chandan singh

let's do good with models

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csinva

education

phd | machine learning
uc berkeley | '17-'22
research: interpretable ml
advisor: bin yu
gpa: 3.95

ms | data science
uc berkeley | '17-'21
research: statistical biology

bs | cs & math
university of virginia | '14-'17
double major: cs, math
concentration: statistics

skills

machine learning
pytorch • scikit-learn • jax
aws ec2 • s3 • sagemaker
keras • mllib • tensorflow

languages
experienced
python • java • matlab
proficient
r • c/c++ • web basics
human languages
english • spanish • hindi

awards

berkeley grad slam semifinalist '19
outstanding teaching award '18
uva rader research award '17
uva undergrad symposium winner '17
raven honor society '16-'17
icpc regional qualification '14-'16
1st place microsoft code jam '16
3rd place google games uva '17
2nd place apt puzzle competition '17
intermediate honors '16
dean's list '14-'17

funding awards
pdsoros fellowship finalist '19
ircn workshop travel award '19
vidya shelat fund award '16
rodman scholarship '14-'17

experience

berkeley | ml research (bin yu lab)
fall '17 - present
- developed interpretation methods for ml models (e.g. neural nets)
- created interpretable models in medicine, biology, and computer vision

aws | research internship (pietro perona lab)
summer '20
- testing for bias with causal matching using GANs
- interpreting semantic directions in generative models

response4life | volunteer data scientist
spring '20
- helped develop, integrate, and deploy models to forecast covid-19 severity

pacmed ai | interpretable ml internship
summer '19
- developed techniques to interpret machine-learning models for healthcare
- integrated interpretability techniques for predicting icu re-admission

facebook | computer vision internship
summer '17
- investigated unsupervised deep learning for segmentation of satellite imagery
- implemented crfs for segmentation post-processing

uva | ml research (yanjun qi lab)
fall '16 – spring '17
- 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 '15, winter '15, summer '16
- extended cnns and watershed algorithms for neural image segmentation
- implemented distributed random forests for image segmentation

uva | comp. neuroscience research (william levy lab)
fall '14 - fall '16
- developed detailed biophysical models of neural computation
- analyzed energy efficiency, noise, and variability in stochastic neurons

hhmi scientific computing | comp. neuroscience research
summer '14
- analyzed backpropagating action potentials via biophysical simulations

research innovations inc. | web dev + android internship
summer '13 - spring '14
- developed web/mobile app for task coordination with qr codes

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* </>

interpretable data science projects

- curating a covid-19 data repository and forecasting county-level death counts in the united states: altieri, barter, ..., singh*, ..., & yu* *harvard data science review 2020* </>
- developing reliable clinical decision rules: a case study in identifying blunt abdominal trauma in children: kornblith, singh et al. *seam abstract* </>
- interpretable deep learning for accurate molecular partner prediction in clathrin-mediated endocytosis: singh*, li* et al. *in prep* </>

software packages

- imodels: a python package for interpretable modeling: singh*, nasseri*, & yu, 2021 </>
- pcs-pipeline: a python package for facilitating stable data analysis </>

causal inference / ml theory

- matched sample selection in face datasets via GAN projections: singh, balakrishnan, & perona 2020 *in submission* </>
- revisiting complexity and the bias-variance tradeoff: dwivedi*, singh*, yu, & wainwright *arXiv 2020* </>

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* </>

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*

teaching

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

fall 2019
cs 188: artificial intelligence

projects / activities

notes, blog, & slides </>	'14-'20
covid-19 forecasting </>	'20
hummingbird tracking </>	'18
news balancer django app </>	'17
madison house volunteering	'15-'16
java mini-games </>	'14-'16

academic service

basis education volunteering	'19-'20
bair undergrad mentoring	'18-'20
cvpr reviewer	'21
aaai xai workshop reviewer	'21
neurips ml4h workshop reviewer	'20