

Vivekkumar Patel

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ACADEMIC DETAILS

Degree	University	Department	Year	GPA
Masters	Stanford University	Computer Science	2019	3.67/4
B.Tech.(Honors)	IIT Bombay	Electrical Engineering	2017	9.5/10
Minors	IIT Bombay	Computer Science	2017	8.8/10

MAJOR PROJECTS AND SEMINARS

- **Playing Space Invaders and Q*bert using Deep Reinforcement Learning**

Prof. Percy Liang, Prof. Stefano Ermon, September'17 - December'17

- Objective: To apply various techniques in Deep Reinforcement Learning to train an agent to play Atari games.
- Implemented Vanilla Deep Q-Network (DQN), Double DQN and Dueling DQN with **Experience replay** using the **Pytorch** framework. Dueling DQN outperforms the other two networks.

- **Graph Based Recommender System**

Prof. Jure Leskovec, September'17 - December'17

- Objective: To build a recommender system leveraging the user-item graph for non-binary rating prediction.
- Designed and implemented an algorithm based on random walks and shortest paths.
- Compared the performance of this algorithm against existing techniques such as Matrix Factorization. Graph based methods scaled better than the existing techniques and performed better with equal amount of computing resources.

- **Neural Approximated Q-learning for Stock Trading**

Prof. Ganesh Ramakrishnan, February'17 - April'17

- Objective: To implement an adaptation of the **Deep-Q Learning** algorithm proposed by **Google Deepmind**, for stock trading.
- Used **Reinforcement Learning** to train the model on five years of stock price data. Approximated the **Q** function by implementing **Deep Neural Networks** using the **TensorFlow API**.
- The model returned higher profits than the average annual rise in share prices when tested on three Indian stocks.

- **Implementation of Quasi Cyclic-Low Density Parity Check (QC-LDPC) Decoder** (BTech. Project)

Prof. Sachin Patkar, August'16 - November'16

- Objective: To test the performance of large sparse parity check matrices of QC-LDPC codes by implementing their encoder and decoder.
- **Explored ways to construct large parity check matrices** on GF(2) field that have good error correcting capability and efficiency.
- Developed the decoder using Majority Logic Decoding, to correct the received codes, in Verilog and Bluespec.

- **Design and Implementation of Multicycle and Pipelined RISC processor**

Prof. Virendra Singh, September'15-November'15

- Implemented complex instructions(e.g. Load Multiple) along with the MIN instruction set for a processor.
- Used Verilog HDL to implement these instructions.
- Tested the multicycle RISC processor on DE0-Nano FPGA board.

INTERNSHIPS

- **Design and Evaluation of Active Noise Cancellation System, Daikin Industries, Shiga, Japan**

(Guide: Naveen Gunturu, May'16-July'16)

- Implemented the Filtered-x Least Mean Squares (FxLMS) algorithm in C, on the RX62T microcontroller to achieve low frequency noise cancellation.
- Carried out simulations of the whole system in MATLAB in order to identify reasonable values for the parameters involved, such as the filter orders and step size.
- Accomplished an average of 4-5 dB decrease in the overall noise level, for frequencies up to 300 Hz.

- **Load Synchronization Automation System, ABB Bangalore (Rajajinagar)**

(Guide: Jayabal K., Lead Engineer, May'15-June'15)

- Developed a library for Load Synchronisation as a part of the Load Management System (LMS) for an upcoming plant, on their Process Automation Software System 800xA.
- Created the modules involved using Structured Text and Function Block Diagrams.

ACHIEVEMENTS

- All India Rank **64 (99.96 percentile)** in JEE Advance 2013, among around 1,50,000 candidates across the country.
- All India Rank **121 (99.99 percentile)** in JEE Mains 2013, among around 14,00,000 candidates.
- State Rank **1** in Central Board of Secondary Education(C.B.S.E.) standard XII examination, in the year 2013.
- Obtained **0.1% certificate** in Maths and Computer Science in standard XII by C.B.S.E. for being in the top 0.1% students in the country.
- Obtained Rajiv Aga Scholarship for securing first position in Mathematics, Chemistry and Computer Science in standard XII.
- All India Rank **1** in C.B.S.E. Group Mathematics Olympiad 2012.

TECHNICAL SKILLS

- **Languages:** C, C++, Python.
- **Software Packages:** Tensorflow, Pytorch, SAGE, MATLAB, AutoCAD, Praat, Octave, Keil.
- **Hardware Description Languages:** Verilog.

POSITIONS OF RESPONSIBILITY

- **Teaching Assistant - MA 108 - Differential Equations**

(Instructor: Prof. U K Anandavardhanan, March'16-April'16)

- Tutored a batch of 45 students for the course.
- Carried out evaluations and collaborated with the course instructor regarding teaching tactics and designing a grading scheme.

- **Teaching Assistant - MA 108 - Differential Equations**

(Instructor: Prof. Preeti Raman, March'17-April'17)

- Tutored a batch of 45 students for the course and extra help sessions for students.
- Carried out evaluations and collaborated with the course instructor regarding problem sets, exams and designing a grading scheme.

RELEVANT COURSES UNDERTAKEN

Machine Learning	Data Interpretation and Analysis	Operating Systems
Neural Networks and Deep Learning	Data Structures	Probability and Stochastic Processes
Improving Neural Networks	Design and Analysis of Algorithms	Microprocessors
AI: Principles and Practices	Analysis of Networks	Randomized Algorithms

Currently pursuing the **Deep Learning** Specialization by **Coursera** (have completed first 3 out of the 5 courses).