Vibhor Kumar

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Education

California Institute of Technology [Caltech], *Computer Science, 3.9 GPA*   *Class of 2016*

- Machine Learning (CS 156ab), Computer Graphics (CS 171), GPU Programming (CS 179), CG Research Intro class (CS 176), Discrete Differential Geometry (CS 177), CG Research Project class (CS 174), Computer Vision in Robotics (CS 132), Functional Programming (CS 115), Data Structures and Algorithms (CS 38), Computability Theory (CS 21), Intro to Systems (CS 24), Neural Computation (Bi/CNS/CS 187), Introduction to Neuroscience (Bi/CNS 150), Optogenetic Methods in Exp. Neuroscience (Bi/CNS/BE 230), fMRI Theory and Practice (CNS 251), Advanced Japanese (L108)

Work and Experience

Janelia Research Campus (HHMI), *Research Consultant*   *October 2015 - Present*

- Using raw visual data of the brain, collected from electron microscope scans of the fly brain, to learn about the physical structures and connectivity of the networks of neurons in the brain.
- Developing project-specific improvements to pre-existing Convolutional Neural Network libraries for increased efficiently and accuracy.

Tokyo Institute of Technology, *Research Exchange Student*   *June 2015 - August 2015*

- Explored Cognitive Neuroscience from the perspective of Computer Science by carefully analyzing fMRI data, collected from language tasks, using standard statistical and Machine Learning techniques.
- Devised a novel Machine Learning paradigm to apply the technique of MVPA to our unique dataset.

Apple, *Platform Architecture - Graphics Research Intern*   *June 2014 - September 2014*

- Worked with the exploratory graphics team to provide recommendations for future graphics hardware.
- Developed novel graphics software algorithms for efficient and visually appealing improvements over the current pipeline, and pre-existing techniques.

Samsung Mobile R&D, *Software Engineering Intern*   *July 2013 - September 2013*

- Developed testing suites for enterprise security applications and their derivatives by working with Android testing tools and bash/python scripting for full automation.
- Worked alongside my team by handling automation and development, and created test cases for various parts of the overall testing suite, including optimizing a UI interface for internal use.

ChoiceFork, *Researcher*   *April 2013 - June 2013*

- Built up from scratch the logistics of improving decision making on the internet as the sole researcher and developer. The resulting methodology was grounded in Natural Language Processing.

Selected Research Projects

Neuronal Tracing in Brains using CNNs in Vision, *Janelia Research Campus*   *October 2015 - Present*

- Analyzing raw electron-microscope scans of the entire Drosophila fly brain using Convolution Neural Networks in a Vision framework to efficiently and accurately segment millions of synaptic connections.

Neural Basis of Language Switching in Jap.-Eng. Bilinguals, *Tokyo Tech*   *Jun. 2015 - Present*

- Analyzing fMRI data collected from Japanese-English bilinguals during a language-switching task to confirm involved brain regions, and to study underlying patterns using machine learning to simultaneously understand the neural basis of semantic representation of objects and bilingual language-switching.

Edge-Preserving Linear-Time Smoothing Optimization, *CS174 Research*   *March 2013 - June 2013*

- Optimizing an edge-preserving linear-time smoothing filter algorithm (Gastal, Oliviera; SIGGRAPH 2011), and implementing both a CPU and GPU version with novel improvements.

Skills and Awards

Skills: C/C++, Python, Java, Haskell, R, OpenGL, GLSL, CUDA, OpenCV, Octave, Matlab, Mathematica, Android (ADT), ANTLR, Bash Scripting, LaTeX, Markdown, Git and Github (**see above**)

Awards: Tokyo Institute of Technology International Research Opportunities Program (TiROP): Caltech Representative (*Summer 2015*), Caltech Scholarships (Stauffer, Marion Gene Vincenti, Frances and Howard Vesper), 1st place at Google Games Coding (*Spring 2013*), 11th Place Regional ACM Collegiate Programming Contest (*Winter 2012*), Top 5 in Silver Division on USA Computing Olympiad US Open Contest (*Spring 2012*)