

Arijit Ray

✉ array@bu.edu

🌐 <https://cs-people.bu.edu/array/>

Goal

To train machines to understand the 3D visual world and language to help people complete tasks faster.

Appointments

- Fall'21 - ? **Research Fellow**, Boston University
Advised by Kate Saenko, Bryan Plummer, and Ranjay Krishna (University of Washington). Partly funded by DARPA Semantic Forensics with UC Berkeley.
- Fall'23 **Teaching Fellow**, Boston University
Designed and co-instructed graduate-level CS 541, Applied Machine Learning.
- Summer'23 **AI Resident**, Google X Moonshot Labs
Worked in the Mineral Team- adapted multimodal language models for custom phrase localization - useful for detecting specific diseases on strawberries described by language.
- Summer'22 **Research Scientist Intern**, Meta (Facebook) AI (FAIR)
Developed a benchmark to explore adaptation strategies for compositional reasoning in vision-language models.
- 2017 - 2021 **Computer Scientist**, SRI International
Developed vision-language models that can rationalize for DARPA Explainable AI Program.
- Summer'16 **Deep Learning Intern**, Blue River Technology
Developed weed detection - a key selling point leading to John Deere acquisition for \$305M.
- 2016 - 2017 **Graduate Research Assistant**, Virginia Tech
Improved robustness of models that can answer questions about images. Advised by Devi Parikh

Education

- 2021 - ? **Ph.D., Boston University**, Computer Science
Teaching machines to compositionally reason about vision, language, and action. Advised by Kate Saenko, Bryan Plummer, and Ranjay Krishna (University of Washington).
- 2022 - 2023 **Visiting Student**, MIT, AIForImpact Venture Studio, Media Lab
Formulating how vision-language AI can impact various verticals.
- 2015 - 2017 **M.S., Virginia Polytechnic Institute and State University**, Computer Engineering
Thesis: Developing models that can converse with humans, advised by Devi Parikh.
- 2011 - 2015 **B.Tech., SRM University, India**, Electrical Engineering
GPA: 9.05/10, First-Class Distinction. Received Academic Merit Scholarship.

Research Publications

Pre-prints/Working drafts

- 1 **A. Ray**, D. Bashkirova, R. Tan, K.-H. Zeng, B. A. Plummer, R. Krishna, and K. Saenko, *R2d3: Imparting spatial reasoning by reconstructing 3d scenes from 2d images*, in submission, 2024.
- 2 D. Bashkirova, **A. Ray**, R. Mallick, S. Bargal, J. Zhang, R. Krishna, and K. Saenko, *Lasagna: Layered score distillation for disentangled object relighting*, in submission, 2023.

Peer-reviewed Conferences

- 1 J. Zhang, Z. Huang, **A. Ray**, and E. Ohn-Bar, “Feedback-guided autonomous driving,” *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024, (Highlight, top 2.8%).
- 2 **A. Ray**, F. Radenovic, A. Dubey, B. A. Plummer, R. Krishna, and K. Saenko, “Cola: How to adapt vision-language models to compose objects localized with attributes?” *Conference on Neural Information Processing Systems (NeurIPS)*, 2023.
- 3 R. Tan, **A. Ray**, A. Burns, B. A. Plummer, J. Salamon, O. Nieto, B. Russell, and K. Saenko, “Language-guided audio-visual source separation via trimodal consistency,” *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 10 575–10 584, 2023.
- 4 K. Alipour, **A. Ray**, X. Lin, M. Cogswell, J. P. Schulze, Y. Yao, and G. T. Burachas, “Improving users’ mental model with attention-directed counterfactual edits,” *Applied AI Letters*, vol. 2, no. 4, e47, 2021.
- 5 **A. Ray**, M. Cogswell, X. Lin, K. Alipour, A. Divakaran, Y. Yao, and G. Burachas, “Generating and evaluating explanations of attended and error-inducing input regions for vqa models,” *Applied AI Letters*, vol. 2, no. 4, e51, 2021.
- 6 K. Alipour, **A. Ray**, X. Lin, J. P. Schulze, Y. Yao, and G. T. Burachas, “The impact of explanations on ai competency prediction in vqa,” *2020 IEEE International Conference on Humanized Computing and Communication with Artificial Intelligence (HCCAI)*, pp. 25–32, 2020.
- 7 **A. Ray**, K. Sikka, A. Divakaran, S. Lee, and G. Burachas, “Sunny and dark outside?! improving answer consistency in vqa through entailed question generation,” *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, pp. 5860–5865, 2019.
- 8 **A. Ray**, Y. Yao, R. Kumar, A. Divakaran, and G. Burachas, “Can you explain that? lucid explanations help human-ai collaborative image retrieval,” *Proceedings of the AAAI Conference on Human Computation and Crowdsourcing*, vol. 7, no. 1, pp. 153–161, 2019.
- 9 **A. Ray**, G. Christie, M. Bansal, D. Batra, and D. Parikh, “Question relevance in vqa: Identifying non-visual and false-premise questions,” *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2016.

Workshops

- 1 K. Deng, R. Tan, S. Gabriel, B. Plummer, K. Saenko, and **A. Ray**, *Socratis: Are large multimodal models emotionally aware?* ICCV Workshop on Emotionally and Culturally Aware AI (Oral), 2023.
- 2 S. Ghosh, G. Burachas, **A. Ray**, and A. Ziskind, *Generating natural language explanations for visual question answering using scene graphs and visual attention*, IJCAI/ECAI Workshop on Explainable Artificial Intelligence, XAI 2018, 2018.

Patents

- 1 G. Burachas, **A. Ray**, and Y. Yao, *Attention-based explanations for artificial intelligence behavior*, US Patent 10,909,401, Feb. 2021.
- 2 A. Divakaran, K. Sikka, **A. Ray**, X. Lin, and Y. Yao, *User targeted content generation using multimodal embeddings*, US Patent App. 17/191,698, Sep. 2021.

Awards

- 2019 **Shark Tank Award**, SRI International, Center for Vision Technologies.
Received \$50,000 for 6 months that supported my project on generating personalized content. Awarded to 3 projects in the center.
- 2016 **Employee of the Fortnight**, Blue River Technology.
Only intern to win this award for quickly prototyping a plant detection model, a key selling point for the company.
- 2013 **Silver Medal**, Research Day, SRM University.
For designing a white paper on an exoskeleton suit. Rank 2 out of ~300 students in the department.
- 2012 **Academic Merit Scholarship**, SRM University.
Rank 3 out of ~300 students in the Electrical Engineering Department.

Mentoring

- 2023 – ? Xavier Thomas (MS BU)
 Gitika Jha (AI4All Undergraduate BU)
 Katherine Deng (AI4All Undergraduate BU)
- 2023 Jiayi Shen (AI4All Undergraduate BU; now MS student at Brown University)
- 2022 Praneeth Chandra Bogineni (MS BU; now at a startup, Oplus.ai)
- 2018–2021 Kamran Alipour (UC San Diego; now Senior AI R&D Engineer, Williams Sonoma)
- 2019 Julia Kruk (SRI International; now MS student at Georgia Tech)

Leadership

- Spring'23 **Student Leadership**, AI For Impact Venture Studio, MIT Media Lab
Part of the student leadership council organizing networking events with over 100 attendees from 3 schools in the Boston area.
- 2021 – 2022 **Co-chair**, AI+X of BU and Harvard
Started a graduate student workshop investigating how AI can impact contemporary research areas.
- 2016 – 2017 **Vice President**, Tau Beta Pi Engineering Honor Society
Vice President of the Virginia Tech Chapter

Venture Experience

- Summer'24 **Build @ Pillar VC**, Pillar VC
Selected as one of the Build @ Pillar VC summer cohort (40 out of 300+ applicants) working on Robotics and AI.

Professional Service

- 2016 – ? **Reviewer**
Neurips'22–24, CVPR'24, ECCV'24, EMNLP'23, COLING'22, ACM Multimedia 2021, CVPR 2016.
- 2022, 2017 **Judge**, Blue Ridge Highlands Regional Science Fair
Science fair for high-school students

Media

- 2019 **TechXplore, Phys.org**
An image-guessing game to evaluate the helpfulness of machine explanations, presented also as a CVPR 2019 Demo and AAAI HCOMP 2019 Poster.
- 2014 **Indian Express, Deccan Chronicle, Engineering.Careers360**
Prototyped an Unmanned Autonomous Drone for identifying disaster victims.

Early Achievements

- 2011 All India Undergraduate Entrance Examination (SRM-JEE)
99%ile among students in India.
All India Central Board Examinations
Mathematics score: 97/100, 99%ile among students in India.
- 2007 National Science Olympiad
All India Rank: 168, City Rank: 7. Maintained a national rank < 600 in National Science Olympiads 2008, 2009, 2010
- 2006 Founded middle-school science society
Goal of encouraging middle-school students to take an interest in science. Won accolades in multiple school/city-level exhibitions.