

ROBIK SHRESTHA

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A Ph.D. candidate with publications on scrutinizing and improving robustness of deep learning systems. Seeking research positions for computer vision/natural language processing/scalable and trustworthy AI.

Research Interests: Deep Learning, Bias-Resilience, Computer Vision/Vision+Language, Concept Learning and Continual Learning

WORK AND RESEARCH EXPERIENCE

Ph.D. Candidate, [Rochester Institute of Technology](#)

Aug 2017 – Present

- Published 9 papers demonstrating failures of existing deep learning systems and providing simpler, yet more robust solutions.
- Showed that existing bias mitigation methods can be *right for the wrong reasons*. Built simpler methods that outperform state-of-the-art debiasing methods.
- Developed *OccamNets* that apply Occam's razor to architecture design to *discard spurious factors* in the datasets.
- Developed *REMIND*, a model based on hippocampal indexing theory to enable online *continual/lifelong learning* using replay.
- Developed *RAMEN*, a Visual Question Answering system that generalizes to *natural and synthetic domains*.

Research Intern, [Adobe Inc](#)

May - Oct 2021

- Improved sensitivity of vision and language embeddings to *fine-grained concepts* using *contrastive learning methods* with algebraic constraints.
- Tested fine-grained concept sensitivity by collecting *image-text pairs with small conceptual differences*.
- Team:** Dr. Kushal Kafle, Dr. Scott Cohen, Dr. Zhe Lin

Research Assistant, [ITEL Laboratories](#)

Jul 2018 - Mar 2021

- Built a *floor material classification system* to enable semi-automated insurance claims processing.
- Enhanced robustness by improving *bias-resilience*, *model calibration* and *out-of-distribution detection*.
- The project partially funded my Ph.D. research at RIT.

Software Engineer, [Viveka Health](#)

Feb 2014 - Apr 2016

- As a first hire for this startup, I helped develop a *fraud detection engine* for U.S. health insurance claims that saved \$1M+ for 25K+ lives through various employers and payers.
- Was involved in building the team by interviewing and hiring personnel and designing+implementing the full stack: cleaning up/loading data to add new clients, implementing fraud, waste, abuse detection engine, and designing UI + reports

Software Engineer, [Yomari Incorporated](#)

Nov 2012 - Feb 2014

- Developed *business intelligence solutions*, including ETL scripts and analytics reports for Nepal Telecom and international retailers.

PUBLICATIONS

- Robik Shrestha**, Kushal Kafle, Christopher Kanan. "[OccamNets: Mitigating Dataset Bias by Favoring Simpler Hypotheses.](#)" *European Conference on Computer Vision (2022)* (*Oral Presentation, Top 2.7%*)
- Robik Shrestha**, Kushal Kafle, Christopher Kanan. "[An investigation of critical issues in bias mitigation techniques.](#)" *IEEE/CVF Winter Conference of Applications on Computer Vision (2022)*
- Usman Mahmood, **Robik Shrestha** et al. "[Detecting Spurious Correlations With Sanity Tests for Artificial Intelligence Guided Radiology Systems.](#)" *Frontiers in Digital Health (2022)*
- Damien Teney, Kushal Kafle, **Robik Shrestha** et al. "[On the Value of Out-of-Distribution Testing: An Example of Goodhart's Law.](#)" *Neural Information Processing Systems (2020)*
- Tyler Hayes*, Kushal Kafle*, **Robik Shrestha***, Manoj Acharya and Christopher Kanan. "[REMIND Your Neural Network to Prevent Catastrophic Forgetting.](#)" *European Conference on Computer Vision (2020)*. (* = equal contributions)
- Robik Shrestha**, Kushal Kafle, and Christopher Kanan. "[A negative case analysis of visual grounding methods for VQA.](#)" *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics (2020)*.
- Kushal Kafle, **Robik Shrestha**, and Christopher Kanan "[Answering questions about data visualizations using efficient bimodal](#)

fusion." *The IEEE Winter Conference on Applications of Computer Vision* (2020).

8. **Robik Shrestha**, Kushal Kafle, and Christopher Kanan. "Answer them all! toward universal visual question answering models." *Proceedings of the IEEE conference on computer vision and pattern recognition* (2019).
9. Kushal Kafle, **Robik Shrestha**, and Christopher Kanan. "Challenges and prospects in vision and language research." *Frontiers in Artificial Intelligence* (2019).

INVITED TALKS AND GUEST LECTURES

- "Dataset Bias in Vision and Language Tasks: Problems and Potential Solutions" for *Center for Human Aware AI (CHAI)*, Rochester, NY (Fall 2021)
- "An Introduction to Bias Mitigation Techniques" for the *Deep Learning* course taught by Dr. Christopher Kanan, RIT, (Spring 2020 and 2021)

ACADEMIC DUTIES

- **Reviewer:** ICLR (2022), TMLR (2022), NeurIPS (2022), AAAI (2019/20), EMNLP (2019/20), EACL (2020), NLE (2020), ICSVT (2020)
- **Teaching Assistant:** Taught and assessed graduate students for the course of *MultiView Geometry* taught by Dr. Guoyu Lu

TECHNICAL SKILLS

- **Languages:** Python, Javascript, Shell Scripting
- **Frameworks/Tools:** PyTorch, Pytorch-Lightning, Tensorflow, Scipy, Pandas
- **Others:** AWS, MTurk, D3.js, Past: Java, C/C++

EDUCATION

Ph.D. in IMAGING SCIENCE

Aug 2017 - Current

Chester F. Carlson Center for Imaging Science, RIT, Rochester Institute of Technology

Relevant Courses: Deep Learning Systems for Vision; Mathematics for Deep Learning; Image Processing and Computer Vision; Human Visual System; Principles of Statistical Data Mining; Probability, Noise and System Modeling

Advisor: Dr. Christopher Kanan | **Research Group:** kLab

B.E. in COMPUTER ENGINEERING

Oct 2008 - Dec 2012

Institute of Engineering, Tribhuvan University, Nepal

Full Merit-Based Scholarship, Obtained 1st rank

Relevant Courses: Image Processing and Pattern Recognition, Artificial Intelligence
