Shawn Jain

shawnjain.com

Summary

Researcher and engineer investigating core problems in artificial intelligence, cognition, and sensing. Targets applications in computer vision, robotics, and natural language.

Education

Massachusetts Institute of Technology **2016 – September 2017**
M.Eng. Computer Science, A.I. Concentration Cambridge, MA

- Thesis: *VirtualHome: Learning to infer programs from synthetic videos of activities in the home*
- Research Area: Computer Vision; Advisor: Antonio Torralba

Massachusetts Institute of Technology **2012 – 2016**
S.B. Electrical Engineering and Computer Science Cambridge, MA

- Best undergraduate lab project in department: *Automatic Projector Tilt Compensation System*, implemented on Xilinx FPGA

Illinois Mathematics and Science Academy **2009 – 2012**

- Coursework: Web Technologies, Network Security, Microeconomic Theory Aurora, IL

Professional Experience

Microsoft Research **September 2019 – September 2020**
AI Resident Redmond, WA

- "Do Transformers Understand Time?" [Blog] [Poster] Mentors: Hamid Palangi, Yonatan Bisk
- "Fast training and inference for NNs, applications to Transformer models." Mentor: Greg Yang

Independent Researcher **February 2019 – August 2019**
Scholar Pittsburgh, PA

- Texts Reviewed: Introduction to Statistical Learning, Deep Learning Book [Ch. 1-9, 11-12]
- Implementations (most from scratch): neural networks/SGD, k-means clustering, SVM, GPs, Naïve Bayes, PCA/SVD applications, HOG features, decision trees. More at shawnjain.com
- Organized study groups with 3+ members, 2x per week; set agenda, kept engagement high for 18+ months.

Uber Advanced Technologies Group **October 2017 – February 2019**
Perception Engineer Pittsburgh, PA

- Independently led research, prototyping, and production implementation of a learning algorithm to calibrate lidar intensity to the physical property of reflectance. US Patent 10,598,791 B2 [Patent]
- Improved consistency across laser beams by 60% and inter-unit consistency by 40%
- Delivered a turnkey calibration solution that works in a mixed lidar vendor fleet, including Velodyne HDL-64e
- The algorithm enabled an online lidar intensity-based localization system and an online lane extraction system
- Addressed safety-critical failures in the core detection algorithm with calibrated intensity

Optimus Ride **Summer 2016**
Software Engineer Intern – Perception and Localization Cambridge, MA

Spot Trading **Summer 2015**
Software Developer Intern – Options and Futures Strategies Chicago, IL

Google Fiber **Summer 2014**
Software Engineer Intern - Embedded Linux Networking Mountain View, CA

Appian **Summer 2013**
Software Engineer Intern Reston, VA

Fermi National Accelerator Laboratory **Summer 2010**
Research Intern – Main Injector Division Batavia, IL

Technical Skills

- Languages: Python, C/C++
- Machine Learning Tools: PyTorch, numpy/scipy, scikit-learn, TensorFlow
- PyTorch Ecosystem: fairseq, huggingface, detectron, pyprof2, TorchScript
- Computer Vision Tools: OpenCV, VLFeat, PCL
- SWE Tools: git (advanced), gdb, pdb, CScope, ipython, perf, pytest, valgrind/cachegrind
- Digital Electronics: Xilinx FPGAs, Arduino, Raspberry P
- SWE processes: Agile/Scrum, Spiral
- Linux: bash, embedded systems, network stack
- Robotics: ROS, SLAM front end

Writing, Code, and Demos

More at shawnjain.com

- Do Transformers Understand Time? [Blog] [Poster]
- Reproducing Uber AI Labs' Deep Neuro-Evolution Paper [Blog] [Code]
- SWAP: Softmax Weighted Average Pooling [Blog] [Code]
- Gradient Descent and Chain Linked Systems [Blog] [Code]
- DeepMind/UCL Lectures - Notes and Questions [Blog]
- Test#Code [Blog] [Code]
- Object Detection Based on Lidar Intensity US Patent 10,598,791 B2 [Patent]
- VirtualHome: Learning to infer programs from synthetic videos of activities in the home [Master's Thesis]
- Naive Bayes from scratch [Demo]
- NNs/SGD from scratch [Demo]
- SVM from scratch [Demo]
- GPs from scratch [Demo]

Interests and Activities

- Active stock trader; options and futures trading
- Automotive technologies; in-car computing, inter-vehicle communication, vehicle as a software platform
- Electrical grid independence; home batteries, PV solar, vehicle to grid, dynamic load scheduling
- Audio & sound reproduction technologies; audio signal processing
- Entrepreneurship: ideation, validation, pitching, and fundraising
- STEM education for youth; Physics First and Problem Based Learning advocate
- Whole-home multimedia platforms
- Digital photography: portrait, event, wildlife
- Hindi, Conversational Mandarin

Teaching

Digital Electronics Lab, MIT 6.111 ("Digital Death") **Fall 2016**
Teaching Assistant Cambridge, MA

Signals and Systems, MIT 6.003 **Spring 2017**
Teaching Assistant Cambridge, MA

References

By Request