chandan singh

let's do good with models

cs1@berkeley.edu | csinva | csinva.io | csinva

education

phd | machine learning
uc berkeley | '17-'22
research: interpretable ml
advisor: bin yu
collaborators:
s. upadhyayula
a. kornblith

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

bs | cs & math
university of virginia | '14-'17
double major

skills

machine learning
data cleaning • deep learning
pytorch • scikit-learn • jax
aws ec2 • s3 • sagemaker
keras • mllib • tensorflow
experienced
python • java • matlab
proficient
r • c/c++ • web basics
human languages
english • spanish • hindi

awards

berkeley grad slam semifinalist '22, '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

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

experience

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

paige ai | ai data scientist
summer '21
- interpretation and neural network modeling for medical imaging in oncology

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

selected publications

interpretable deep learning

- adaptive wavelet distillation from neural networks through interpretations: ha, **cs**, et al. *neurips '21* </>
- interpretations are useful: penalizing explanations to align neural networks with prior knowledge: rieger, **cs**, murdoch, & yu, *icml '20* </>
- hierarchical interpretations for neural network predictions: **cs***, murdoch*, & yu, *iclr '19* </>
- transformation importance with applications to cosmology: **cs***, ha*, lanusse, boehm, liu & yu, *iclr '20 workshop (spotlight talk)* </>
- interpretable machine learning: definitions, methods, and applications: murdoch*, **cs***, kumbier, abbasi-asl, & yu, *pnas '19*

interpretable rule-based modeling

- fast interpretable greedy-tree sums (figs): tan*, **cs***, nasseri, agarwal, & yu *arxiv '22* </>
- hierarchical shrinkage: improving accuracy and interpretability of tree-based methods: agarwal*, tan*, ronen, **cs**, & yu *arxiv '22* </>
- disentangled attribution curves for interpreting random forests and boosted trees: devlin, **cs**, & yu *arxiv '19* </>

interpretable data-science

- curating a covid-19 data repository and forecasting county-level death counts in the united states: altieri, barter, ..., **cs***, ..., & yu* *harvard data science review '20* </>
- developing reliable clinical decision rules: a case study in identifying blunt abdominal trauma in children: kornblith*, **cs***, et al. *seam abstract* </>
- interpretable deep learning for accurate molecular partner prediction in clathrin-mediated endocytosis: **cs***, li* et al. *in prep* </>

software packages

- imodels: a python package for interpretable modeling: **cs***, nasseri*, tan, tang, & yu, *journal of open source software '21* </>
- veridical-flow: a python package for facilitating stable data analysis: duncan*, kapoor*, agarwal*, **cs***, & yu, *journal of open source software '22* </>

statistical neuroscience

- large scale image segmentation with structured-loss-based deep learning for connectome reconstruction: funke et al. *tpami '18* </>
- a weighted-ℓ_1, multi-task graphical model with applications to heterogeneous brain connectivity: **cs**, wang, & qi, *neurips '17 amlicd workshop* </>

misc: causal inference, ml theory

- matched sample selection with GANs for mitigating attribute confounding: **cs**, balakrishnan, & perona *cvpr '21 civ workshop* </>
- revisiting complexity and the bias-variance tradeoff: dwivedi*, **cs***, yu, & wainwright *topml workshop '21* </>

teaching

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

fall 2019
artificial intelligence: cs 188

mini-projects

notes, blog, & slides </>	'14-'20
hummingbird tracking </>	'18
news balancer django app </>	'17
java mini-games </>	'14-'16

service

basis education volunteering	'19-'22
bair undergrad mentoring	'18-'22
acl rolling reviewer	'22
neurips reviewer	'21
iclr workshop reviewer	'21
cvpr reviewer	'21
aaai xai workshop reviewer	'21
neurips ml4h workshop reviewer	'20
computer literacy volunteering	'15-'17