chandan singh

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education

phd | computer science
uc berkeley | fall 2017-present
- major: learning
- minor 1: statistics
- minor 2: comp. neuroscience
- advised by bin yu & jack gallant

bs | computer science & math
university of virginia | spring 2017
- conc. in statistics
- graduated with high distinction

research interests

computational neuroscience
interpretability
computer vision

coursework

computation
computer vision
machine learning
structure learning
algorithms
artificial intelligence
deep learning seminar
learning theory
deep learning in graphics
theory of computation
data structures
software dev. I & II

neuro
neurobiology
neural network models
visual neuroscience
cognitive science seminar

mathematics
statistical models
optimization
probability, statistics
linear algebra
real analysis
linear models
stochastic processes
chaos theory I & II
multivariate calculus
discrete mathematics
differential equations
abstract algebra

experience

berkeley b. yu research lab | ai researcher
fall 2017 - present
- developed machine learning techniques to model high-dimensional neural data
- investigated methods to interpret deep learning methods
- examined brain-inspired models for computer vision

facebook | computer vision intern
summer 2017
- improved deep learning models for semantic segmentation of satellite imagery
- investigated autoencoders for unsupervised layer-wise pretraining
- implemented crfs for segmentation post-processing

uva y. qi research lab | ml researcher
fall 2016 – spring 2017
- developed novel weighted-ℓ_1, multi-task gaussian graphical models
- applied novel graphical model techniques to large-scale functional brain connectivity

hhmi s. turaga research lab | ml researcher
summer 2015, winter 2015, summer 2016
- implemented and extended novel watershed algorithms for neural image segmentation performance evaluation
- contributed to development of novel 3d unet cnn architecture with malis training objective
- set up distributed mllib implementation to run in parallel on compute cluster using apache spark

uva w. levy research lab | comp. neuroscience researcher
fall 2014 - fall 2016
- simulated biophysically detailed neurons to understand the computations of real neurons
- simulated stochastic gating of sodium channels to analyze noise, variability, and mutual information
- analyzed energy efficiency of neurons, particularly with regard to interpulse interval coding
- performed calculations for top-down and bottom-up partitioning of the brain's energy budget

hhmi scientific computing | research intern
summer 2014
- examined effects of back-propagating action potentials by simulating intracellular neural firing with detailed biophysical models
- simulated extracellular recording from neurons and measured noise
- made detailed visualizations of action potential firing

research innovations inc. | web dev / android intern
summer 2013 - spring 2014
- developed web application to simultaneously coordinate different tasks
- developed android app to increase data storage capacity of qr codes

skills

languages

experienced
python • java • matlab • LaTeX
proficient
r • c++ • c • android • mathematica
familiar
scala • javascript • django

machine learning

frameworks
tensorflow • scikit-learn • keras • mllib • caffe
algorithms
cnns • graphical models • rfs

general

software
photoshop • NEURON
os
linux • mac • windows
ides
intellij • pycharm • eclipse • vim
collaboration
slack • github • markdown
languages
english • spanish • hindi

android

activity lifecycle • ui design • graphics

web

basic languages • django • mapping

papers / posters

published/accepted

- morel, singh, & levy, 2018: "linearized synaptic integration at no extra cost" *journal of computational neuroscience*
- singh, wang, & qi, 2017: "a weighted-ℓ_1, multi-task graphical model with applications to heterogeneous brain connectivity" *nips 2017 workshop on advances in modeling and learning interactions from complex data*
- singh & levy, 2017: "a consensus layer V pyramidal neuron can sustain interpulse-interval coding" *plos one.*

under review

- funke, tschopp, grisaitis, sheridan, singh, saalfeld, & turaga, 2017: "a deep structured learning approach towards automating connectome reconstruction from 3d electron micrographs" *tpami*

posters / talks

- singh, 2017: "a novel machine-learning algorithm for uncovering brain connections underlying autism" *uva undergraduate research & design symposium*, **winner in design category**
- singh, 2017: "uncovering brain connections underlying autism via graphical models" *tom tom founder's machine learning conference*
- singh, 2017: "complexity leads to simplicity: investigating neural linearization via biophysical simulations" *uva undergraduate research & design symposium* **semifinalist in research category** (1 of 6 undergraduates)
- singh, hewitt, & turaga, 2015: "optimizing random forest image segmentation for connectomics" *janelia undergraduate scholar poster session*

in preparation

- levy lab: "neural computation at the thermal limit"
- levy lab: "action potential velocity optimization via biophysical simulation"

awards

uva rader research award	2017
raven honor society	2016-2017
icpc regional qualification	2014, 2015, 2016
1st place microsoft code competition	2016
3rd place google games uva	2017
2nd place apt puzzle competition	2017
intermediate honors	2016
dean's list	2014-2017

funding awards

graduate student researcher appointment	2018
eecs departmental fellowship	2017
vidya balvantrai shelat fund award	2016
rodman scholar	2014-2017

outside activities

im basketball, soccer	2015-2018
apda, pf debate	2010-2017
indian student association	2014-2017
madison house volunteering (computer literacy)	2014-2017
chinmaya mission volunteering	2010-2014