

Mohit Agarwal

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Research Interests

[Brain-Computer Interfaces](#)
[Reinforcement Learning](#)
[Human-In-The-Loop ML](#)
[Ubiquitous Computing](#)
[Machine/Deep Learning](#)

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

Technical Skills

Programming Languages
 • C/C++ • Java • Python
 • MATLAB • R
 Web: • HTML • CSS • d3 • JS
Deep Learning Frameworks
 • Tensorflow • PyTorch

Selected Awards

- **2nd Position Worldwide** in ISBI Melanoma Detection Challenge
- **Semi-Finalist** Qualcomm Innovation Fellowship'18

Responsibilities

PC Member
 • ICWSM'20
Session Chair
 • Allerton'19
Reviewer
 • CHI, CogSci, IMWUT, ICWSM, IEEE TMC, MobileHCI, AutomotiveUI

Education

Georgia Institute of Technology

MS/PhD in Electrical and Computer Engineering | **GPA: 4.0/4.0**

Advisor: Prof. Raghupathy Sivakumar | Expected Graduation: Summer 2020

Fall'14 - Present (USA)

Indian Institute of Technology Kanpur

Bachelors in Electrical Engineering | **GPA: 8.7/10.0**

Fall'10 - Spring'14 (India)

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 RL algorithms without burdening human-in-the-loop through EEG-based brain waves
- Demonstration of the impact of our approach in improving state-of-the-art RL algorithms (e.g., DQN) by developing multiple Atari-like discrete-grid based games in OpenAI Gym
- Experimentally showed that error-potentials can be learned in a zero-shot manner (with **AUC ≥ 0.8**), and achieves **2.25x acceleration** in training while making **75.56%** fewer queries

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 Publications

Mohit Agarwal and Raghupathy Sivakumar, "Charge for a whole day: Extending Battery Life for BCI Wearables using a Lightweight Wake-Up Command", **ACM CHI 2020**

Mohit Agarwal and Raghupathy Sivakumar, "BLINK: A Fully Automated Unsupervised Algorithm for Eye-Blink Detection in EEG Signals", **Allerton 2019**

Mohit Agarwal, Duo Xu, F. Fekri and Raghupathy Sivakumar, "Playing Games with Implicit Human Feedback", Workshop on Reinforcement Learning for Games at AAAI, 2020

Mohit Agarwal, Duo Xu, F. Fekri and Raghupathy Sivakumar, "Accelerating Reinforcement Learning Agent with EEG-based Implicit Human Feedback", IJCAI'20 (under review)

Ekansh Gupta, **Mohit Agarwal** and Raghupathy Sivakumar, "Blink to Get In: Biometric Authentication for Mobile Devices using EEG Signals", ICC 2020