chandan singh

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education

phd | computer science
uc berkeley | 2017-present
- research: interpretable ml
- advisor: bin yu
- gpa: 3.95

bs | computer science & math
university of virginia | 2014-2017
- double major
- concentration in statistics
- graduated with high distinction

skills

machine learning
frameworks + tools
pytorch • scikit-learn • tensorflow
aws ec2 • s3 • sagemaker
keras • mllib • caffe2

languages
experienced
python • java • matlab
proficient
r • c++ • c • mathematica
web
javascript • django • basics

general
languages
english • spanish • hindi
software
LaTeX• photoshop • NEURON
os
linux • mac • windows

teaching

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

fall 2019
cs 188: artificial intelligence

experience

berkeley | ml research (bin yu lab)
fall 2017 - present
- developed interpretation methods for machine-learning models (e.g. neural nets)
- created interpretable models for data in science, medicine, and computer vision

amazon | research internship (pietro perona lab)
summer 2020
- testing for bias with causal matching using GANs
- interpreting semantic directions for generative models

response4life | volunteer data scientist
spring 2020
- helped develop, integrate, and deploy models to forecast covid-19 severity

pacmed ai | interpretable ml internship
summer 2019
- developed new techniques to interpret machine-learning models for healthcare
- integrated cutting-edge interpretability techniques into medical pipeline

facebook | computer vision internship
summer 2017
- investigated unsupervised deep learning for segmentation of satellite imagery
- implemented crfs for segmentation post-processing

uva | ml research (yanjun qi lab)
fall 2016 – spring 2017
- developed novel weighted-ℓ_1, multi-task gaussian graphical model
- analyzed large-scale functional brain connectivity with graphical models

hhmi | ml research (srini turaga lab)
summer 2015, winter 2015, summer 2016
- extended cnns and watershed algorithms for neural image segmentation
- implemented distributed random forests for image segmentation

uva | comp. neuroscience research (william levy lab)
fall 2014 - fall 2016
- simulated detailed biophysical neurons to develop models of neural computation
- analyzed energy efficiency, noise, and variability in stochastic neurons

hhmi scientific computing | comp. neuroscience research
summer 2014
- analyzed backpropagating action potentials via biophysical simulations

research innovations inc. | web dev + android internship
summer 2013 - spring 2014
- developed web app for task coordination, android app to increase qr code capacity

coursework

computation
machine learning
computer vision
structure learning
algorithms
artificial intelligence
deep learning
learning theory
ai in graphics
cs theory
data structures
software dev. I & II
information retrieval
computer architecture

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

papers

interpretability

- interpretations are useful: penalizing explanations to align neural networks with prior knowledge: rieger, singh, murdoch, & yu, *icml 2020* </>
- transformation importance with applications to cosmology: singh*, ha*, lanusse, boehm, liu & yu, *iclr 2020 workshop (spotlight talk)* </>
- hierarchical interpretations for neural network predictions: singh*, murdoch*, & yu, *iclr 2019* </>
- interpretable machine learning: definitions, methods, and applications: murdoch*, singh*, kumbier, abbasi-asl, & yu, *pnas 2019*
- disentangled attribution curves for interpreting random forests and boosted trees: devlin, singh, & yu *arXiv 2019* </>

statistical neuroscience

- large scale image segmentation with structured-loss-based deep learning for connectome reconstruction: funke et al. *tpami 2018* </>
- a weighted-ℓ_1, multi-task graphical model with applications to heterogeneous brain connectivity: singh, wang, & qi, *neurips 2017 amlicd workshop* </>
- linearized synaptic integration at no extra cost: morel, singh, & levy, *journal of computational neuroscience 2018*
- a consensus layer V pyramidal neuron can sustain interpulse-interval coding: singh & levy *plos one 2017* </>

other

- curating a covid-19 data repository and forecasting county-level death counts in the united states: altieri et al. *arXiv 2020* </>
- revisiting complexity and the bias-variance tradeoff: dwivedi*, singh*, yu, & wainwright *arXiv 2020* </>
- an interpretable clinical-decision rule for intra-abdominal injury *in prep*
- predicting successful clathrin-coated pits in clathrin-mediated endocytosis via auxilin *in prep*

selected talks

- interpreting ml models: *uc berkeley bair seminar, 2020*
- uncovering brain connections underlying autism via graphical models: *tom tom founder's machine learning conference, 2017*

funding awards

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

projects / activities

notes, blog, & slides </>	2014-2020
covid19 severity prediction </>	2020
basis middle school volunteering	2019-2020
bair undergraduate mentoring	2018-2020
hummingbird tracking </>	2017-2018
news balancer django app </>	2017
madison house volunteering	2015-2016
java mini-games </>	2014-2016

awards

berkeley grad slam semifinalist	2019
outstanding student instructor award	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