

# Pratik Mangalore

<https://pratmangalore.github.io/>

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## EDUCATION

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- **University Of California, Los Angeles** Los Angeles, CA  
*Master of Science in Computer Science; GPA: (3.9/4.0)* March 2020 (Expected)
- **Indian Institute Of Information Technology, Allahabad** Allahabad, India  
*Bachelor of Technology in Information Technology; GPA: (3.9/4.0)* July. 2014 – July. 2018

## EXPERIENCE

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- **Arista Networks** Santa Clara, CA  
*Software Engineering Intern - Routing & Algorithms* July 2019 - September 2019
  - **Unicast Routing:** - Configured the Arista EOS to use custom IP addresses for sending neighbour solicitation messages, by refactoring existing code and adding functions to IPv6 package, thus improving security by introducing a level of abstraction and normalizing the memory state to be consistent with the underlying kernels.
  - Added a description field to BGP peer groups by modifying the behavior of existing CLI commands.
  - Implemented a variety of bug fixes and wrote breadth and stress tests to ensure precision and reliability.
- **University Of California, Los Angeles** Los Angeles, CA  
*Graduate Researcher - Dept. of Psychiatry and Behavioral Sciences | Dr. Mirella Dapretto* Dec. 2018 - June 2019
  - **Similarity Network Fusion:** - Implemented the Similarity Network Fusion, a belief propagation algorithm, to integrate complementary information from different data modalities such as fMRI, genetic and behavioral data. Performed spectral clustering on the fused network to obtain patient subgroups based on symptoms, genes, etc.
  - Developed a command line interface to perform statistical analysis on the patient subgroups.
- **Cisco Systems** Bangalore, India  
*Software Engineering Intern - Mobility Core Business Unit* Jan. 2018 - June. 2018
  - **Application Detection & Control (ADC):** - Developed and integrated a low latency, N-Gram and Decision tree based heuristic machine learning algorithm to classify network traffic based on TCP payload data. The module was able to classify 97% of the traffic correctly.
  - Optimized memory usage for branches related to Machine Learning within the ADC module.
  - Developed and integrated an independent module which can auto-document logic for an application's protocol detection code.

## RESEARCH & PROJECTS

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- **Developed a language invariant OCR using Unsupervised Machine Learning:** - Classified handwritten text by converting input into a set of strokes which were learned using a novel combination of the Expectation Maximization algorithm and Probabilistic Latent Semantic Indexing.
- **Using HMM & Complex Network Measures to compute functional and causal connectivity in the brain:**
  - Mapped brain response activity for verbal and mathematical tasks to a connectome using Hidden Markov Models.
  - Applied Complex Network measures to differentiate the activity caused in response to verbal and mathematical tasks
- **Improved CPU Branch Prediction using CNN:** - Obtained CPU branch traces, extracted and learned spacio-temporal information using a variety of deep learning models. The CNN model obtained 87.43% accuracy, thus establishing itself as a proof-of-concept for using deep learning in branch prediction.
  - Parallelized the code using CUDA-10.1 and NVIDIA Tesla GPU to obtain a speedup by an order of 90.
- **Developed a Probabilistic Database enhanced with Open World Semantics:** - Implemented the Lifted Inference Algorithm to perform probabilistic and tractable queries on large amounts of uncertain data. Enhanced the algorithm with open world semantics.
- **Dynamic Screen Clipper - (Self Project):** - Developed a GUI app for the Windows OS, that can crop selected regions from an application and sticky it onto the screen. These regions retain full functionality of the application.

## PROGRAMMING SKILLS

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- **Languages:** Python, R, C++, C, MATLAB, Java, C#
- **Tools & Libraries:** CUDA, Git, Perforce, NumPy, Scikit-Learn, Tensorflow, Keras, PyTorch
- **Relevant Coursework & Skills:** Data Structures & Algorithms, Machine Learning in Hardware, Deep Learning & Neural Networks, Event-Driven Programming, Natural Language Processing, OS, Machine Learning Algorithms, Compiler Design, Software Engineering