Sahil **Verma**

SECOND YEAR GRADUATE STUDENT · COMPUTER SCIENCE AND ENGINEERING, UNIVERISTY OF WASHINGTON

(+1)2065811556 | v.sahil1@gmail.com | vsahil.github.io | vsahil | MMBSSXgAAAAJ | sahil-verma-48035264

Education

University of Washington *Seattle, USA*

PH.D., COMPUTER SCIENCE AND ENGINEERING *2019 –*

- GPA at the end of first year: **3.8/4.0**

IITK (Indian Institute of Technology, Kanpur) *Kanpur, India*

BACHELOR OF TECHNOLOGY, ELECTRICAL ENGINEERING *2015 - 2019*

- Cumulative Grade Point/ CPI at the end of 8^{th} semester: **8.1/10.0**

DELHI PUBLIC SCHOOL, BOKARO *Bokaro Steel City, India*

ICSE *2015, 2013*

- 12^{th} GRADE | Aggregate **96.0%**
- 10^{th} GRADE | Aggregate **95.2%**

Honors & Awards

2020	**Best Paper Award,** ML-RSA @ NeurIPS 2020	*USA*
2018	**Awarded $1500 by ACM SIGPLAN,** Attending PLMW, PLDI	*USA*
2017	**Awarded $1800 by Google India,** Attending FSE	*Germany*
2015	**All India Rank 663,** IIT-JEE Advanced	*India*
2015	**0.1 Percentile,** IIT-JEE Mains	*India*
2015	**KVPY Fellow | All India Rank 205,** IISc Bangalore and Government of India	*Banglore, India*
2015	**Top 1%,** National Standard Examinations in Chemistry	*India*
2015	**Top 1%,** National Standard Examinations in Biology	*India*

Publications

Counterfactual Explanations for Machine Learning: A Review PAPER *Arthur AI*

RESEARCH INTERN *Jun 2020 –*

- Paper won **best paper award** at ML-RSA workshop, NeurIPS 2020.
- We reviewed about 40 papers in counterfactual explainability and evaluated them on desirable properties of a counterfactual.
- We proposed 15 future research directions in this area.

Generating Fast Counterfactual Explanations for Black-box Models Using Reinforcement Learning PAPER *Arthur AI*

RESEARCH INTERN *Jun 2020 –*

- Paper accepted at XAI workshop, AAAI 2021.
- We proposed a novel approach to generate counterfactual explanations which satisfies all desirable properties.
- Our approach is the first to work with black-box model and generate multiple counterfactuals after training once.

Facets of Fairness in Search and Recommendations PAPER *Univeristy of Washington*

RESEARCH PROJECT, PROF. CHIRAG SHAH *Jan 2020 - Jan 2020*

- Paper accepted at Bias, ECIR 2020.
- We collected 25 definitions of fairness in ranking from literature
- We categorized the definitions in 5 major recommendations settings.

Fairness Definitions Explained PAPER *Univeristy of British Columbia*

RESEARCH PROJECT, PROF. JULIA RUBIN *August 2017 - Jan 2018*

- Paper accepted at Fairware, ICSE 2018.
- We examined the similarities and differences across all definitions in fairness literature.

NAP: Noise-Based Sensitivity Analysis for Programs PAPER

Massachusetts Institute of Technology

Research Project, Prof. Michael Carbin — *May 2018 - August 2018*

- Paper accepted at WAX, 2019.
- We proposed a Noise-based sensitivity analyzer which provides an analysis of each operator and variable in a program.
- We validated NAP's sensitivities by using them to generate mixed-precision approximate programs for a neural network and scientific computing benchmarks.

Synergistic Debug-Repair for Heap Manipulations PAPER

IIT Kanpur

Research Project, Prof. Subhajit Roy — *May 2016 - Feb 2017*

- Paper accepted at ESEC/FSE, 2017.
- Developed interaction of live execution of heap programs and instantaneous memory state graphical representation with the program repair engine.
- Developed features like hot-patching (runtime repair and insertion of newcode).
- Proposed the idea of synergistic debug and repair of programs in the tool named Wolverine.

Current Projects

Fairness in Machine Learning PREPRINT

Univeristy of Washington

Research Project, Prof. Michael Ernst & Prof. Rene Just — *Sep 2019 - Present*

- Developed a novel algorithm to identify biased datapoints in a dataset.
- Empirically shows that our techniques leads to zero discrimination levels for all benchmarks.
- Empirically shown to beat many popular previous techniques.

ShapeFlow: Dynamic Shape Interpreter for TensorFlow PREPRINT

ETH Zurich

Research Project, Prof. Zhendong Su — *May 2019 - Sep 2019*

- Designed an algorithm to detect shape incompatibility bugs in Tensorflow code.
- We beat vanilla Tensorflow by more than 400X in time performance.
- To the best of our knowledge, we are the first to build a tool for bug detection in Tensorflow.

Bug localization PREPRINT

IIT Kanpur

Research Project, Prof. Subhajit Roy — *May 2018 - May 2019*

- Developed a novel algorithm for bug localization for heap programs.
- Integrated the bug localization with program repair in the tool Wolverine.
- Achieved an average speed up of about 225X in repair timings in Wolverine.

Relevant Courses

Completed

Reasoning for Software | Deep Learning | Foundations of Fairness in Machine Learning
Machine Learning | Computer Vision | Natural Language Processing*

Ongoing

Reinforcement Learning

* : Online

Skills

Programming C/C++, Python

Utilities Numpy, Tensorflow, PyTorch, Keras, NLTK, scikit-learn, OpenCV, Bash, Git, GDB, LaTeX