chandan singh

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education

phd | computer science
uc berkeley | 2017-present
- research: interpretable ml, computational neuroscience
- advisor: bin yu
- collaborators: jack gallant
- gpa: 3.92

bs | computer science & math
university of virginia | 2017
- cs gpa: 3.97, math gpa: 3.89
- concentration in statistics
- graduated with high distinction

coursework

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

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

neuroscience
neural coding
neural network models
neurobiology
visual neuroscience
cognitive science

experience

berkeley b. yu research lab | ml researcher
fall 2017 - present
- investigated methods to interpret deep learning models
- developed machine-learning algorithms to model neural data
- developed statistical methods to learn from small data

pacmed ai | interpretable ml intern
summer 2019
- developing techniques to interpret machine-learning models for healthcare

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 model
- analyzed large-scale functional brain connectivity with graphical models

hhmi s. turaga research lab | ml researcher
summer 2015, winter 2015, summer 2016
- extended novel watershed algorithms for neural image segmentation
- contributed to development of novel 3d unet cnn architecture with malis loss
- distributed mllib random forest over compute cluster with apache spark

uva w. levy research lab | comp. neuroscience researcher
fall 2014 - fall 2016
- simulated detailed biophysical neurons to understand neural computation
- analyzed energy efficiency, noise, and variability of neural computation via stochastic sodium-channel gating

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

teaching

berkeley | student instructor
summer 2018
- cs 189/289: machine learning
- lectures to class of 80+ students

fall 2019
- cs 188: artificial intelligence

skills

languages
experienced
python • java • matlab
proficient
r • c++ • c • mathematica

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

general
languages
english • spanish • hindi
software
LaTeX • photoshop • NEURON
os
linux • mac • windows
ides
jupyter • intellij • eclipse • vim
web/mobile
basic languages • javascript • django
android • jekyll • mapping apis

projects (non-research)

hummingbird tracking with opencv
news balancer django app
notes, blog, & slides

funding awards

neurocomputing workshop travel award (2019)
pdsoros fellowship finalist (2019)
vidya shelat fund award (2016)
rodman scholar (2014-2017)

papers / posters

published/accepted
- singh*, murdoch*, & yu, 2019: "hierarchical interpretations for neural network predictions" *iclr*
- funke*, tschopp*, grisaitis, sheridan, singh, saalfeld, & turaga, 2018: "large scale image segmentation with structured-loss-based deep learning for connectome reconstruction" *tpami*
- 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 amlicd workshop*
- singh & levy, 2017: "a consensus layer V pyramidal neuron can sustain interpulse-interval coding" *plos one.*

under review
- murdoch*, singh*, kumbier, abbasi-asl, & yu, 2018: "interpretable machine learning: definitions, methods, and applications"
- devlin, singh, & yu, 2019: "disentangled attribution curves for interpreting random forests and boosted trees"
- levy lab: "neural computation at the thermal limit"

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)

posters
- singh*, murdoch*, & yu, 2018: "interpretable machine learning with applications to neuroscience" *utokyo neurcomputing workshop 2019*
- singh*, murdoch*, & yu, 2018: "hierarchical interpretations for neural network predictions" *berkeley bair workshop fall 2018, iclr 2019*
- singh, hewitt, & turaga, 2015: "optimizing random forest image segmentation for connectomics" *janelia undergraduate scholar poster session*

awards

berkeley grad slam semifinalist	2019
outstanding student instructor award (10%)	2018
uva rader research award	2017
uva undergraduate research symposium winner	2017
raven honor society	2016-2017
icpc regional qualification	2014-2016
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

outside activities

im basketball, soccer, frisbee	2015-2019
apda, pf debate	2010-2017
indian student association	2014-2017
madison house volunteering (computer literacy)	2014-2017