Saurabh Daptardar

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Research Interests

Reinforcement Learning, Machine Learning, Graphical Models and Inference

Education

Rice University — *Houston, TX*

M.S. in Electrical Engineering — *Aug. 2016 - Present*

- Research Areas: Neuroscience and Data science
- Cumulative GPA: 3.90

Indian Institute of Technology, Madras — *Chennai, India*

B.Tech in Electrical Engineering — *Aug. 2010 - May 2014*

- CGPA: 8.77/10.0

Experience

Xaq Labs, Rice — *Houston, TX*

Research Assistant — *Nov. 2016 - Present*

- Working on the Firefly project: Understanding the control algorithms of the brain
- Implemented Iterative LQG algorithm to solve the firefly task.
- Working on POMDPs, Reinforcement Learning to solve similar tasks in much broader and general framework.
- Implemented DQN with experience replay to solve the firefly task.
- Developed OpenAI Gym environment with rendering for the firefly task.
- Working on Inverse Reinforcement Learning problem and graphical models to do inference on the assumed dynamics and latent variables of the brain

Samsung Research — *Bengaluru, India*

Senior Software Engineer — *Jul. 2014 - Aug. 2016*

- Worked on the Car Analytics Engine and Smart Glove Gestures project.
- My code went into the product Samsung connect auto
- Worked on user/driver profiling, context based dynamic fuel estimation modeling, maneuver detection, event detection, and gesture recognition based on IMU sensors
- Published a paper in IEEE Sensors 2015, Busan Conference
- Worked on high-dimensional clustering algorithm for big data

Undergraduate Research, Prof. Devendra Jalihal — *IIT Madras, India*

Single Frame Image Super Resolution — *Oct. 2013 - May. 2014*

- Implemented the kernel hebbian algorithm for single frame image super resolution.
- Integrated algorithm into a web application for medical/agricultural advisory.
- Presented a paper poster on the idea at Indo-UK meet at Ipswich, UK.

Course Projects

Decoding neural activity to estimate control target — *Neural Signal Processing*

- Implemented and reproduced the results in the paper "*Improving neural prosthetic system performance by combining plan and peri-movement activity*", Yu et. al.
- Wrote a code to convert data from Python compatible `.npz` format to R compatible `.rds` format and made it available for others.

Neural decoding: ECOG data to speech — *Statistical Learning*

- Implemented few ensemble methods to classify the signals into limited dictionary of words.
- Identified few brain areas, and frequencies which were important for decoding.
- Accuracy of these approaches was not very good though.

PacWar — *Artificial Intelligence*

- Goal of the project was to find the best possible gene sequence that defines an agent's behavior in large state space to win over most of other mites.
- Designed and implemented genetic evolutionary algorithm to find the best possible gene sequence.

Publications

[1] Saurabh Daptardar et al. “Hidden Markov Model based driving event detection and driver profiling from mobile inertial sensor data”. In: *SENSORS, 2015 IEEE*. IEEE. 2015, pp. 1–4.

Technical Skills

Programming Languages C, C++, Python, R, MATLAB
Deep learning frameworks Tensorflow, PyTorch

Honors & Awards

2016 **Fellowship**, Rice ECE Department Fellowship *Houston, TX*

note: links to the github profile, linkedin profile and mail are embedded at the top of the first page