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Sayan Goswami

Education

Universitat Pompeu Fabra, Barcelona, Spain *2020 - 2021*
Master of Science, Intelligent Interactive Systems

Jadavpur University, Kolkata, India *2016 - 2020*
Bachelor of Engineering, Electronics & Telecommunication Engineering

Experience

Research Programmer, Quantum Information Group, UAB, Barcelona *Sep '21 - Present*
Research on applying ML methods to optimize continuos variable quantum computing circuits.

Mentor, Google Summer of Code, mlpack.org *May '21 - Aug '21*
Guiding mentees on multi-objective optimization methods for mlpack, a C++ ML library.

Research Fellow, AI Research Institute (IIIA-CSIC), Barcelona *Nov '20 - Aug '21*
Applying RL to model realistic behaviour of NPCs in simulation environments.

Core Contributor, mlpack.org, Remote *Sep '20 - Present*
Maintaining the popular C++ based open-source machine learning framework mlpack.

Developer Associate, Samsung R&D Institute, Bangalore *May '19 - Jul '19*
Significantly decreased latency, increased throughput over QUIC protocol for wireless use.

Mentor, Deep Reinforcement Learning Nanodegree, Udacity *Jul '19 - Jan '20*
Guided students taking Udacity's Deep RL "Nanodegree", weekly meetings, coursework.

Research Fellow, Vison & Image Processing Lab, IIT Bombay *May '18 - Jul '18*
Worked on deep learning (CNNs, GANs) based CV methods for image co-segmentation with *Prof. Subhasis Chaudhuri*.

Research Assistant, AI Lab, Javapur University *Aug '18 - May '20*
Worked on multi-agent RL, game theory, neural control interface & algorithms research with *Prof. Amit Konar*.

Community Mentor, Convolutional NN Course, Coursera *Jan '18 - Jul '19*
Guided students taking Andrew Ng's CNN course on Coursera via community forums.

Research Assistant, NLP Lab, Javapur University *Jul '17 - Apr '19*
Worked on NLP methods for abstractive text summarization with *Prof. Sudip K. Naskar*.

Awards & Achievements

Awarded **JAE Intro ICU Fellowship** by the Spanish National Research Council (CSIC) in 2020.
Awarded **Summer Research Fellowship** by the Indian Academy of Sciences in 2018.
National Finalist at Automate for the Bank hackathon organised by State Bank of India in 2018.
Secured a **National Rank of 228** in WBJEE amongst 150,000 candidates in 2016.
Secured a **National Rank of 26, Zonal Rank of 2** in National Cyber Olympiad in 2016.
Regional Finalist at TCS IT Wiz Quiz (top 3/100 teams) in 2015.

Key Skills

Programming: Python, Golang, C++/C, Unix Scripting, Git, Tensorflow, Pytorch, Keras, MapReduce (Hadoop), MATLAB, Java/Kotlin (Android), Haskell, LaTeX, Assembly (x86, MIPS), Verilog, SQL, HTML, React, Typescript, Redis, Django, Flask

Machine Learning & Data Analysis: Reinforcement Learning (Factored MDP, Bandits, Options Framework), Deep Learning (CNNs, RNNs, GANs), Machine Learning (SVM, KNN, Decision Trees, Bayes)

Publications

"Brain Signal Analysis for Mind Controlled Type-Writer Using a Deep Neural Network" – 5^{th} WiSPNET, 2020, Rohini Das, **Sayan Goswami**, Sayantani Ghosh, Mousumi Laha, Chandrima Debnath and Amit Konar

"Relationship between Nash Equilibria and Pareto Optimal Solutions for Games of Pure Coordination" – 10^{th} ICCCNT, 2019, Rohini Das, **Sayan Goswami** and Amit Konar

"Application of Deep Neural Network on Image Co-segmentation" – Indian Academy of Sciences SRF Report, 2018, **Sayan Goswami** and Subhasis Chaudhuri

Select Projects

dns.amplify – A proof of concept implementation to understand DNS amplification based DDoS attacks.
metal.compute – A C++ example showcasing the use of Apple's Metal API for general purpose GPU accelerated compute.
bandit.rl – A k-armed bandit test bed implementation for comparing various reinforcement learning algorithms.
mlpack – Implemented a framework for multi-objective optimization in the popular open-source C++ machine learning library mlpack.
rtx.go – A brute force ray tracing implementation.
eightyfive – An emulator for Intel's 8085.
ysh – An UNIX shell implementation.
gobi – An in-memory database with a query language.
infinity – A signed, arbitrary precision decimal arithmetic library for C++, dynamically linked at compile time.
Deep Co-segmentation – Deep object co-segmentation with deep convolutional neural networks using a siamese architecture.
SegNet – Semantic image segmentation using deep convolutional auto-encoders.
flow – Visualiser for control flow of arbitrary python code.
fsmutil – A finite state machine generator for binary sequence detection.
Pyscuss – A real time messaging app, uses web sockets, non-persistent sessions.
bfutil – An interpreter for the BF language and a translator from BF to C with optimisations.
LinkTo – An URL shortener with analytics dashboard, built using Flask framework, uses Redis as datastore.

References

Available on request.