, Keras, PyTorch, MatConvNet
Competent in Programming:	Python, MATLAB
Also Familiar With:	Java
Operating Systems:	Linux (Ubuntu), Microsoft Windows
Applications:	Microsoft Office, Word, Excel, Outlook, SharePoint, LaTeX

Reviewer

IEEE International Conference on Image Processing (ICIP)
IEEE International Symposium on Biomedical Imaging (ISBI) [Delegate Reviewer]

Activities

RIT Ukulele Club, Cofounder, Member (2014-Present), Vice President (2013-2014), Treasurer (2012-2013)
RIT Alpine Ski Team, Member (2012-2014)
RIT Concert Band, Member (2011-2013)