Abhinav **Valada**

Professor & Director of Robot Learning Lab

University of Freiburg · Department of Computer Science · Robot Learning Lab · Georges-Köhler-Allee 080 · 79110 Freiburg · Germany

(+49) 1573-2868955 | valada@cs.uni-freiburg.de | http://rl.uni-freiburg.de | avalada | GoogleScholar

Education

Ph.D. in Computer Science (Dr. rer. nat.) — *Freiburg, Germany*

University of Freiburg — **summa cum laude (with highest distinction)** — *Aug. 2014 - Feb. 2019*

Thesis: *Discovering and Leveraging Deep Multimodal Structure for Reliable Robot Perception and Localization*
Advisors: Prof. Dr. Wolfram Burgard, Prof. Dr. Dieter Fox

M.S. in Robotics — *Pittsburgh, USA*

Carnegie Mellon University — *Jan. 2012 - Dec. 2013*

Thesis: *An Autonomous Robot for Manipulation and Mapping of NFT Installations*
Advisors: Prof. Dr. George Kantor and Prof. Dr. Paul Scerri, Carnegie Mellon University, USA

B.Tech in Electronics and Instrumentation Engineering — *Vellore, India*

VIT University — *Jun. 2006 - Dec. 2010*

Thesis: *Design and Development of a Wireless Sensor Network System for Precision Agriculture*
Advisor: Prof. Dr. George Kantor, Carnegie Mellon University, USA

Academic & Industry Experience

Full Professor (W3), Chair of Autonomous Intelligent Systems — *Freiburg, Germany*

University of Freiburg, Department of Computer Science, Robot Learning Lab — *Aug. 2023 - Present*

Assistant Professor (W1) of Robot Learning — *Freiburg, Germany*

University of Freiburg, Department of Computer Science, Robot Learning Lab — *Dec. 2019 - July 2023*

Postdoctoral Research Scientist — *Freiburg, Germany*

University of Freiburg, Department of Computer Science, Autonomous Intelligent Systems Lab — *Mar. 2019 - Nov, 2019*

Ph.D. Student and Research Associate — *Freiburg, Germany*

University of Freiburg, Department of Computer Science, Autonomous Intelligent Systems Lab — *Aug. 2014 - Feb. 2019*

Co-founder & Director of Operations — *Pittsburgh, USA*

Platypus LLC — *Aug. 2012 - Aug. 2015*

Systems Engineer — *Pittsburgh, USA*

National Robotics Engineering Center — *Jul. 2013 - Jul. 2014*

Systems/Software Engineer — *Pittsburgh, USA*

Carnegie Mellon University, The Robotics Institute, Field Robotics Center — *Nov. 2011 - Jun. 2013*

Research Scholar — *Pittsburgh, USA*

Carnegie Mellon University, The Robotics Institute, Field Robotics Center — *Jan. 2010 - Oct. 2011*

Research Assistant — *Vellore, India*

VIT University — *Aug. 2008 - Dec. 2009*

Research Associate — *Chennai, India*

Indian Institute of Technology Madras — *May. 2009 - Jul. 2009*

Research Intern — *Bangalore, India*

ABB Robotics — *Apr. 2008 - Jun. 2008*

Honors & Awards

Honors

IROS Toshio Fukuda Young Professional Award or contributions to the advancement of robot learning — *2024*
IEEE Early Career Award in Robotics and Automation for contributions that have had a major impact in robotics — *2023*
Emmy Noether AI Fellow of the DFG - German Research Foundation — *2021*
Scholar of the European Laboratory for Learning and Intelligent Systems (ELLIS) Society — *2020*

Robotics: Science and Systems (RSS) Pioneer for world's top early career researcher in robotics *2018*

Awards

Best Paper Award on Cognitive Robotics at IROS *2024*
Best Student Paper Award Finalist at IROS *2024*
Outstanding Workshop Presentation Award at IROS Workshop on Long-Term Perception for Autonomy *2024*
Third place at the Future Prize (Zukunftspreis) *2024*
Best Paper Award Honorable Mention IEEE Robotics and Automation Letters *2023*
Best Paper Award at IROS 2022 Workshop on Mobile Manipulation and Embodied Intelligence *2022*
NVIDIA Research Award for socially compliant autonomous robot navigation *2022*
AutoSens Most Novel Research Award for amodal panoptic segmentation *2022*
Second Place in the CVPR Embodied AI SoundSpaces Challenge *2022*
Winner of the NeurIPS AI Driving Olympics - Panoptic Tacking Challenge *2021*
Winner of the CVPR Embodied AI SoundSpaces Challenge *2021*
AutoSens Silver 2020 Vision Award for inspiring progress throughout the vehicle perception ecosystem *2020*
Finalist for Young Engineer of the Year Award at AutoSens for demonstrating great achievement & leadership in ADAS *2020*
Winner of the ECCV Robust Vision Challenge - Panoptic Segmentation *2020*
Finalist for Georges Giralt PhD Award for the Best Robotics PhD Thesis in Europe *2020*
Doctoral Consortium Award at The International Symposium on Robotics Research (ISRR) *2017*
Chancellor's Scholarship at VIT University *2009*

Funded Research Projects

Robust Visual SLAM for Unstructured Environments
Principal Investigator, funded by Honda R&D Co., Ltd. *2024-2025*

Collaborative Research Centre 1597 Small Data - Essentials For Few-Shot Learning
Principal Investigator, funded by German Research Foundation (DFG) *2023-2027*

AI-based System Architectures for Automated Driving
Coordinator, funded by Robert Bosch GmbH, Lighthouse Collaboration *2023-2026*

Zuse School ELIZA
Principal Investigator, funded by Federal Ministry of Education and Research (BMBF) *2022-2027*

Autonomous Robust Outdoor Robots
Principal Investigator, funded by Baden-Württemberg Foundation *2023-2025*

Robot Learning for Long-Horizon Mobile Manipulation
Principal Investigator, funded by Toyota Motor Europe *2023-2025*

Learning BEV Maps for Automated Driving
Principal Investigator, funded by Qualcomm Technologies, Inc. *2022-2025*

Learning Multisensory Integration for Neural Circuits Modeling
Principal Investigator, funded by Cluster of Excellence BrainLinks-BrainTools *2022-2023*

Efficient Learning for Transferable Robot Autonomy in Human-Centered Env.
Principal Investigator, funded by German Research Foundation (DFG), Emmy Noether AI Program *2022-2027*

Responsible and Scalable Learning for Robots Assisting Humans
Principal Investigator, funded by Carl Zeiss Foundation *2022-2028*

Intelligent Scene Understanding of Operating Room Video Streams
Principal Investigator, funded by Stryker Corporation *2021-2025*

Embodied Cognitive Robotics
Principal Investigator, funded by Eva Mayr-Stihl Foundation *2020-2022*

Brain Controlled Service Robots
Principal Investigator, funded by Cluster of Excellence BrainLinks-BrainTools *2020-2023*

From Learning to Relearning Algorithmic Fairness in Socially-Aware Robot Navigation
Principal Investigator, funded by Cluster of Excellence BrainLinks-BrainTools *2020-2022*

Intel. System for Autonomous Monitoring of Production Plants in Industry 4.0
Principal Investigator, funded by Federal Ministry of Education and Research (BMBF) *2020-2022*

Sensor Systems for Localization of Trapped Victims in Collapsed Infrastructure

Principal Investigator, funded by Federal Ministry of Education and Research (BMBF) *2020-2022*

Open Deep Learning Toolkit for Robotics

Principal Investigator, funded by European Commission H2020 *2020-2023*

Robust Localization Using Deep Landmark Features

Co-Principal Investigator, funded by Samsung GRO *2017-2018*

Invited Talks

Plenary and Keynote Talks

IEEE IROS Workshop on Embodied Navigation to Movable Objects - Keynote Talk, Abu Dhabi, AE *Oct. 2024*
IEEE ITSC Workshop on Vision and Language Oriented Representation - Keynote Talk, Edmonton, CA *Sep. 2024*
11th International Conference on Signal Processing and Integrated Networks - Keynote Talk, New Delhi, IN *Mar. 2024*
14th International Conference on Cloud Computing, Data Science & Engineering - Keynote Talk, New Delhi, IN *Jan. 2024*
Bosch Distinguished Lecture on Machine Learning and Artificial Intelligence - Keynote Talk, Renningen, DE *Aug. 2023*
Edinburgh Center for Robotics and the Alan Turing Institute Symposium - Keynote Talk, Edinburgh, UK *Jun. 2023*
IEEE IV Workshop on Bridging the Gap between Map-based and Map-less Driving - Keynote Talk, Anchorage, US *Jun. 2023*
IEEE IV Workshop on Data Driven Intelligent Vehicle Applications - Keynote Talk, Anchorage, US *Jun. 2023*
Robotics & AI Research Conference - Keynote Talk, Rome, IT *Mar. 2023*
13th International Conference on Cloud Computing, Data Science & Engineering - Keynote Talk, New Delhi, IN *Jan. 2023*
ECCV Workshop on Map-Based Localization for Autonomous Driving - Keynote Talk, Tel Aviv, IL *Oct. 2022*
International Symposium on Robotics Research (ISRR) - Distinguished Speaker, Geneva, CH *Sep. 2022*
IEEE Intelligent Vehicles Symposium Workshop on Beyond Supervised Learning - Keynote Talk, Aachen, DE *Jun. 2022*
Robotics and Computer Science World Forum (RoboComp 2021) - Keynote Talk, Amsterdam, NL *Oct. 2021*
3rd International Workshop on Data Driven Intelligent Vehicle Applications - Keynote Talk, Nagoya, JP *Jul. 2021*
IEEE International Conference on Unmanned Systems (ICUS 2020) - Plenary Talk, Harbin, CN *Nov. 2020*
AutoSens Conference - Keynote Talk, Brussels, BE *Jul. 2020*

Other Invited Talks

IEEE IROS Workshop on Interaction-aware Autonomous Systems - Abu Dhabi, AE *Oct. 2024*
Toyota TRACE Workshop Leuven, BE *Sep. 2024*
Freiburg.ai Freiburg, DE *Aug. 2024*
Halmstad University Halmstad, SE *Jun. 2024*
Zebra Technologies AiLN Seminar London, UK *Feb. 2024*
KION Group Research Series Online *Feb. 2024*
Freiburg Robotics and Biology Conference Freiburg, DE *Nov. 2023*
Freiburg-Oxford Workshop on Internal World Models in Animals, Humans, and AI Freiburg, DE *Nov. 2023*
Summer School on Deep Learning for Autonomous Systems and Smart Cities, Aarhus, DK *May 2023*
KTH Royal Institute of Technology, Stockholm, SE *Nov. 2022*
TU Delft, Delft, NL *Nov. 2022*
Workshop on Embedded Optimization and Learning for Robotics and Mechatronics, Freiburg, DE *Oct. 2022*
Summer School on Continuous Engineering and Deep Learning for Trustworthy Autonomous Sys., Thessaloniki, GR *Oct. 2022*
Australian Centre for Field Robotics, Sydney, AU *Jun. 2022*
TU Nuremberg, Nuremberg, DE *Jun. 2022*
University of Bonn, Bonn, DE *May. 2022*
Sapienza University of Rome, Rome, IT *Apr. 2022*
Qualcomm Technologies, Online *Mar. 2022*
TU Graz, Graz, AT *Jan. 2022*
ICAR Workshop on Design, Learning, and Control for Safe Human-Robot Collaboration Ljubljana, SL *Dec. 2021*
Universidad De Las Américas Puebla, Puebla, MX *Dec. 2021*
Bosch Corporate Research, Renningen, DE *Nov. 2021*
IROS Workshop on Open Deep Learning Toolkit for Robotics Prague, CZ *Sep. 2021*
Karlsruhe Institute of Technology, Karlsruhe, DE *Jun. 2022*
Robert Bosch, Heilbronn, DE *Mar. 2021*
Toyota Research Institute, Los Altos, US *Jul. 2020*
Wayve, London, UK *Jul. 2020*

Freiburg Center for Data Analysis and Modeling, University of Freiburg, Freiburg, DE *May 2020*
Sapienza University of Rome, Rome, IT *Mar. 2020*
Robert Bosch Center for Data Science and Artificial Intelligence, Chennai, IN *Sep. 2018*
Indo-German Workshop on Sensor Systems for Localization in Collapsed Infrastructure, New Delhi, IN *Sep. 2018*
Field Robotics Center Seminar, Carnegie Mellon University, Pittsburgh, US *Jul. 2018*
NVIDIA GPU Technology Conference Europe, Amsterdam, NL *Sep. 2016*
IEEE IROS Workshop on State Estimation and Terrain Perception, Daejeon, KR *Oct. 2016*
Field Robotics Center Seminar, Carnegie Mellon University, Pittsburgh, US *Jun. 2016*
Field Robotics Center Seminar, Carnegie Mellon University, Pittsburgh, US *Dec. 2013*
International Conference of Agricultural Engineering, Valencia, ES *Jul. 2012*
VIT Alumni Lecture, Vellore, IN *Jun. 2012*
The Indian Institute of Technology Madras, Chennai, IN *Jun. 2012*
Field Robotics Center Seminar, Carnegie Mellon University, Pittsburgh, US *Sep. 2010*
IEEE Resonance, VIT University, Vellore, IN *Jul. 2008*

Teaching Experience

Advanced Deep Learning - University of Freiburg, MSc, lecture *2024-Present*
Artificial Intelligence - University of Freiburg, MSc, lecture *2024-Present*
Machine Learning - University of Freiburg, MSc, lecture *2023-Present*
Introduction to Mobile Robotics - University of Freiburg, MSc, lecture *2022-Present*
Foundations of Deep Learning - University of Freiburg, MSc, lecture *2019-Present*
Deep Learning Laboratory - University of Freiburg, MSc, laboratory *2018-Present*
FreiCAR: Practical Autonomous Driving - University of Freiburg, MSc, laboratory *2020-Present*
Learning from Limited Supervision - University of Freiburg, MSc, seminar *2022-Present*
Robot Learning - University of Freiburg, MSc, seminar *2021-Present*
Deep Learning for Autonomous Systems - University of Freiburg, MSc, seminar *2020*
Self-Supervised Learning - University of Freiburg, MSc, seminar *2020*
Deep Learning for Autonomous Driving - University of Freiburg, MSc, laboratory *2018*
Robot Navigation - University of Freiburg, MSc, seminar *2015-2017*
Robot Perception - University of Freiburg, MSc, seminar *2015*

Advising and Mentoring

PhD Supervision (23 PhD Students)

Imen Mahdi	PhD	*11/2024-Present*
Jiarong Wei	PhD	*06/2024-Present*
Liudi Yang	PhD	*05/2024-Present*
Mohamed Abdelsamad	PhD	*02/2024-Present*
Markus Käppeler	PhD	*01/2024-Present*
Sajad Marvi	PhD	*10/2023-Present*
Iana Zhura	PhD	*08/2023-Present*
Maximilian Luz	PhD	*07/2023-Present*
Sharang Kaul	PhD	*02/2023-Present*
Jan Ole von Hartz	PhD	*12/2022-Present*
Julia Hindel	PhD	*09/2022-Present*
Nick Heppert	PhD	*09/2022-Present*
José Arce y de la Borbolla	PhD	*07/2022-Present*
Kürsat Petek	PhD (Co-advised)	*06/2022-12/2024*
Martin Büchner	PhD	*10/2021-Present*
Adrian Röfer	PhD	*06/2021-Present*
Niclas Vödisch	PhD (Co-advised)	*05/2021-Present*
Rohit Mohan	PhD	*05/2021-Present*
Christopher Lang	PhD	*11/2020-Present*
Eugenio Chisari	PhD	*09/2020-Present*

Nikhil Gosala	PhD	*07/2020-Present*
Daniel Honerkamp	PhD	*05/2020-Present*
Juana Valeria Hurtado Rincon	PhD	*11/2019-Present*

PostDoc Supervision (6 PostDoctoral Researchers)

Simon Bultmann	PostDoc	*10/2024-Present*
Lukas Luft	PostDoc	*08/2023-12/2024*
Daniel Büscher	PostDoc	*08/2023-12/2024*
Daniele Cattaneo	PostDoc	*01/2020-Present*
Paulo Drews-Jr	PostDoc (Capes-Humboldt Fellowship)	*08/2021-Present*
Tim Welschehold	PostDoc	*03/2020-Present*

Master Theses (32 Master Students)

Sven Pfitzer	Master Thesis	*2024*
Amrutha Venkatesan	Master Thesis	*2024*
Aron Distelzweig	Master Thesis	*2024*
Simon Andreas Dorer	Master Thesis	*2024*
Ahmet Selim Canakci	Master Thesis	*2024*
Jonas Schramm	Master Thesis	*2023*
Sassan Mokhtar	Master Thesis	*2023*
Kiran Kumaraswamy	Master Thesis	*2023*
Elias Greve	Master Thesis	*2023*
Akshay Mirylkar	Master Thesis	*2023*
Abdallah Ayad	Master Thesis	*2023*
Nayana Koneru	Master Thesis	*2023*
Amith Boggram	Master Thesis	*2023*
Abhijeet Nayak	Master Thesis	*2023*
Markus Käppeler	Master Thesis	*2023*
Asmaa Khalid	Master Thesis	*2023*
Monish Reddy Nallapareddy	Master Thesis	*2023*
Kiran Kumaraswamy	Master Thesis	*2023*
Fabian Schmalstieg	Master Thesis	*2023*
Venkat Subramanyam	Master Thesis	*2023*
Jan Ole von Hartz	Master Thesis	*2022*
Francesco Peracchia	Master Thesis	*2022*
Lorenzo Mur Labadia	Master Thesis	*2022*
Suresh Guttikonda	Master Thesis	*2022*
José Arce y de la Borbolla	Master Thesis	*2022*
Jing Lu	Master Thesis	*2022*
Abdelrahman Younes	Master Thesis	*2021*
Sai Sourabh Tiruvaipati	Master Thesis	*2021*
Rohit Mohan	Master Thesis	*2021*
Borna Bešić	Master Thesis	*2021*
Manav Madan	Master Thesis	*2019*
Eduardo Alvarado	Master Thesis	*2019*
Johan Vertens	Master Thesis	*2016*

Visitors

Prof. Giovanni Beltrame	Visiting Professor	*2024*
Niyati Rawal	PhD Exchange Student	*2024*
Bhavesh Garg	Internship	*2024*
Mohammad Mohammadi	PhD Exchange Student	*2024*
Jiaye Yang	MSc Exchange Student	*2023*
Alvari Seppänen	PhD Exchange Student	*2023*
Harsh Mahesheka	DAAD-WISE Internship	*2023*

Abhinav Gupta	Internship	*2022*
Jasmeet Kaur	Internship	*2021*
Matteo Vaghi	Internship	*2020*
Jay Patravali	Internship	*2017*
Mayank Mittal	DAAD-WISE Internship	*2017*
Rohit Suri	DAAD-WISE Internship	*2017*
Himanshu Maurya	DAAD-WISE Internship	*2018*
Ankit Dhall	DAAD-WISE Internship	*2016*

Academic Activities

Editorial Services

General Chair, German Conference on Pattern Recognition (GCPR) *2024*
Chair, IEEE Robotics and Automation Society (RAS) Technical Committee on Robot Learning *2021-Present*
Senior Editor, IEEE Robotics and Automation Letters (RA-L) *2024-Present*
Area Chair, Robotics: Science and Systems Conference (RSS) *2025-Present*
Area Chair, Conference on Robot Learning (CoRL) *2020-Present*
Guest Editor, IEEE Transactions on Robotics (T-RO) *2024*
Guest Editor, Sensors Journal, Special Issue on Sensing and Semantic Perception in Autonomous Driving *2021*
Associate Editor, International Journal of Robotics Research (IJRR) *2023-Present*
Associate Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *2020-Present*
Associate Editor, IEEE International Conference on Robotics and Automation (ICRA) *2020-Present*
Associate Editor, International Symposium on Robotics Research (ISRR) *2022-Present*
Associate Editor, IEEE International Conference on Advanced Robotics (ICAR) *2021*
Associate Editor, IEEE Robotics and Automation Letters (RA-L) *2019-2023*
Senior Program Committee Member, International Joint Conference on Artificial Intelligence (IJCAI) *2021-Present*
Program Committee Member, AAAI Conference on Artificial Intelligence, Student Abstract and Poster Program *2020-2023*
Program Committee Member, Conference on Robot Learning (CoRL) *2019-2020*
Program Committee Member, Robotics: Science and Systems (RSS) *2020-2021*
Program Committee Member, 24th European Conference on Artificial Intelligence (ECAI) *2020*
General Co-chair, RSS Pioneers, Robotics: Science and Systems Conference (RSS) *2019*

Workshop & Tutorial Organization

Label Efficient Learning Paradigms for Autonomy at Scale, IEEE/RSJ Int. Conference on Intelligent Robots and Systems *2024*
Interaction-Aware Autonomous Systems, IEEE/RSJ Int. Conference on Intelligent Robots and Systems (IROS) *2024*
RoboNerF: Neural Fields in Robotics, IEEE International Conference on Robotics and Automation (ICRA) *2024*
Mobile Manipulation and Embodied Intelligence, IEEE International Conference on Robotics and Automation (ICRA) *2024*
3D-Deep Learning for Automated Driving, IEEE Intelligent Vehicles Symposium (IV) *2020, 21, 22, 23*
Open and Trustworthy Deep Learning for Robotics, IEEE/RSJ Int. Conference on Intelligent Robots and Systems (IROS) *2022*
Perception and Navigation for Autonomous Robotics in Unstructured and Dynamic Environments, IEEE/RSJ IROS *2022*
AI Driving Olympics, Conference on Neural Information Processing Systems (NeurIPS) *2021*
Scene Understanding for Unstructured Environments, DAGM German Conference on Pattern Recognition (GCPR) *2021*
Self-Supervised Robot Learning, Robotics: Science and Systems Conference (RSS) *2020*

Reviewing

Project Proposals

European Commission, German Research Foundation (DFG), Swiss National Science Foundation (SNSF), German Academic Exchange Service (DAAD), Luxembourg National Research Fund (FNR)

Journals

International Journal of Robotics Research (IJRR), International Journal of Computer Vision (IJCV), IEEE Transactions on Robotics (T-RO), IEEE Transactions on Neural Networks and Learning Systems (TNNLS), Robotics and Autonomous Systems (RAS), IEEE Robotics and Automation Letters (RA-L), IEEE Robotics & Automation Magazine, Journal of Field Robotics (JFR), International Journal of Pattern Recognition and Artificial Intelligence (IJPRAI), IEEE Transactions on Industrial Electronics (T-IE), IEEE Transactions on Multimedia (T-MM), Sensors

Conferences

Conference on Robot Learning (CoRL), IEEE Conference on Computer Vision and Pattern Recognition (CVPR), IEEE International Conference on Computer Vision (ICCV), Robotics: Science and Systems (RSS), IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), International Conference on Field and Service Robotics (FSR), International Symposium on Robotics Research (ISRR), European Conference on Mobile Robotics (ECMR), International Conference on Advanced Robotics (ICAR), German Conference on Pattern Recognition (GCPR), International Conference on Intelligent Robotics and Applications (ICIRA)

External Ph.D. Committee Memberships

University of Modena and Reggio Emilia, Italy *2025*
Inria Paris, France *2025*
Technical University Eindhoven, Netherlands *2024*
Halmstad University, Sweden *2024*
Technical University of Munich, Germany *2023, 2024, 2025*
The University of Sydney, Australia *2023*
German Research Centre for Artificial Intelligence, Germany *2023*
TU Delft, Netherlands *2022, 2025*
University of Bonn, Germany *2021, 2024*

Other Activities

IEEE Autonomous Agent Alignment Working Group (VT/AVSC/AAA-WG), Founding Member *since 2024*
ELIZA Unit Freiburg, Director & Board Member *since 2025*
ELIZA, Scholarships & PhD Admissions Committee Member *2023-2024*
ELLIS Unit Freiburg, Founding Faculty *since 2020*
BrainLinks-BrainTools Center, Member and Principal Investigator *since 2019*

University Departmental Services

- **Admissions Committee Member**, MSc. Computer Science Program, University of Freiburg
- **Organizing Committee Member**, Robotics: Science and Systems (RSS) 2019
- **Organizing Committee Member**, International Conference on Sensors and Related Networks 2007
- **Public Spaces Committee Member**, Field Robotics Center, Carnegie Mellon University

Consultancy Activities

Advisory Board Member, EU Horizon Europe EVENTS project *2023-Present*
Industry Advisory Activities, NDA *since 2022*

Software & Datasets

My group strives to make research code and datasets available as open source whenever possible.

Code: `https://github.com/robot-learning-freiburg`

Datasets: `https://rl.uni-freiburg.de/datasets-code`

Publications

Peer-Reviewed Journal and Conference Articles

[1] D. Cattaneo and A. Valada, "Cmrnext: Camera to lidar matching in the wild for localization and extrinsic calibration," *IEEE Transactions on Robotics (T-RO)*, 2025.

[2] J. V. Hurtado, R. Mohan, and A. Valada, "Panoptic-depth forecasting," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2025.

[3] A. Distelzweig, E. Kosman, A. Look, F. Janjoš, D. K. Manivannan, and A. Valada, "Motion forecasting via model-based risk minimization," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2025.

[4] A. Röfer, N. Heppert, A. Ayman, E. Chisari, and A. Valada, "Pseudotouch: Efficiently imaging the surface feel of objects for robotic manipulation," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2025.

[5] D. Honerkamp, H. Mahesheka, J. O. von Hartz, T. Welschehold, and A. Valada, "Zero-cost whole-body teleoperation for mobile manipulation," *IEEE Robotics and Automation Letters (RA-L)*, 2025.

[6] J. Hindel, D. Cattaneo, and A. Valada, "Taxonomy-aware continual semantic segmentation in hyperbolic spaces for open-world perception," *IEEE Robotics and Automation Letters (RA-L)*, vol. 10, no. 2, pp. 1904–1911, 2025.

[7] N. Vödisch, K. Petek, M. Käppeler, A. Valada, and W. Burgard, "A good foundation is worth many labels: Label-efficient panoptic segmentation," *IEEE Robotics and Automation Letters*, vol. 10, no. 1, pp. 216–223, 2025.

[8] E. Chisari, N. Heppert, M. Argus, T. Welschehold, T. Brox, and A. Valada, "Learning robotic manipulation policies from point clouds with conditional flow matching," in *Conference on Robot Learning (CoRL)*, 2024.

[9] R. Mohan, D. Cattaneo, F. Drews, and A. Valada, "Progressive multi-modal fusion for robust 3d object detection," in *Conference on Robot Learning (CoRL)*, 2024.

[10] S. Prasanna, D. Honerkamp, K. Sirohi, T. Welschehold, W. Burgard, and A. Valada, "Perception matters: Enhancing embodied ai with uncertainty-aware semantic segmentation," in *Proceedings of the International Symposium on Robotics Research (ISRR)*, 2024.

[11] J. von Hartz, T. Welschehold, A. Valada, and J. Boedecker, "The art of imitation: Learning long-horizon manipulation tasks from few demonstrations," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 2, pp. 11 369–11 376, 2024.

[12] K. Petek, N. Vödisch, J. Meyer, D. Cattaneo, A. Valada, and W. Burgard, "Automatic target-less camera-lidar calibration from motion and deep point correspondences," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 11, pp. 9978–9985, 2024.

[13] S. Lochner, D. Honerkamp, A. Valada, and A. D. Straw, "Recent trends in insect and robot navigation through the lens of reinforcement learning," *Frontiers in Computational Neuroscience*, vol. 18, 2024.

[14] A. R. Sekkat, R. Mohan, O. Sawade, E. Matthes, and A. Valada, "Amodalsynthdrive: A synthetic amodal perception dataset for autonomous driving," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 11, pp. 9597–9604, 2024.

[15] D. Honerkamp, M. Büchner, F. Despinoy, T. Welschehold, and A. Valada, "Language-grounded dynamic scene graphs for interactive object search with mobile manipulation," *IEEE Robotics and Automation Letters (RA-L)*, 2024.

[16] A. Röfer, I. Nematollahi, T. Welschehold, W. Burgard, and A. Valada, "Bayesian optimization for sample-efficient policy improvement in robotic manipulation," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024.

[17] N. Heppert, M. Argus, T. Welschehold, T. Brox, and A. Valada, "Ditto: Demonstration imitation by trajectory transformation," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024.

[18] J. Schramm, N. Vödisch, K. Petek, R. B. Kiran, S. Yogamani, W. Burgard, and A. Valada, "Bevcar: Camera-radar fusion for bev map and object segmentation," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024.

[19] L. Christopher, A. Braun, L. Schillingmann, and A. Valada, "A point-based approach to efficient lidar multi-task perception," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024.

[20] N. Gosala, K. Petek, B. R. Kiran, S. Yogamani, P. L. J. Drews-Jr, W. Burgard, and A. Valada, "Letsmap: Unsupervised representation learning for semantic bev mapping," in *European Conference on Computer Vision (ECCV)*, 2024.

[21] R. Mohan, J. Arce, S. Mokhtar, D. Cattaneo, and A. Valada, "Syn-mediverse: A multimodal synthetic dataset for intelligent scene understanding of healthcare facilities," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 8, pp. 7094–7101, 2024.

[22] L. Londono, J. V. Hurtado, N. Hertz, P. Kellmeyer, S. Voeneky, and A. Valada, "Fairness and bias in robot learning," *Proceedings of the IEEE*, vol. 112, no. 4, pp. 305–330, 2024.

[23] I. Diester, M. Bartos, J. Bödecker, A. Kortylewski, C. Leibold, J. Letzkus, M. M. Nour, M. Schönauer, A. Straw, A. Valada, A. Vlachos, and T. Brox, "Internal world models in humans, animals, and ai," *Neuron*, vol. 112, no. 14, pp. 2265–2268, 2024, ISSN: 0896-6273.

[24] A. Werby, C. Huang, M. Büchner, A. Valada, and W. Burgard, "Hierarchical open-vocabulary 3d scene graphs for language-grounded robot navigation," *Robotics: Science and Systems (RSS)*, 2024.

[25] E. Chisari, N. Heppert, T. Welschehold, W. Burgard, and A. Valada, "Centergrasp: Object-aware implicit representation learning for simultaneous shape reconstruction and 6-dof grasp estimation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 6, pp. 5094–5101, 2023.

[26] G. K.J. Fischer, M. Bergau, D. A. Gómez-Rosal, A. Wachaja, J. Gräter, M. Odenweller, U. Piechottka, F. Hoeflinger, N. Gosala, N. Wetzel, D. Büscher, A. Valada, and W. Burgard, "Evaluation of a smart mobile robotic system for industrial plant inspection and supervision," *IEEE Sensors Journal*, vol. 24, no. 12, pp. 19 684–19 697, 2024.

[27] R. Mohan, K. Kumaraswamy, J. V. Hurtado, K. Petek, and A. Valada, "Panoptic out-of-distribution segmentation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 5, pp. 4075–4082, 2024.

[28] M. Luz, R. Mohan, A. R. Sekkat, O. Sawade, E. Matthes, T. Brox, and A. Valada, "Amodal optical flow," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[29] M. Argus, A. Nayak, M. Büchner, S. Galesso, A. Valada, and T. Brox, "Compositional servoing by recombining demonstrations," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[30] R. Buchanan, A. Röfer, J. Moura, A. Valada, and S. Vijayakumar, "Online estimation of articulated objects with factor graphs using vision and proprioceptive sensing," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[31] M. Käppeler, K. Petek, N. Vödisch, W. Burgard, and A. Valada, "Few-shot panoptic segmentation with foundation models," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[32] A. Nayak, D. Cattaneo, and A. Valada, "Ralf: Flow-based global and metric radar localization in lidar maps," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[33] E. Greve, M. Büchner, N. Vödisch, W. Burgard, and A. Valada, "Collaborative dynamic 3d scene graphs for automated driving," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[34] C. Lang, A. Braun, L. Schillingmann, K. Haug, and A. Valada, "Self-supervised representation learning from temporal ordering of automated driving sequences," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 3, pp. 2582–2589, 2023.

[35] C. Lang, A. Braun, L. Schillingmann, and A. Valada, "Self-supervised multi-object tracking from consistency across timescales," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 11, pp. 7711–7718, 2023.

[36] D. Unger, N. Gosala, V. Ravi Kumar, S. Borse, A. Valada, and S. Yogamani, "Multi-camera bird's eye view perception for autonomous driving," *Computer Vision: Challenges, Trends, and Opportunities*, A. Rahman Ahad, U. Mahbub, M. Turk, and R. Hartley, Eds., 2023.

[37] D. A. Gómez-Rosal, M. Bergau, G. K.J. Fischer, A. Wachaja, J. Gräter, U. Piechottka, F. Hoeflinger, N. Gosala, N. Wetzel, D. Büscher, A. Valada, and W. Burgard, "A smart robotic system for industrial plant supervision," *IEEE SENSORS*, 2023.

[38] F. Schmalstieg, D. Honerkamp, T. Welschehold, and A. Valada, "Learning hierarchical interactive multi-object search for mobile manipulation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 12, pp. 8549–8556, 2023.

[39] J. O. von Hartz, E. Chisari, T. Welschehold, W. Burgard, J. Boedecker, and A. Valada, "The treachery of images: Bayesian scene keypoints for deep policy learning in robotic manipulation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 11, pp. 6931–6938, 2023.

[40] J. Hindel, N. Gosala, K. Bregler, and A. Valada, "Inod: Injected noise discriminator for self-supervised representation learning in agricultural fields," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 9, pp. 6013–6020, 2023.

[41] R. Trumpp, M. Büchner, A. Valada, and M. Caccamo, "Efficient learning of urban driving policies using bird's-eye-view state representations," in *IEEE International Conference on Intelligent Transportation Systems (ITSC)*, 2023.

[42] M. R. Nallapareddy, K. Sirohi, P. L. J. Drews-Jr, W. Burgard, C.-H. Cheng, and A. Valada, "Evcenternet: Uncertainty estimation for object detection using evidential learning," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.

[43] D. Honerkamp, T. Welschehold, and A. Valada, "N2m2:learning navigation for arbitrary mobile manipulation motions in unseen and dynamic environments," *IEEE Transactions on Robotics (T-RO)*, vol. 39, no. 5, pp. 3601–3619, 2023.

[44] N. Vödisch, K. Petek, W. Burgard, and A. Valada, "Codeps: Online continual learning for depth estimation and panoptic segmentation," in *Robotics: Science and Systems (RSS)*, 2023.

[45] N. Gosala, K. Petek, P. L. Drews-Jr, W. Burgard, and A. Valada, "Skyeye: Self-supervised bird's-eye-view semantic mapping using monocular frontal view images," in *IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.

[46] N. Heppert, M. Zubair Irshad, S. Zakharov, K. Liu, R. Andrei Ambrus, J. Bohg, A. Valada, and T. Kollar, "Carto: Category and joint agnostic reconstruction of articulated objects," in *IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.

[47] M. Büchner, J. Zürn, I.-G. Todoran, A. Valada, and W. Burgard, "Learning and aggregating lane graphs for urban automated driving," in *IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.

[48] T. Elsken, A. Zela, J. H. Metzen, B. Staffler, T. Brox, A. Valada, and F. Hutter, "Neural architecture search for dense prediction tasks in computer vision," *International Journal of Computer Vision (IJCV)*, vol. 131, no. 7, pp. 1784–1807, 2022.

[49] J. Arce, N. Vödisch, D. Cattaneo, W. Burgard, and A. Valada, "Padloc: Lidar-based deep loop closure detection and registration using panoptic attention," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 3, pp. 1319–1326, 2023.

[50] A. Younes, D. Honerkamp, T. Welschehold, and A. Valada, "Catch me if you hear me: Audio-visual navigation in complex unmapped environments with moving sounds," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 2, pp. 928–935, 2023.

[51] C. Celemin, R. Pérez-Dattari, E. Chisari, G. Franzese, L. de Souza Rosa, R. Prakash, Z. Ajanović, M. Ferraz, A. Valada, and J. Kober, "Interactive imitation learning in robotics: A survey," *Foundations and Trends in Robotics*, vol. 10, no. 1-2, pp. 1–197, 2022.

[52] F. Schmalstieg, D. Honerkamp, T. Welschehold, and A. Valada, "Learning long-horizon robot exploration strategies for multi-object search in continuous action spaces," in *International Symposium on Robotics Research (ISRR)*, 2022.

[53] N. Vödisch, D. Cattaneo, W. Burgard, and A. Valada, "Continual slam: Beyond lifelong simultaneous localization and mapping through continual learning," in *International Symposium on Robotics Research (ISRR)*, 2022.

[54] C. Lang, A. Braun, and A. Valada, "On hyperbolic embeddings in 2d object detection," in *German Conference on Pattern Recognition (GCPR)*, 2022.

[55] C. Lang, A. Braun, and A. Valada, "Contrastive object detection using knowledge graph embeddings," in *German Conference on Pattern Recognition (GCPR)*, 2021.

[56] R. Mohan and A. Valada, "Perceiving the invisible: Proposal-free amodal panoptic segmentation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 4, pp. 9302–9309, 2022.

[57] M. Büchner and A. Valada, "3d multi-object tracking using graph neural networks with cross-edge modality attention," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 4, pp. 9707–9714, 2022.

[58] N. Passalis, S. Pedrazzi, R. Babuska, W. Burgard, D. Dias, F. Ferro, M. Gabbouj, O. Green, A. Iosifidis, E. Kayacan, J. Kober, O. Michel, N. Nikolaidis, P. Nousi, R. Pieters, M. Tzelepi, A. Valada, and A. Tefas, "Opendr: An open toolkit for enabling high performance, low footprint deep learning for robotics," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022.

[59] R. Mohan and A. Valada, "Amodal panoptic segmentation," in *IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.

[60] J. V. Hurtado and A. Valada, "Semantic scene segmentation for robotics," *Deep Learning for Robot Perception and Cognition*, vol. chapter 12, pp. 279–311, 2022.

[61] I. Nematollahi, E. Rosete-Beas, A. Röfer, T. Welschehold, A. Valada, and W. Burgard, "Robot skill adaptation via soft actor-critic gaussian mixture models," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2022.

[62] D. Cattaneo, M. Vaghi, and A. Valada, "Lcdnet: Deep loop closure detection and point cloud registration for lidar slam," *IEEE Transactions on Robotics (T-RO)*, vol. 38, no. 4, pp. 2074–2093, 2022.

[63] W. K. Fong, R. Mohan, J. V. Hurtado, L. Zhou, H. Caesar, O. Beijbom, and A. Valada, "Panoptic nuscenes: A large-scale benchmark for lidar panoptic segmentation and tracking," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 3795–3802, 2022.

[64] A. Röfer, G. Bartels, A. Valada, and M. Beetz, "Kineverse: A symbolic articulation model framework for model-agnostic mobile manipulation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 3372–3379, 2022.

[65] E. Chisari, T. Welschehold, J. Boedecker, W. Burgard, and A. Valada, "Correct me if i am wrong: Interactive learning for robotic manipulation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 3695–3702, 2022.

[66] B. Bešić, N. Gosala, D. Cattaneo, and A. Valada, "Unsupervised domain adaptation for lidar panoptic segmentation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 3404–3411, 2022.

[67] B. Besic and A. Valada, "Dynamic object removal and spatio-temporal rgb-d inpainting via geometry-aware adversarial learning," *IEEE Transactions on Intelligent Vehicles (T-IV)*, vol. 7, no. 2, pp. 170–185, 2022.

[68] N. Gosala and A. Valada, "Bird's-eye-view panoptic segmentation using monocular frontal view images," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 1968–1975, 2021.

[69] K. Sirohi, R. Mohan, D. Büscher, W. Burgard, and A. Valada, "Efficientlps: Efficient lidar panoptic segmentation," *IEEE Transactions on Robotics (T-RO)*, vol. 38, no. 3, pp. 1894–1914, 2021.

[70] P. Jakob, M. Madan, T. Schmid-Schirling, and A. Valada, "Multi-perspective anomaly detection," *Sensors*, vol. 21, no. 16, 2021.

[71] D. Honerkamp, T. Welschehold, and A. Valada, "Learning kinematic feasibility for mobile manipulation through deep reinforcement learning," *IEEE Robotics and Automation Letters (RA-L)*, vol. 6, no. 4, pp. 6289–6296, 2021.

[72] F. Rivera Valverde, J. V. Hurtado, and A. Valada, "There is more than meets the eye: Self-supervised multi-object detection and tracking with sound by distilling multimodal knowledge," in *IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021, pp. 11 612–11 621.

[73] J. V. Hurtado, L. Londoño, and A. Valada, "From learning to relearning: A framework for diminishing bias in social robot navigation," *Frontiers in Robotics and AI*, vol. 8, p. 650 325, 2021.

[74] R. Mohan and A. Valada, "EfficientPS: Efficient Panoptic Segmentation," *International Journal of Computer Vision (IJCV)*, vol. 129, no. 5, pp. 1551–1579, 2021.

[75] J. Zürn, W. Burgard, and A. Valada, "Self-supervised visual terrain classification from unsupervised acoustic feature learning," *IEEE Transactions on Robotics (T-RO)*, vol. 37, no. 2, pp. 466–481, 2020.

[76] N. Radwan, W. Burgard, and A. Valada, "Multimodal Interaction-aware Motion Prediction for Autonomous Street Crossing," *International Journal of Robotics Research (IJRR)*, vol. 39, no. 13, pp. 1567–1598, 2020.

[77] M. Mittal, R. Mohan, W. Burgard, and A. Valada, "Vision-based autonomous uav navigation and landing for urban search and rescue," in *International Symposium on Robotics Research (ISRR)*, 2019.

[78] A. Valada, R. Mohan, and W. Burgard, "Self-supervised model adaptation for multimodal semantic segmentation," *International Journal of Computer Vision (IJCV)*, vol. 128, no. 5, pp. 1239–1285, 2019.

[79] F. Boniardi*, A. Valada*, R. Mohan, T. Caselitz, and W. Burgard, "Robot Localization in Floor Plans using a Room Layout Edge Extraction Network," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2019.

[80] N. Radwan, A. Valada, and W. Burgard, "Vlocnet++: Deep multitask learning for semantic visual localization and odometry," *IEEE Robotics and Automation Letters (RA-L)*, vol. 3, no. 4, pp. 4407–4414, 2018.

[81] A. Valada*, N. Radwan*, and W. Burgard, "Deep auxiliary learning for visual localization and odometry," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2018, pp. 6939–6946.

[82] W. Burgard, A. Valada, N. Radwan, T. Naseer, J. Zhang, J. Vertens, O. Mees, A. Eitel, and G. Oliveira, "Perspectives on Deep Multimodel Robot Learning," in *International Symposium on Robotics Research (ISRR)*, 2017.

[83] J. Vertens*, A. Valada*, and W. Burgard, "SMSnet: Semantic Motion Segmentation using Deep Convolutional Neural Networks," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2017.

[84] A. Valada, J. Vertens, A. Dhall, and W. Burgard, "AdapNet: Adaptive Semantic Segmentation in Adverse Environmental Conditions," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2017.

[85] A. Valada and W. Burgard, "Deep spatiotemporal models for robust proprioceptive terrain classification," *The International Journal of Robotics Research (IJRR)*, vol. 36, no. 13-14, pp. 1521i–1539, 2017.

[86] A. Valada, G. L. Oliveira, T. Brox, and W. Burgard, "Deep Multispectral Semantic Scene Understanding of Forested Environments Using Multimodal Fusion," *International Symposium on Experimental Robotics*, pp. 465–477, 2017.

[87] G. L. Olivera, A. Valada, W. Burgard, and T. Brox, "Deep Learning for Human Part Discovery in Images," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2016.

[88] F. Boniardi, A. Valada, W. Burgard, and G. D. Tipaldi, "Autonomous Indoor Robot Navigation Using a Sketch Interface for Drawning Maps and Routes," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2016.

[89] A. Valada, L. Spinello, and W. Burgard, "Deep Feature Learning for Acoustics-based Terrain Classification," *International Symposium on Robotics Research*, vol. 2, pp. 21–37, 2015, (Selected in Top 10).

[90] C. Tomaszewski, A. Valada, and P. Scerri, "Planning Efficient Paths through Dynamic Flow Fields in Real World Domains," in *MTS/IEEE OCEANS*, 2013.

[91] A. Valada, C. Tomaszewski, B. Kannan, P. Velagapudi, G. A. Kantor, and P. Scerri, "An Intelligent Approach to Hysteresis Compensation while Sampling using a Fleet of Autonomous Watercraft," in *International Conference on Intelligent Robotics and Applications (ICIRA)*, 2012.

[92] N. Tanke, G. A. Long, D. Agrawal, A. Valada, and G. A. Kantor, "Automation of Hydroponic Installations using a Robot with Position Based Visual Feedback," in *International Conference of Agricultural Engineering (CIGR-Ageng)*, 2012.

[93] D. Kohanbash, A. Valada, and G. A. Kantor, "Base Station Design and Architecture for Wireless Sensor Networks," in *International Conference of Agricultural Engineering (CIGR-Ageng)*, 2012.

[94] A. Valada, P. Velagapudi, B. Kannan, C. Tomaszewski, G. A. Kantor, and P. Scerri, "Development of a low cost multi-robot autonomous marine surface platform," in *International Conference on Field and Service Robotics (FSR)*, 2012.

[95] P. Scerri, P. Velagapudi, B. Kannan, A. Valada, C. Tomaszewski, J. M. Dolan, A. Scerri, K. S. Shankar, L. L. Bill-Clark, and G. A. Kantor, "Real-World Testing of a Multi-Robot Team," in *11th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2012.

[96] A. Valada, D. Kohanbash, and G. A. Kantor, "DSRP: Distributed SensorWeb Routing Protocol," in *21st International Conference on Electronics, Communications and Computers (CONIELECOMP)*, 2011.

[97] D. Kohanbash, A. Valada, and G. A. Kantor, "Development of a Distributed Wireless Sensing System for Agriculture," in *International Symposium on Wireless Sensor Network for Agriculture*, 2012.

Peer-Reviewed Workshop Papers

[1] M. Kurenkov, S. Marvi, J. Schmidt, C. B. Rist, A. Canevaro, H. Yu, J. Jordan, G. Schildbach, and A. Valada, "Traffic and safety rule compliance of humans in diverse driving situations," in *CoRL Workshop on Safe and Robust Robot Learning for Operation in the Real World*, 2024.

[2] S. D. Martin Büchner and A. Valada, "Learning lane graphs from aerial imagery using transformers," in *Robotics: Science and Systems Workshop on Autonomous Vehicles Across Scales*, 2024.

[3] A. Ayman, A. Röfer, N. Heppert, and A. Valada, "Imagine2touch: Predictive tactile sensing for robotic manipulation using efficient low-dimensional signals," in *IEEE International Conference on Robotics and Automation Workshop on Robot Embodiment through Visuo-Tactile Perception*, 2024.

[4] S. Mokhtar, E. Chisari, N. Heppert, and A. Valada, "Centerart: Joint shape reconstruction and 6-dof grasp estimation of articulated objects," in *IEEE International Conference on Robotics and Automation Workshop on 3D Visual Representations for Robot Manipulation*, 2024.

[5] N. Vödisch, D. Cattaneo, W. Burgard, and A. Valada, "Covio: Online continual learning for visual-inertial odometry," in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, 2023.

[6] D. Honerkamp, S. Guttikonda, and A. Valada, "Active particle filter networks: Efficient active localization in continuous action spaces and large maps," *IEEE/RSJ International Conference on Intelligent Robots and Systems Workshop on Probabilistic Robotics in the Age of Deep Learning*, 2022.

[7] J. O. von Hartz, E. Chisari, T. Welschehold, and A. Valada, "Self-supervised learning of multi-object keypoints for robotic manipulation," *IEEE International Conference on Robotics and Automation Workshop on Reinforcement Learning for Contact-Rich Manipulation*, 2022.

[8] L. Londoño, A. Röfer, T. Welschehold, and A. Valada, "Doing right by not doing wrong in human-robot collaboration," *ACM/IEEE International Conference on Human-Robot Interaction Workshop on Fairness and Transparency in Human-Robot Interaction*, 2022.

[9] R. Mohan and A. Valada, "7th ai driving olympics: 1st place report for panoptic tracking," in *Conference on Neural Information Processing Systems (NeurIPS 2021) Workshop on AI Driving Olympics*, 2021.

[10] R. Mohan and A. Valada, "Robust vision challenge 2020 - 1st place report for panoptic segmentation," *European Conference on Computer Vision (ECCV) Workshop on Robust Vision Challenge*, 2020.

[11] D. Cattaneo, D. G. Sorrenti, and A. Valada, "Cmrnet++: Map and camera agnostic monocular visual localization in lidar maps," in *IEEE International Conference on Robotics and Automation (ICRA) Workshop on Emerging Learning and Algorithmic Methods for Data Association in Robotics*, 2020.

[12] J. V. Hurtado, R. Mohan, W. Burgard, and A. Valada, "Mopt: Multi-object panoptic tracking," in *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshop on Scalability in Autonomous Driving*, 2020.

[13] M. Mittal*, A. Valada*, and W. Burgard, "Vision-based Autonomous Landing in Catastrophe-Struck Environments," in *Workshop on Vision-based Drones: What's Next? at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2018.

[14] A. Valada*, N. Radwan*, and W. Burgard, "Incorporating Semantic and Geometric Priors in Deep Pose Regression," in *Workshop on Learning and Inference in Robotics: Integrating Structure, Priors and Models at Robotics: Science and Systems (RSS)*, 2018.

[15] A. Valada and W. Burgard, "Learning Reliable and Scalable Representations Using Multimodal Multitask Deep Learning," in *RSS Pioneers at Robotics: Science and Systems (RSS)*, 2018.

[16] A. Valada, A. Dhall, and W. Burgard, "Convoluted Mixture of Deep Experts for Robust Semantic Segmentation," in *Workshop on State Estimation and Terrain Perception for All Terrain Mobile Robots at IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2016.

[17] A. Valada, G. L. Olivera, T. Brox, and W. Burgard, "Towards Robust Semantic Segmentation using Deep Fusion," in *Workshop on Limits and Potentials of Deep Learning in Robotics at Robotics: Science and Systems (RSS)*, 2016.

[18] F. Boniardi, A. Valada, W. Burgard, and G. D. Tipaldi, "Autonomous Indoor Robot Navigation Using Sketched Maps and Routes," in *Workshop on Model Learning for Human-Robot Communication at Robotics: Science and Systems (RSS)*, 2015.

[19] T. El-Gaaly, C. Tomaszewski, A. Valada, P. Velagapudi, B. Kannan, and P. Scerri, "Visual Obstacle Avoidance for Autonomous Watercraft using Smartphones," in *Autonomous Robots and Multirobot Systems workshop (ARMS, at AAMAS)*, 2013.

[20] D. Kohanbash, A. Valada, and G. A. Kantor, "Irrigation Control Methods for Wireless Sensor Network," in *American Society of Agricultural and Biological Engineers (ASABE) Annual Meeting*, 2012.

[21] P. Scerri, P. Velagapudi, B. Kannan, A. Valada, C. Tomaszewski, J. M. Dolan, A. Scerri, K. S. Shankar, L. L. Bill-Clark, and G. A. Kantor, "Real-World Testing of a Multi-Robot Team," in *Autonomous Robots and Multi- Robot Systems Workshop at the 11th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2012.

[22] D. Kohanbash, A. Valada, and G. A. Kantor, "Wireless Sensor Networks and Actionable Modeling for Intelligent Irrigation," in *American Society of Agricultural and Biological Engineers (ASABE) Annual Meeting*, 2011.

Theses

[1] A. Valada, "Discovering and leveraging deep multimodal structure for reliable robot perception and localization," in *PhD Thesis, University of Freiburg, Department of Computer Science, doi: 10.6094/UNIFR/17427*, 2019.

[2] A. Valada, "An Autonomous Robot for Manipulation and Mapping of Hydroponic NFT Installations," in *MS Thesis, Tech. rep. CMU-RI-TR-28-13, Carnegie Mellon University, Robotics Institute*, 2013.

[3] A. Valada, "Design and Development of a Wireless Sensor Network System for Precision Agriculture," in *BTech Thesis, Tech. rep. CMU-RI-TR-10-21, Carnegie Mellon University, Robotics Institute*, 2010.

Selected Media Coverage

The ImageNet moment of robotics	*Industrial AI Podcast, 2023*
Towards Safer and More Robust Automated Driving Systems	*AZO Robotics, 2023*
Next generation of AI algorithms for automated driving	*Mirage News, 2023*
Künstliche Intelligenz zum Anfassen	*Baden TV Süd, 2023*
Diese Drohne soll Erdbeben-Opfer retten	*Bild, 2023*
Drohnen Übung für den Ernstfalls	*RTL News, 2023*
How AI can help autonomous vehicles perceive objects	*The Economic Times, 2023*
Autonome Autos können ihre Umgebung menschlicher wahrnehmen	*Motor Zeitung, 2023*
Mit KI die Umgebungserkennung autonomer Fahrzeuge verbessern	*AI Society, 2023*
Human-Like Perception for Self-Driving Cars	*elektroniknet, 2023*
Auf dem Weg zu menschenähnlicher Wahrnehmung für selbstfahrende Autos	*RegioTrends, 2022*
Autonomous Vehicles With Human-like Vision	*electronicsforum, 2022*
Human-Like Awareness Emerging in Self-Driving Vehicles	*AZO Robotics, 2022*
Advancing human-like perception in self-driving vehicles	*TechXplore, 2022*
Unlocking Human-Like Perception In Self-Driving Vehicles	*Autotech News, 2022*
University Of Freiburg: Step By Step Toward Safe Autonomous Driving	*India Education Diary, 2021*
Step by Step Toward Safe Autonomous Driving	*Uni Freiburg Magazine, 2021*
Advanced AI Model Enables Coherent Scene Recognition for Autonomous Vehicles	*selfdrivingcars360, 2020*
Deep Learning: Wie selbstfahrende Autos Szenen besser verstehen	*autocad-magazin, 2020*
New deep analysis breaks information in picture recognition capacity of self-driving automobiles	*news8plus, 2020*
AI Model Enhances Image Recognition Ability Of Self-Driving Cars	*pioneeringminds, 2020*
Advanced AI Model Enables Coherent Scene Recognition for Autonomous Vehicles	*azorobotics, 2020*
Neues KI-Modell verbessert die Umfelderkennung	*Springer Professional, 2020*
Deep learning method improves environment perception of self-driving cars	*eenewsautomotive, 2020*
Neue Methoden des Deep Learning	*intellicar, 2020*
EfficientPS: New State-of-the-art Model in Panoptic Segmentation	*Neurohive, 2020*
Faster and more effective scene understanding	*News Break, 2020*
Freiburger Forscherteam besser als Google	*elektroniknet, 2020*
New deep learning research breaks records in image recognition ability of self-driving cars	*innovations report, 2020*
Faster and more effective scene understanding	*Miragenews, 2020*
New deep learning research breaks records in image recognition ability of self-driving cars	*TechXplore, 2020*
FOUNT^2 – Einsatz fuı̈ die Wissenschaft	*Technisches Hilfswerk, 2019*
Robotic Crocodiles	*Discovery Channel, 2015*
Autonomous airboats monitor hippo dung in Kenya's Mara River basin	*ScienceDaily, 2014*
Crocodile Robot Dodges Hippo ... for Science!	*NBC News, 2014*
Robots: A Fun Context for Learning	*Grow a Generation, 2014*
For Surveying Dangerous Hippo Pools, Platypus Robots Go Where People Can't	*Environmental Monitor, 2014*
Dirty and Dangerous	*Cary Institute, 2014*
Platypus Floats Idea of Affordable Environmental Robotics	*Business Times, 2012*
Cooperative Robotic Watercraft	*Robots.net, 2012*
CMU's Team Develops Environmental Robotics	*Business Journal, 2012*
CMU Startup Adds Robotics to Water	*Pittsburgh Business Times, 2012*