Vedant Dave

Curriculum Vitae

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Vedant Dave
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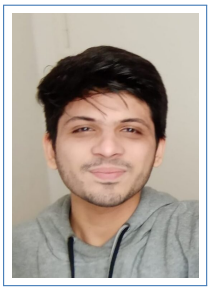

Current Position

since 2021/10 **Ph.D. Student**, *Montanuniversität Leoben*, Austria
Predictive Information, Exploration through Intrinsic rewards. Empowerment. Reinforcement Learning. Robot learning. Movement Primitives. Grasping. Tactile manipulation.

Education

2018/10 – 2021/06 **M.Sc., Automation and Robotics**, *Technische Universität Dortmund*, Germany
Thesis: Model-agnostic reinforcement learning solution for autonomous programming of robotic motion.

2014/08 – 2018/06 **B.Sc., Mechanical Engineering**, *Gujarat Technological University*, India, Rank:5/240
Thesis: Exoskeleton - A powered armor.

Teaching Experience

2023/10 – 2024/02 **Teaching Assistant**, *Montanuniversität Leoben*, Austria
Integrated CPS Projekt I (190.019)

2022/10 – 2023/02 **Tutorial**, *Montanuniversität Leoben*, Austria
Introduction to Machine Learning Lab (190.013)

2023/10 – 2024/02 **Teaching Assistant**, *Montanuniversität Leoben*, Austria
Introduction to Python (170.031)

2022/10 – 2023/02 **Teaching Assistant**, *Montanuniversität Leoben*, Austria
Cyber-Physical Systems Lab (190.002)

Academic/Industrial Experience

2025/04 – 2025/07 **Research Intern**, *Okinawa Institute of Science and Technology (OIST)*, Okinawa, Japan
Multimodal data under noisy conditions with Prof.Makoto Yamada.

2022/03- 2023/02 **Consultant**, *Stahl- und Walzwerk Marienhütte GmbH*, Graz, Austria
Predicting Yield Strength of different materials from production process. Designing Neural Networks and optimization. Found out error in measurement inaccuracy from data analysis.

2021/10 **Project Member TRAIN, train.ai-lab.science**, *Montanuniversität Leoben*, Austria
Robot skill learning with human feedback.

2021/04- 2020/10 **Master Thesis**, *Mercedes-Benz AG*, Stuttgart, Germany
Developed a model-agnostic deep reinforcement learning framework for motion planning in dynamic environments, leveraging Proximal Policy Optimization (PPO) as the RL backbone. Integrated a real-world car environment simulated with point cloud data and the KUKA iiwa 14 robotic arm, achieving enhanced motion adaptability in complex scenarios.

2020/09 – 2020/03 **Research Intern**, *Bosch Centre for Artificial Intelligence*, Renningen, Germany
Theoretical contribution of extending Probabilistic Movement Primitives to Riemannian manifold (mainly S^3). Published work in Conference on Robot Learning 2021 along with Leonel Rozo.

2017/05 – 2017/08 **Intern**, *Bosch Rexroth*, Anand, India
Thorough study of the manufacturing processes in all the departments within the company. Designing process to increase productivity in the finishing line.

2017/04 – 2018/04 **ABU Asia-Pacific Robocon 2017 Team**, *Gujarat Technological University*, India
Main mechanical designer for the robot. Responsible for robot dynamics calculation.

Publications

Conference Publications

[1] **Vedant Dave**, Ozan Özdenizci and Elmar Rueckert. Learning Robust Representations for Visual Reinforcement Learning via Task-Relevant Mask Sampling *(Accepted as Extended Abstract). International Conference on Autonomous Agents and Multiagent Systems (AAMAS), Detroit, Michigan, USA, 2025*.

[2] **Vedant Dave** and Elmar Rueckert. Skill Disentanglement in Reproducing Kernel Hilbert Space. *Annual AAAI Conference on Artificial Intelligence (AAAI), Philadelphia, Pennsylvania, USA, 2025*.

[3] Linus Nwankwo, Björn Ellensohn, **Vedant Dave**, Peter Hofer, Jan Forstner, Marlene Villneuve, Robert Galler, and Elmar Rueckert. EnvoDat: A Large-Scale Multisensory Dataset for Robotic Spatial Awareness and Semantic Reasoning in Heterogeneous Environments, *IEEE International Conference on Robotics and Automation (ICRA), Atlanta, USA, 2025*.

[4] **Vedant Dave***, Fotios Lygerakis* and Elmar Rueckert (Equal Contribution). Multimodal Visual-Tactile Representation Learning through Self-Supervised Contrastive Pre-Training, *2024 IEEE International Conference on Robotics and Automation (ICRA), Yokohama, Japan, 2024, pp. 8013-8020, https://ieeexplore.ieee.org/document/10610228*.

[5] Fotios Lygerakis, **Vedant Dave** and Elmar Rueckert. M2CURL: Enhancing Multimodal Reinforcement Learning through Self-Supervised Representation Learning in Robotic Manipulation. *2024 21st International Conference on Ubiquitous Robots (UR), New York, NY, USA, 2024, pp. 490-497, https://ieeexplore.ieee.org/document/10597462*. (Best Student Paper Award)

[6] **Vedant Dave** and Elmar Rueckert. Predicting full-arm grasping motions from anticipated tactile responses. *2022 IEEE-RAS 21st International Conference on Humanoid Robots (Humanoids)*, Ginowan, Japan, 2022, pp.464-471, https://ieeexplore.ieee.org/document/9999743.

[7] Leonel Rozo* and **Vedant Dave*** (Equal Contribution). Orientation Probabilistic Movement Primitives on Riemannian Manifolds. *Proceedings of the 5th Conference on Robot Learning (CoRL)*, PMLR 164:373-383, 2022., https://proceedings.mlr.press/v164/rozo22a.html.

Workshop/ Late-Breaking Publications

[8] **Vedant Dave** and Elmar Rueckert. Skill Disentanglement in Reproducing Kernel Hilbert Space. *Advances in Neural Information Processing Systems (NeurIPS) 2024, Intrinsically Motivated Open-ended Learning*.

[9] **Vedant Dave** and Elmar Rueckert. Denoised Predictive Imagination: An Information-theoretic approach for learning World Models. Seventeenth European Workshop on Reinforcement Learning (EWRL) 2024.

[10] Fotios Lygerakis, **Vedant Dave** and Elmar Rueckert. M2CURL: Enhancing Multimodal Reinforcement Learning through Self-Supervised Representation Learning in Robotic Manipulation. *ProxyTouch Workshop 2024 IEEE International Conference on Robotics and Automation (ICRA), Tokyo, Japan, 2024.* `https://arxiv.org/abs/2401.17032`.

[11] **Vedant Dave** and Elmar Rueckert. Can we infer the full-arm manipulation skills from tactile targets? Workshop on Advances in Close-Proximity Human-Robot Collaboration, IEEE-RAS 21st International Conference on Humanoid Robots (Humanoids) 2022. `https://drive.google.com/file/d/18BSlOC-HrYdrfAL3RiHjF7a6RNmDrgDo/view`.

Theses

[12] **Vedant Dave**. Model-agnostic reinforcement learning solution for autonomous programming of robotic motion. *Master Thesis*, 2021, Technische Universität Dortmund, Mercedes-Benz AG.

[13] **Vedant Dave**. Exoskeleton - A powered armor. *Bachelor Thesis*, 2018, Gujarat Technological University

Student Supervision

M.Sc. Theses

2022/10 – 2022/04 Benjamin Schoedinger: A framework for learning Vision and Tactile correlation, Montanuniversität Leoben, Austria.
Thesis

2023/06 – 2024/02 Klemens Lechner: Deep Neural Energy Price Forecasting for the Hydrogen Industry, Montanuniversität Leoben, Austria.
Thesis

2023/08 – Stefan Maintinger: Map-based and map-less mobile navigation in crowded dynamic environments, Montanuniversität Leoben, Austria.
Topic details

Collaborations

2024/06 – Pankhuri Vanjani: Imitation Learning with multiview sensory information with diffusion policies.
Intuitive Robots Lab (IRL) , Karlsruhe Institute of Technology (KIT), Germany.

2024/06 – Sahar Keshavarz: A Reinforcement Learning Approach for Decision-Making in Wells.
Department of Drilling and Completion Engineering, Montanuniversität Leoben, Austria.

2024/01 – Simone Trimmel and Prof.Johanna Irrgeher: Green and blue infrastructure as model system for emissions of technology-critical elements.
Department of General and Analytical Chemistry, Montanuniversität Leoben, Austria.

2023/08 – Clement Paulson: Physics-informed neural network for predicting the Gibbs free energy.
Department of Material Science, Montanuniversität Leoben, Austria.

Internships

2023/06 – 2023/08 (Remote) Harshit Sethi: Investigating Reinforcement Learning strategies to learn low-level control policies of the quadruped robot Unitree Go1 in computer simulations,
Montanuniversität Leoben, Austria.
Topic details

Talks

2025/03 Learning Robust Representations for Visual Reinforcement Learning via Task-Relevant Mask Sampling. **Invited Speaker (Contributed Talks).**
OIST Machine Learning Workshop 2025, Okinawa, Japan.

2024/07 Learning Robust Multimodal Representations under Noisy Conditions. **Invited Speaker (Contributed Talks).**
International Workshop of Intelligent Autonomous Learning Systems 2024.

2024/05 Learning Robust Multimodal Representations under Noisy Conditions. **Invited Speaker.**
University of Tokyo, Japan.

2024/05 Multimodal Visual-Tactile Representation Learning through Self-Supervised Contrastive Pre-Training. **Conference Talk**. *IEEE International Conference on Robotics and Automation (ICRA), Yokohama, Japan, 2024.*

2022/11 Predicting full-arm grasping motions from anticipated tactile responses. **Conference Talk**. *IEEE-RAS 21st International Conference on Humanoid Robots (Humanoids), Ginowan, Japan, 2022.*

2022/11 Can we infer the full-arm manipulation skills from tactile targets? **Workshop Talk**. *Workshop on Advances in Close-Proximity Human-Robot Collaboration, IEEE-RAS 21st International Conference on Humanoid Robots (Humanoids) 2022.*

Honors, Awards & Fellowships

2025 Research Intern Grant, Okinawa Institute of Science and Technology 2025, Okinawa

2025 Travel Award, OIST Machine Learning Workshop 2025, Okinawa

2024 Travel Award, Summer School on Touch Sensing and Processing Summer School 2024, Dresden

2024 Best Student Paper Award, Twenty-First International Conference on Ubiquitous Robots 2024

2024 Summer School on OxML Representation Learning & Generative AI, Oxford

Reviewing Experience

2025 International Conference on Machine Learning (ICML)

2025 IEEE International Conference on Robotics and Automation (ICRA)

2025 International Conference on Artificial Intelligence and Statistics (AISTATS).

2025 International Conference on Learning Representations (ICLR).

2024 Conference on Neural Information Processing Systems (NeurIPS).

2024/23/22 International Conference on Intelligent Robots and Systems (IROS).

2024 IEEE International Conference on Biomedical Robotics and Biomechatronics (BioRob).

2024/23 European Conference on Artificial Intelligence (ECAI).

2024/23/22 Conference on Robot Learning (CoRL).

2023/22 IEEE Robotics and Automation Letters (RA-L).

2022 IEEE RAS International Conference on Humanoid Robots (Humanoids).

Miscellaneous Experience

2018 **Techfest Coordinator**, *Gujarat Technological University*, India
Design and manufacturing of different arenas for robotic events for the University.

2018 **Examiner and Invigilator**, *Robocon 2018*, India

Outreach Activities

2023/06 **Main Speaker**, *Leveraging ChatGPT for Scientific Research*, Tag der Lehre - Lehren und Lernen in zeiten von KI.

2022/07 **Co-Organizer**, *LEGO Robotic Workshop: Montanuniversität Leoben*, future.ai-lab.science.

2022/05 **Co-Organizer**, *Lange Nacht der Forschung 2022 for pupils and prepare lab demos, Montanuniversität Leoben*.

Skills & Software Projects

Software Projects

CPS-Hub: Integrating multiple robotic systems into one framework and move it to ROS2.

Programming and Software Skills

PYTHON, PyTorch, C/C++, Matlab, Robot Operating System (ROS), Gazebo, OpenAI Gym, Isaac Gym, LaTeX, V-REP, Computer-Aided Design (CAD), Git, Wordpress.

Languages

German (B1), English (Fluent), Hindi (Fluent), Gujarati (Mothertongue).

Hobbies

Computer Games, Working out, Badminton, Bouldering, Shooting, Skiing, Ice skating.