Daniel E. **Brown**

R&D Engineer · Researcher

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Creative and inquisitive engineer, a resourceful leader and team player equipped to apply knowledge to solve real world problems. Armed with an abundance of hands-on and practical experience, prepared to undertake any project requiring a multidisciplinary mind-set.

Experience

Associate Techincal Staff - Active Optical Systems
Lexington, Massachusetts

MIT Lincoln Laboratory
Aug. 2020 - Present

- Design, implementation and test of complex laser and LiDAR systems. Low level command and control of electrical, power-electronics, mechanical, optical and RF devices through use of FPGA + CPU SoCs. Demonstrated logic level hardware safeties to ensure user and hardware fault-tolerance.
- Test and analysis of various laser system sub-components to verify expected power, timing, and waveforms.
- Utilized Slurm to parallelized GPU accelerated simulator on MITLL supercomputing cluster.
- "Build-a-LiDAR" hardware kit design and test. A basic introduction to LiDAR electronics, physics, and processing taught via MIT IAP course.

Research & Development Engineer
Cambridge, Massachusetts

Aurora Flight Sciences - A Boeing Company
Jul. 2018 - Jul. 2020

- Developing and integrating aircraft-based perception and sensing techniques for non-cooperative detect and avoid applications utilizing EO, gimbaled cameras, lidar, INS, and radar sensors on embedded GPGPU platforms.
- Led the design, manufacturing, integration and testing of hardware-in-the-loop and software-in-the-loop flight data collection systems utilizing an array of perception sensors and compute to validate system functionality and reliability.
- Collaborated with multi-disciplinary avionics, airframe and vendor groups to achieve optimal sensor and compute selection for new flight vehicles utilizing aviation grade hardware systems.
- Demonstrated proof-of-concept computer vision pipelines for; optical character recognition, facial feature tracking, and body pose analysis for fatigue monitoring within a simulated locomotive environment.
- Created automated parsing, graphing, and quantitating scripts to process logged flight data. Assisted in the creation of sensor drivers, supporting software for system functionality, and configuration of linux based compute.

Research Specialist - Instrumentation Engineer
Cambridge, Massachusetts

Massachusetts Institute of Technology
May. 2014 - May. 2018

- Conceived, prototyped, built and tested a compact and remote autonomous automotive data logging platform to capture sensor data through disparate sources including vehicle state information via CANbus, GPS, IMU, audio and high definition video. Hands-on instrumentation of over 28 vehicles, including 21 Tesla.
- Focused on automotive safety systems research using semi-autonomous driving features, data collection and analysis. Hands-on experience building and integrating intelligent systems into Tesla, Volvo, Toyota, Jaguar, Land Rover, Mercedes, Ford and GM vehicles.
- Assisted subject data collection in laboratory, simulation, field, and naturalistic experiments. Performed data analysis using Python, OpenCV, and R on large scale data sets stored as flat file and SQL databases. Created technical documentation for instrumentation installations. Formed and executed test plans, and assisting with the development of experimental protocols.

Undergraduate Research, Metallurgy Lab
Amherst, Massachusetts

University of Massachusetts – Amherst
Dec. 2012 - May. 2013

- Conducted research in laboratory of Professor Joseph Goldstein, performing metallurgical experiments to form the Tetrataenite phase of Fe-Ni found in meteorites.
- Set up, calibrated, measured output from heat furnaces. Gained knowledge of grinding, polishing and etching techniques for use in optical microscopy and spectroscopy.

Education

University of Massachusetts Amherst
Amherst, Massachusetts

B.S. in Mechanical Engineering
Graduated May 2013

- SAE Supermileage Vehicle Competition
- Metallurgy Lab Technician/Research Assistant

Projects

MIT $100K Business Plan Competition *Cambridge, Massachusetts*

VELOAI *Jan. 2016 - May. 2016*

- Computer vision based bicycle saftey system (ABAS)
- Using 2 cameras, GPS, IMU and other sensors, VeloAI detects threats such as potholes, opening car doors, turning vehicles, pedestrians, dangerous intersections and warns the rider.
- Advanced to the semi-final round of 15 other startups. Awarded $1000 in project funding.

Society of Automotive Engineers Supermileage Vehicle Competition *Amherst, Massachusetts*

SUB-GROUP CAPTAIN-"OLD" BODY TEAM *Sept. 2012 - May. 2013*

- Leading team of 5 students to improve upon the previous years' car design of body, power transmission.
- Searched areas for which losses are present, lessening losses at wheel bearings, aerodynamic profile for increased fuel mileage.
- Placed 4th of 28 universities with 1010mpg, a almost 20% increase from the prior years' fuel mileage.

Skills

Programming: Python, Linux, Matlab, C++, R, LaTeX

Software: ROS, WireShark, OpenCV, Slurm, Docker, Solidworks, Altium, KiCAD

Other: Nvidia Jetson GPGPU, Oscilloscope, Electronics, CANbus

Publications

MIT AUTONOMOUS VEHICLE TECHNOLOGY STUDY: LARGE-SCALE DEEP LEARNING BASED ANALYSIS OF DRIVER BEHAVIOR AND INTERACTION WITH AUTOMATION
Fridman, Brown, Glazer, Angell, Dodd, Jenik, et al.. IEEE Access, 2019

ROAD CURVATURE WITH TESLA AUTOPILOT: DIFFERENCE IN APPROACH BETWEEN HUMAN AND MACHINE
Brown, Fridman, Kindelsberger, Glazer, Reimer, 2018

OBSERVED DIFFERENCES IN LANE DEPARTURE WARNING RESPONSES DURING SINGLE-TASK AND DUAL-TASK DRIVING: A SECONDARY ANALYSIS OF FIELD DRIVING DATA
McWilliams, Brown, Reimer, Mehler, Dobres. SAE Technical Papers, 2016

DETECTING ROAD SURFACE WETNESS FROM AUDIO: A DEEP LEARNING APPROACH
Abdić, Fridman, Marchi, Brown, Angell, Reimer, Schuller. In IEEE Signal Processing, 2016

AUTOMATED SYNCHRONIZATION OF DRIVING DATA USING VIBRATION AND STEERING EVENTS
Fridman, Brown, Angell, Abdić, Reimer, Young Noh. In Pattern Recognition Letters, 2016

AN ON-ROAD STUDY INVOLVING TWO VEHICLES: OBSERVED DIFFERENCES BETWEEN AN AUDITORY AND HAPTIC LANE DEPARTURE WARNING SYSTEM
Brown, Reimer, Mehler, Dobres. 2015 International Conference on Automotive User Interfaces and Interactive Vehicular Applications, Nottingham, UK 2015

Interests and Activities

- Teaching assistant for the MIT IAP course 6.S094 Deep Learning for Self-Driving Cars and 6.S099 Artificial General Intelligence
- Licensed amateur "HAM" radio operator, Technician class
- Participated in SAE-Supermileage Vehicle competition, placed 4th with 1010MPG, Member of UMass Motorsport Club, active in Hillel organization and charitable fund raising.
- Executed major repairs to automotive systems of various brands, and many electro-mechanical systems.
- Built NIXIE tube clock with components from Cold War era international sources.
- Member of open source community for ECU development and exploration.