SIMRAN KAUR

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EDUCATION

Princeton University — Princeton, NJ
Ph.D. student in Computer Science Department. — 2022 - Present

Carnegie Mellon University — Pittsburgh, PA
B.S. Artificial Intelligence, School of Computer Science. — 2018-2022
GPA: 3.95/4.00

Senior Thesis: "On the Dubious Relationship between Flatness and Generalization"
Advised by Zachary Lipton.

PUBLICATIONS

[1] *On the Maximum Hessian Eigenvalue and Generalization* [Link]
Simran Kaur, Jeremy Cohen, Zachary C. Lipton.
Preprint

[2] *Gradient Descent on Neural Networks Typically Occurs at the Edge of Stability* [Link]
Jeremy M. Cohen, **Simran Kaur**, Yuanzhi Li, Zico Kolter, Ameet Talwalkar.
In *Proceedings of the 9th International Conference on Learning Representations* (ICLR), 2021.
In *Opt2020: 12th Annual Workshop on Optimization for Machine Learning* (NeurIPS), 2020.

[3] *Are Perceptually-Aligned Gradients a General Property of Robust Classifiers?* [Link]
Simran Kaur, Jeremy Cohen, Zachary C. Lipton.
In the *Science Meets Engineering of Deep Learning Workshop* (NeurIPS), 2019.

EXPERIENCE

RESEARCH ASSISTANT, ACMI LAB (CMU) — **June 2019 – Aug 2022**

- Investigated targeted adversarial attacks against a robust classifier trained under randomized smoothing
- Demonstrated that the behavior of gradient descent in non-convex settings is inconsistent with conventional optimization theory
- Currently investigating (i) why minibatch stochastic gradient descent generalizes better than full-batch gradient descent (GD) and (ii) the role of the train loss Hessian in the generalization ability of models trained via stochastic gradient descent (SGD) and full-batch gradient descent (GD) and (ii) why minibatch SGD generalizes better than GD

RESEARCH INTERN, ABRIDGE INC — **Summer 2021**

- Used machine learning and NLP to extract and classify symptom mentions from doctor patient transcripts; working towards automating ROS section of SOAP Notes for doctors

TEACHING

Carnegie Mellon University

- Teaching Assistant for *15281 Artificial Intelligence: Representation and Problem Solving*.
  Spring 2020, Fall 2020, Spring 2021*, Fall 2021*, Spring 2022*.
  Instructors: Stephanie Rosenthal, Patrick Virtue, Zico Kolter.
  * - denotes semester serving as Head Teaching Assistant

- Teaching Assistant for *10301/10601 Introduction to Machine Learning* (Undergraduate and Graduate Level).
  Summer 2020.
  Instructors: Patrick Virtue.

HONORS

CMU Senior Leadership Recognition Recipient — **May 2022**
Phi Beta Kappa — **May 2022**
CMU SCS College Honors (successful completion of senior thesis) — **May 2022**
Dean's List — **Spring 2019 – May 2022**

SKILLS

Programming: Python, C, Java, Standard ML, R, LaTeX
Frameworks & Softwares: PyTorch, Matlab, Jupyter Notebook, Git

RELEVANT COURSEWORK

10-315 Machine Learning	15-281 Artificial Intelligence	11-485 Deep Learning
11-711 Algorithms for NLP	16-385 Computer Vision	36-218 Probability Theory
15-210 Parallel & Sequential Algorithms	15-251 Great Theoretical Ideas in CS	15-122 Data Structures & Algorithms
15-213 Computer Systems	15-150 Functional Programming	36-401 Modern Regression
10-725 Convex Optimization		

HOBBIES

Running, painting, and baking biscotti