Vedant Shah

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Education

Birla Institute of Technology and Science, Pilani *Sancoale, Goa*
B.E. in Electronics and Communication Engineering | CGPA: 8.9/10 *Aug. 2018 – May 2022*

Research Interests

Reinforcement Learning, Meta Learning, Object Centric Representation Learning, Modular Deep Learning, Neurosymbolic AI, Robotics, Cognitive Science

Publications and Preprints

1. Vedant Shah, Frederik Träuble, Ashish Malik, Hugo Larochelle, Michael Mozer, Sanjeev Arora, Yoshua Bengio, Anirudh Goyal. Unlearning via Sparse Representations. ArXiv, abs/2311.15268, 2023. Link
2. Dianbo Liu*, **Vedant Shah***, Oussama Boussif*, Cristian Meo, Anirudh Goyal, Tianmin Shu, Michael Mozer, Nicolas Heess, and Yoshua Bengio. Stateful active facilitator: Coordination and Environmental Heterogeneity in Cooperative Multi-Agent Reinforcement Learning. In *The Eleventh International Conference on Learning Representations, 2023.* Link
3. **Vedant Shah***, Aditya Agrawal*, Lovekesh Vig, Ashwin Srinivasan, Gautam Shroff, Tanmay Verlekar. Neural Feature-Adaptation for Symbolic Predictions Using Pre-Training and Semantic Loss. ArXiv, abs/2211.16047, 2022. Link
4. **Vedant Shah** and Gautam Shroff. Forecasting market prices using DL with data augmentation and meta-learning: ARIMA still wins! In *I (Still) Can't Believe It's Not Better! NeurIPS 2021 Workshop, 2021.* Link.
5. **Vedant Shah**, Anmol Agarwal, Tanmay Tulsidas Verlekar, and Raghavendra Singh. Adapting deep neural networks for pedestrian-detection to low-light conditions without re-training. In *Proceedings of IEEE/CVF International Conference on Computer Vision (ICCV) Workshops, pages 2535-2541, October 2021.* Link.

Experience

Mila - Quebec AI Institute | WEB *Sep. 2021 – Present*
Visiting Researcher | Primary Advisor: Dr. Anirudh Goyal

- Working on developing general purpose pretraining frameworks for Reinforcement Learning and using GFlowNets for drug discovery
- Previously worked on investigating the use of behavioral priors in MARL, augmenting deep learning models with retrieval and language grounding for better compositional generalization.

APP Center for Artificial Intelligence Research | WEB *Jan. 2021 – Aug. 2022*
Undergraduate Researcher | Primary Advisors: Prof. Ashwin Srinivasan, Prof. Tanmay Verlekar

- [**Jan. 2022 - Aug. 2022**] Worked on using Neurosymbolic Approaches for explainable Arrhythmia Detection in collaboration with TCS Research
- [**Jan. 2021 - Aug. 2021**] Previously worked on improving performance of Deep learning based pedestrian detection systems in low-light scenarios in collaboration with Oyla Inc.

TCS Research and Innovation | WEB *May 2021 – Aug. 2021*
Research Intern | Primary Advisor: Dr. Gautam Shroff

- Worked on improving financial market data forecasting using Deep Learning, Meta Learning and Data Augmentation

Google Summer of Code, 2021 | PROJECT *May 2021 – Aug. 2021*
Student Developer | Organisation: GFOSS

- Worked on adding support for adding support for genetic algorithm to Deepbots - an open source RL wrapper framework for Webots.

Center of Robotics and Machine Intelligence, IIIT Allahabad | **WEB** *Aug. 2020 – Nov. 2020*
Research Intern | Advisor: Prof. GC Nandi

- Explored the application of Deep RL algorithms in sparse reward setting of Robotic Manipulation using Hindsight Experience Replay

Selected Projects

Jeta | **Jax based Meta Learning library** | CODE *Jun. 2022 – Sep. 2022*

- Lead maintainer for the project.
- Worked with a group of 5+ people to build a collection of Jax implementation of optimization based Meta Learning algorithms

Meta Reinforcement Learning | CODE & REPORT *Mar. 2021*

- Implementation, Experiments and Ablation Studies for the paper: RL^2: Fast Reinforcement Learning via Slow Reinforcement Learning (Duan et al., 2016).

GenRL | **PyTorch Reinforcement Learning Library** | CODE | DOCS *May 2020 – Aug. 2020*

- Worked on adding support for **Petting Zoo** and Multi Agent Reinforcement Learning Algorithms.
- Developed the documentation for off-policy Deep RL approaches present in the library.

Social Cognition and Computational Social Learning | REVIEW *Aug. 2020 – Dec. 2020*

- Did an extensive review of the field of computational social learning.
- Investigated how concepts from social cognition can be incorporated into muti-agent AI systems.

Volleyball-ML | CODE | REPORT *Oct. 2020 – Nov. 2020*

- Scraped data of previous 4 years from the NCAA women's volleyball league website.
- Tested different machine learning models using feature selection and other techniques.

Relevant Courses

Probability and Statistics, Computer Programming, Object Oriented Programming, Data Structures and Algorithms, Machine Learning, Reinforcement Learning, Meta Learning†, Control Systems, Modern Control Systems, Introduction to Cognitive Neuroscience, Discrete Mathematics

† = Graduate Level

Technical Skills

Languages: Python, C/C++, Java, Bash, MATLAB
Deep Learning: PyTorch, Tensorflow, NumPy, Pandas, scikit-learn
Tools: Git, TravisCI, Unix, VS Code, Eclipse, LaTeX, Docker
Robotics: Robot Operating System, Gazebo, STDR, Moveit, RaspberryPi, Arduino

Achievements

1. Selected to attend the Google Research Week 2022 for the ML Foundations Track.
2. Awarded a merit scholarship for being among the **top 3%** of the batch of 880 students in the 2nd semester.

Positions of Leadership, Mentoring and Teaching

Vice President - Society for Artificial Intelligence and Deep Learning | WEB *June 2021 – Present*

- Working on and managing research and open source projects, reading groups and student run courses with a group of undergraduates interested in AI and DL.

Organising Co-Lead - AI Symposium 2021 | WEB *Oct. 2021*

- Co-led a team of 10 undergraduate students in organizing an AI Symposium (700+ attendees) featuring talks and conversations with a mix of senior researchers and early career practitioners in the field of AI from across industry and academia along with a social event

Instructor - Center for Technical Education, BITS Goa | WEB *Aug. 2020 – Apr. 2021*

- Managed and taught student run courses on Causal Inference, Introductory Robotics and Robot Automation

Student Coordinator - Electronics and Robotics Club, BITS Goa | WEB *Apr. 2020 – July 2021*

- Organising research projects, student run courses on robotics and research discussion sessions, ensuring ***easy access to learning resources*** to the members and managing funds for a group of 100+ undergrads

Student Mentor - Peer Mentorship Programme, BITS Goa | WEB *Aug. 2019 – May 2020*

- Guided a group of 7 students in adjusting to the academics, and daily life in their initial days at BITS Goa