Mohit Agarwal

About

PhD Student
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Research Interests

| Brain-Computer Interfaces
| Machine Learning
| Deep Learning
| Signal Processing
| Reinforcement Learning
| Ubiquitous Computing
| Wireless Communication

Selected Coursework

Computer Science
Machine Learning
Deep Learning
Artificial Intelligence
Computation and Brain
Information Visualization
Applied Cryptography
Mobile Computing
Data Structure & Algorithms

Mathematics
Probability & Statistics
Linear Algebra
Convex Optimization

Signal Processing/Telecom
Information & Coding Theory
Random Processes
Digital Signal Processing
Statistical Signal Processing
Digital Communications
Communication Networks
Wireless Communications

Technical Skills

Programming Languages
• C/C++ • Java • Python
• MATLAB • R
Web: • HTML • CSS • d3 • JS
Deep Learning Frameworks
• Tensorflow • PyTorch
Network Simulation Tools
• ns2 • NetLogo • iPerf
Others
• Android App Development

Education

Georgia Institute of Technology *Fall'14 - Present (USA)*
MS/PhD in Electrical and Computer Engineering | **GPA: 4.0/4.0**
Advisor: Prof. Raghupathy Sivakumar | Expected Graduation: Spring 2020

Indian Institute of Technology Kanpur *Fall'10 - Spring'14 (India)*
Bachelors in Electrical Engineering | **GPA: 8.7/10.0**

Internships

Apple | Wireless Technologies *Summer'18 (USA)*
RAT Simulator: Worked on the development of a system-level discrete event simulator (in C++) to characterize and optimize a radio-access technology (RAT) [undisclosed, and developed in-house]

Lawrence Livermore National Labs | Machine Learning *Summer'17 (USA)*
High Dimensional Spectral Sampling Methods: Automated pair-correlation function estimation for arbitrary point clouds (traditionally requires manual tuning or multiple days of MD simulation)

Cisco | Deep Learning *Summer'16 (USA)*
Video Action Classification using Deep Stateful Networks: Designed deep neural nets using LSTMs in Tensorflow for action recognition in videos | Evaluated on UCF-101 dataset against stateless models

Syracuse University | Wireless Communication *Summer'13 (USA)*
Automatic Modulation Classification in WSNs: Developed algorithm for automatic identification of digital modulation in wireless communication in the presence of noisy environment using Bayesian model

Selected Research Projects

Multi-Human Assisted Learning for Machine Agents using EEG *Fall'18 - Present*
| Brain-Computer Interfaces (BCIs) and Reinforcement Learning [Doctoral Research Work]
- Research, design and develop an interesting solution paradigm allowing humans to assist ML algorithms without burdening human-in-the-loop through EEG-based brain waves
- Demonstration of the impact of our approach (including multi-human and multi-agent) in improving state-of-the-art RL algorithms by evaluating on Atari 2600 benchmark
- Preliminary results: **26.19%** improvement in detection of error-potentials | Reduces average number of steps in a cursor-target game by **72.98%** as compared to baseline methods

Low-Power Command Detection for BCI Wearables *Fall'16 - Spring'18*
| BCIs, Ubiquitous Computing and Statistical Learning [Doctoral Research Work]
- Proposed a wakeup command design and detection strategy enabling always-on BCI wearables to run on low-power mode achieving **2.7x** improvement in battery life
- Proposed algorithm to self-learn and detect eye-blinks in user brainwaves with 98% accuracy

Skin Lesion Analysis towards Melanoma Detection *Spring'16*
| Deep Learning
- Automated skin cancer detection by proposing CNN based deep architectures for skin lesion classification | **81.3%** accuracy, 2nd position worldwide in ISBI Melanoma Detection Challenge

Selected Awards

- **Semi-Finalist** of Qualcomm Innovation Fellowship 2018, USA
- Recipient of **MCM Scholarship** for continued excellent academic performance (2010-2014)
- Ranked in the **Top 0.1%** (amongst 475,000 students) in IIT-JEE 2010

Selected Publications/Patents

Mohit Agarwal and Raghupathy Sivakumar, "THINK: Toward Practical General-Purpose Brain-Computer Communication", HotWireless, ACM MobiCom, 2015
Mohit Agarwal and Raghupathy Sivakumar, "Cerebro: A Wearable Solution to Detect and Track User Preferences using Brainwaves", ACM WearSys, 2019