

David Shriver

Contact

Email: davidshriver@outlook.com

Website: <http://localhost:4000>

Research Interests

My research interests are in ensuring correctness of machine learning systems. In particular, I am interested in *analysis, testing, and verification of neural networks*, especially in the context of systems with a high cost of failure, such as safety-critical systems.

Education

Ph.D., Computer Science • Dec 2022 • University of Virginia

Advised by: Matt Dwyer and Sebastian Elbaum

M.S., Computer Science • May 2018 • University of Nebraska-Lincoln

Advised by: Sebastian Elbaum

B.S., Computer Engineering • May 2016 • University of Nebraska-Lincoln

Positions Held

Research Assistant • Department of Computer Science, University of Virginia

August 2018 — Present

Research Intern • Langley Research Center, NASA

June 2021 — August 2021

Research Assistant • Department of Computer Science and Engineering, University of Nebraska-Lincoln

March 2014 — July 2018

Tools and Artifacts

dnnf : Implements a reduction to enable the application of falsification tools, such as adversarial attacks, to a more general set of behavioral properties of neural networks. <https://github.com/dlshriver/dnnf>

dnnv-benchmarks : A large collection of DNN verification benchmarks, specified in DNNP and ONNX for use with DNNV, DNNF and their supported verifiers and falsifiers. <https://github.com/dlshriver/dnnv-benchmarks>

dnnv : Introduces a standard network and property specification formats and implements network simplifications and property reductions, facilitating verifier execution, comparison, and artifact re-use. <https://github.com/dlshriver/dnnv>

Publications

Felipe Toledo, **David Shriver**, Sebastian Elbaum, Matthew B. Dwyer. 2021. Distribution Models for Falsification and Verification of DNNs. In *2021 36th IEEE/ACM International Conference on Automated Software Engineering (ASE)*. 317-329. <https://doi.org/10.1109/ASE51524.2021.9678590>

David Shriver, Sebastian Elbaum, Matthew B. Dwyer. 2021. DNNV: A Framework for Deep Neural Network Verification. In *Computer Aided Verification*. 137--150. https://doi.org/10.1007/978-3-030-81685-8_6

David Shriver, Sebastian Elbaum, Matthew B. Dwyer. 2021. Reducing DNN Properties to Enable Falsification with Adversarial Attacks. In *2021 IEEE/ACM 43rd International Conference on Software Engineering (ICSE)*. 275-287. <https://doi.org/10.1109/ICSE43902.2021.00036>

Dong Xu, **David Shriver**, Matthew B. Dwyer, Sebastian Elbaum. 2020. Systematic Generation of Diverse Benchmarks for DNN Verification. In *Computer Aided Verification - 32nd International Conference, CAV 2020, Los Angeles, CA, USA, July 21-24, 2020, Proceedings, Part I*. 97-121. https://doi.org/10.1007/978-3-030-53288-8_5

David Shriver, Dong Xu, Sebastian Elbaum, Matthew B. Dwyer. 2019. Refactoring Neural Networks for Verification. [arXiv:1908.08026](https://arxiv.org/abs/1908.08026). <https://arxiv.org/abs/1908.08026>

David Shriver, Sebastian Elbaum, Matthew B. Dwyer, David S. Rosenblum. 2019. Evaluating Recommender System Stability with Influence-Guided Fuzzing. In *The Thirty-Third AAAI Conference on Artificial Intelligence, AAAI 2019, The Thirty-First Innovative Applications of Artificial Intelligence Conference, IAAI 2019, The Ninth AAAI Symposium on Educational Advances in Artificial Intelligence, EAAI 2019, Honolulu, Hawaii, USA, January 27 - February 1, 2019*. 4934-4942. <https://doi.org/10.1609/aaai.v33i01.33014934>

David Shriver. 2018. Toward the development of richer properties for recommender systems. In *Proceedings of the 40th International Conference on Software Engineering: Companion Proceedings, ICSE 2018, Gothenburg, Sweden, May 27 - June 03, 2018*. 173-174. <https://doi.acm.org/10.1145/3183440.3195082>

David Shriver. Assessing the Quality and Stability of Recommender Systems. MS Thesis, University of Nebraska-Lincoln, 2018.

David Shriver, Sebastian G. Elbaum, Kathryn T. Stolee. 2017. At the End of Synthesis: Narrowing Program Candidates. In *39th IEEE/ACM International Conference on Software Engineering: New Ideas and Emerging Technologies Results Track, ICSE-NIER 2017, Buenos Aires, Argentina, May 20-28, 2017*. 19-22. <https://doi.org/10.1109/ICSE-NIER.2017.7>

Awards and Honors

- John A. Stankovic Outstanding Graduate Research Award, May 2022
- University of Nebraska-Lincoln, Highest Distinction, May 2016
- University of Nebraska-Lincoln, Computer Engineering Outstanding Undergraduate Senior, May 2016

Service

- ASE 2022: Committee Member in Program Committee within Artifact Evaluation-track
- ISSTA 2021: Committee Member in Artifact Evaluation Committee within the Artifact Evaluation-track
- ISSTA 2021 Co-reviewer
- ICSE 2020: Co-reviewer