

Kushal KAFLE

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RESEARCH INTERESTS

Artificial Intelligence, Machine Learning, Deep Learning, Computer Vision, Natural Language Processing (NLP), Visual Question Answering (VQA), Vision & Language, Bias and Fairness

EDUCATION

AUG 2014 - FEB 2020 | **Ph.D. in IMAGING SCIENCE**
Chester F. Carlson Center for Imaging Science
Rochester Institute of Technology, Rochester, NY
Advisor: Dr. Christopher Kanan | **Research Group:** [klab](#)

OCT 2008 - DEC 2012 | **B.E. in ELECTRONICS & COMMUNICATION ENGINEERING**
Institute of Engineering, Tribhuvan University, Nepal

RESEARCH EXPERIENCE

MAR 2020- CURRENT | **RESEARCH SCIENTIST II**
Adobe Research, San Jose, CA
Manager: Dr. Scott Cohen | **Group:** [Vision Group](#)
Responsibilities: Perform independent research on using deep learning for computer vision and natural language processing; Mentor research interns, collaborate with other researchers and publish findings in premiere publication venues in computer vision and NLP; Engage in internal and external professional services.

MAY 2019- AUG 2019 | **RESEARCH INTERN**
Microsoft Research, Redmond, WA
Mentors: Dr. Dinei Florencio | **Group:** [Visual Text Intelligence](#)
Highlights: Developed new dataset and multimodal vision and language transformer based approach for named entity recognition for natural image scene text.

MAY 2017- MAR 2018 | **RESEARCH INTERN**
Adobe Research, San Jose, CA
Mentors: Dr. Scott Cohen and Dr. Brian Price | **Group:** [Vision Group](#)
Highlights: Developed new dataset and deep learning algorithm for question answering on data visualization. Filed for patent for question answering on charts. Published findings and a new dataset in CVPR 2018 and an improved model in WACV 2020.

JULY 2015 - FEB 2020 | **RESEARCH ASSISTANT**
Rochester Institute of Technology
Advisor: Dr. Christopher Kanan | **Group:** [klab](#)
Highlights: Independent research on using deep learning to solve advanced problems in computer vision and natural language processing with a special emphasis on VQA. Published 10 scientific papers on peer-reviewed internationally circulated conferences and journals.

PUBLICATIONS

Peer Reviewed International Conferences

- (C1) Pham, K., **Kafle, K.**, Lin, Z., Ding, Z., Cohen, S., Tran, Q., and Shrivastava, A. (2022). Improving Closed and Open Set Attribute Prediction using Transformers. *European Conference on Computer Vision (ECCV 2022)*
- (C2) Shrestha, R., **Kafle, K.**, and Kanan, C. (2022). OccamNets: Mitigating Dataset Bias by Favoring Simpler Hypotheses. *European Conference on Computer Vision (ECCV 2022)*
Oral Presentation (Top 2.7%)
- (C3) Shrestha, R., **Kafle, K.**, and Kanan, C. (2022). An investigation of critical issues in bias mitigation techniques. *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2022)*
- (C4) Ravi, H., **Kafle, K.**, Cohen, S., Brandt, J., and Kapadia, M. (2021). AESOP: Abstract Encoding of Stories, Objects, and Pictures. *IEEE/CVF International Conference on Computer Vision (ICCV 2021)*.
- (C5) Pham, K., **Kafle, K.**, Lin, Z., Ding, Z., Cohen, S., Tran, Q., and Shrivastava, A. (2021). Learning to predict visual attributes in the wild. *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2021)*.
- (C6) Teney, D., **Kafle, K.**, Shrestha, R., Abbasnejad, E., Kanan, C., and Hengel, A. V. D. (2020). On the Value of Out-of-Distribution Testing: An Example of Goodhart's Law. *Neural Information Processing System (NeurIPS 2020)*
- (C7) Shrestha, R., **Kafle, K.**, Kanan, C. (2020). A negative case analysis of visual grounding methods for VQA. *Annual Meeting of the Association for Computational Linguistics (ACL 2020)*
- (C8) Hayes, T.*, **Kafle, K.***, Shrestha, R.*, Acharya, M., and Kanan, C. (2020). REMIND Your Neural Network to Prevent Catastrophic Forgetting. *European Conference on Computer Vision (ECCV 2020)* ***equal contribution.**
- (C9) **Kafle, K.**, Shrestha, R., Price, B., Cohen, S., and Kanan, C. (2020). Answering Questions about Data Visualizations using Efficient Bimodal Fusion. *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2020)*.
- (C10) Shrestha, R., **Kafle, K.**, and Kanan, C. (2018). Answer Them All! Toward Universal Visual Question Answering Models. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2019)*.
- (C11) Acharya, M., **Kafle, K.**, and Kanan, C. (2018). TallyQA: Answering Complex Counting Questions. *Association for the Advancement of Artificial Intelligence (AAAI 2018)*
- (C12) **Kafle, K.**, Cohen, S., Price, B., and Kanan, C. (2018). DVQA: Understanding Data Visualizations via Question Answering. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2018)*.
- (C13) **Kafle, K.** and Kanan, C. (2017) An analysis of visual question answering algorithms. *International Conference on Computer Vision (ICCV 2017)*.
- (C14) **Kafle, K.**, Yousefhussein, M., and Kanan, C.. (2017) Data augmentation for visual question answering. *International Natural Language Generation Conference (INLG 2017)*.
- (C15) **Kafle, K.** and Kanan, C. (2016) Answer-type prediction for visual question answering. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2016)*

Peer Reviewed Journals

- (J1) **Kafle, K.**, Shrestha, R. and Kanan, C. (2019). Challenges and Prospects in Vision and Language Research. *Frontiers in Artificial Intelligence*.
- (J2) **Kafle, K.** and Kanan, C. (2017) Visual question answering: Datasets, algorithms, and future challenges. *Computer Vision and Image Understanding (CVIU)*.

Pre-prints and Technical Reports

- (TR1) **Kafle, K.**, and Kanan, C. (2020). Do we need fully connected output layers in convolutional networks?. *arXiv preprint arXiv:2004.13587*.

TEACHING EXPERIENCE

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| AUG 2014 -
MAY 2015 | TEACHING ASSISTANT
Chester F. Carlson Center for Imaging Science,
Rochester Institute of Technology, Rochester, NY
Highlights: Teaching Assistant for courses <i>Radiometry</i> and <i>Fundamentals of Imaging Science</i> |
| MAY 2013 -
OCT 2013 | LECTURER
College of Information Technology and Engineering,
Purbanchal University, Kathmandu, Nepal
Highlights: Taught an undergraduate semester course on <i>Image Processing and Pattern Recognition</i> |

HONORS , AWARDS AND GRANTS

- **Outstanding Reviewer Computer Vision and Pattern Recognition (CVPR 2018 - CVPR 2021)**
Awarded to approx. 8% of total reviewers for 2018 and 2019, top 4% of total reviewers in 2020, and 20% of all reviewers in 2021.
- **Top Reviewer Neural Information Processing System (NeurIPS 2019)**
Awarded to 50% of all reviewers.
- **Travel Award for Deep Learning Summer School, 2016**
Registration fee waiver granted to attend deep learning summer school, 2016
- **Amazon AWS Research Grant, 2015**
Co-applied with Dr. Christopher Kanan. Worth \$15,000 in kind (AWS credits).
- **Scholarship from Ministry of General Administration, Nepal Government (2009)**
Merit based scholarship awarded to 200 STEM students across Nepal.

INVITED TALKS AND GUEST LECTURES

- **Why bias affects machine learning and what can we do about it?**
 - Invited Speaker: The 2021 SIGIR Workshop On eCommerce, ECOM@SIGIR (July 2021)
- **Vision Language Models and VQA**
 - Invited Speaker: 3rd Nepal Winter School in AI (Dec 2021)
- **Biases in Vision and Language: Visual Question Answering**
 - Guest Lecture for the Virginia Tech class CS 6501/4501: *Vision and Language* (Sept 2020)

- Guest Lecture for the RIT Class CS 6501/4501: *Vision and Language* (Sept 2020)
- **Language Grounded Visual Understanding**
 - Invited talk at Microsoft (Nov 2019), and Adobe Research (Nov 2019)

PROFESSIONAL SERVICES

Journal Editing

- **Associate guest editor:** Special Topic on *Identifying, Analyzing, and Overcoming Challenges in Vision and Language Research*, cross-posted to: *Frontiers in Big Data*, *Frontiers in Robotics and AI*, and *Frontiers in Artificial Intelligence*.

Workshop Organization

- Workshop on shortcomings in vision and language (SiVL) at **ECCV, 2018**
- Workshop on shortcomings in vision and language (SiVL) At **NAACL, 2019**
- Drawings and abstract Imagery: Representation and Analysis (DIRA) At **ECCV, 2022**

Journal Reviewing

- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI): **2019**
- IEEE Transactions on Image Processing (TIP): **2019**
- Computer Vision and Image Understanding (CVIU): **2017, 2018**
- Multimedia Computing Communications and Applications (ACM-MM): **2018, 2019**
- Frontiers in Robotics and AI: **2020**
- IEEE Transactions on Medical Imaging (TMI): **2020**
- IEEE Transactions on Knowledge and Data Engineering (TKDE): **2019**
- Pattern Recognition (PR): **2021**

Conference Reviewing

- Computer Vision and Pattern Recognition (CVPR): **2017 - 2022**
- Neural Information Processing System (NeurIPS): **2016, 2019, 2020, 2022**
- Association for the Advancement of Artificial Intelligence (AAAI): **2017, '19, '20**
- International Conference on Computer Vision (ICCV): **2019**
- Empirical Methods in Natural Language Processing (EMNLP): **2019- 2021**
- Annual Meeting of the Association for Computational Linguistics (ACL): **2020**
- Annual Conference of the North American Chapter of the ACL (NAACL): **2021**
- International Conference on Machine Learning (ICML): **2020, 2021**
- Internal Conference on Learning Representations (ICLR): **2022**

SKILLS

- **Proficient in:** PyTorch, Python, Numpy, Scikit-learn, Git, \LaTeX , AWS, Bash/Zsh Scripting, Crowd-sourcing (MTurk, Appen, Hive)
- **Also knows about:** Tensorflow, Keras, C, C++, MATLAB, JavaScript, Azure, GCP