Name	Timo Korthals, M.Sc.
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Info

Affiliation	Cognitronics & Sensor Systems Group (AG-KS) Research Institute for Cognition and Robotics (CoR-Lab) Center for Cognitive Interaction Technology - Graduate School (CITEC) Bielefeld University - Germany (UBi)
Interests	**Learning to Act on Multi-Modal Data**: My work tackles the development of **multi-modal deep generative models** to learn **multi-sensory fusion**. In the context of **artificial intelligence**, my approach contributes to **unsupervised curiosity-driven** learning of **active sensing** for a robot fleet equipped with visual, depth, and proximity sensors (**Ph.D. due date 07/20**).
Skills	embedded and high-level programming in C/C++, robotics, ROS, embedded systems development, Python, Tensorflow, curiosity driven / reinforcement / unsupervised / deep / machine learning, sensor & information fusion, Linux application development, Matlab

Academic Career

11/18 - today	**BMBF Project** ML4Pro^2 Machine Learning for Production and Products - Distributed Robot Fleet Management (CoR-Lab)
01/17 - 12/19	**DAAD PPP Grant** on Learning to act on Multi-Modal Data in collaboration with Queensland University of Technology
02/15	**ERASMUS+ Lecturer** at Aarhus University
07/14 - 10/17	**BMBF Project** in the Leading Edge Cluster for Cyber-Physical Systems for Electronic Environment Detection and Mapping in Agriculture Scenarios (CoR-Lab)
09/13 - 12/18	**DFG Project** Mini Robot Developement (CITEC)
09/13 - 06/14	**PhD Scholarship Holder** Mini Robot Developement (CITEC)

Education

03/12 - 06/13	**Electrical Engineering Master - University of Paderborn** Topic: Unsupervised Learning of Acoustic- and Word-Units via Hierarchical, Generative Models
03/10 - 08/10	**Peking/China**, Beihang University of Aeronautics & Astronautics
08/07 - 03/12	**Electrical Engineering Bachelor - University of Paderborn** Topic: Evaluation of Algorithms for Creating Disparity Maps on the Basis of Monucalur Video Streams

RoboCup Competitions

03/12 - 08/16	Open Challenge Rescue League: 2012 Germany (3rd)
04/14 - 04/16	Open Challenge @Home: 2014 Germany (4th), 2015 Germany (3rd), 2016 Netherlands (2nd)
08/14 - 08/16	World Cup @Home: 2014 Brasil (3rd), 2015 China (3rd), 2016 Germany (**1st**)

Literature

Herbrechtsmeier, Stefan u. a. (2016). "AMiRo: A Modular & Customizable Open-Source Mini Robot Platform". In: *ICSTCC*.

Korthals, Timo, Andreas Skiba und Thilo Krause (2016). "Einsatz Event-Basierter Systemarchitektur für Erntemaschinen zur Elektronischen Umfelderkennung". In: *74. Tagung LAND.TECHNIK*. VDI e.V.

Korthals, Timo u. a. (2016a). "Evidenzkartenbasierte Sensorfusion zur Umfelderkennung und Interpretation in der Ernte". In: *Informatik in der Land-, Forst und Ernährungswirtschaft*, S. 15–18.

Korthals, Timo u. a. (2016b). "Occupancy Grid Mapping with Highly Uncertain Range Sensors based on Inverse Particle Filters". In: *ICINCO 2016 - Proceedings of the 13th International Conference on Informatics in Control, Automation and Robotics* 2.

Borgsen, Sebastian Meyer zu u. a. (2017). "ToBI – Team of Bielefeld: Enhancing Robot Behaviors and the Role of Multi-robotics in RoboCup@Home". In: *RoboCup 2016: Robot World Cup XX*. Hrsg. von Sven Behnke u. a. Cham: Springer International Publishing, S. 577–588.

Korthals, Timo u. a. (2017a). "Semantical Occupancy Grid Mapping Framework". In: *2017 European Conference on Mobile Robots, ECMR 2017*. IEEE.

Korthals, Timo u. a. (2017b). "Towards Inverse Sensor Mapping in Agriculture". In: *IROS 2017 Workshop on Agricultural Robotics: learning from Industry 4.0 and moving into the future.* Vancouver.

Korthals, T u. a. (2018a). "Path Evaluation via HMM on Semantical Occupancy Grid Maps". In: *ArXiv e-prints.* arXiv: `1805.02944 [cs.RO]`.

Korthals, Timo, Thilo Krause und Thorsten Jungeblut (2018). *Elektronische Umfelderkennung bei Erntemaschinen : Verbundprojekt itsOWL-EUE innerhalb des Spitzenclusters it's OWL : Abschlussbericht des itsOWL-EUE Konsortiums.* Techn. Ber. Claas Selbstfahrende Erntemaschinen GmbH, S. 1–38.

Korthals, Timo, Jürgen Leitner und Ulrich Rückert (2018). "Coordinated Heterogeneous Distributed Perception based on Latent Space Representation". In: *IROS 2018 Second Workshop on Multi-robot Perception-Driven Control and Planning.* arXiv: `arXiv:1809.04558v1`.

Korthals, Timo u. a. (2018b). "Obstacle Detection and Mapping in Agriculture for Process Evaluation". In: *Frontiers in Robotics and AI Robotic Control Systems* 1.1.

Korthals, Timo (2019). *M^2VAE - Derivation of a Multi-Modal Variational Autoencoder Objective from the Marginal Joint Log-Likelihood.* arXiv: `arXiv:1903.07303`.

Korthals, Timo, Malte Schilling und Jürgen Leitner (2019). *A Perceived Environment Design using a Multi-Modal Variational Autoencoder for learning Active-Sensing.* arXiv: `1911.00584 [cs.RO]`.

Korthals, Timo u. a. (2019a). "Fiducial Marker based Extrinsic Camera Calibration for a Robot Benchmarking Platform". In: *European Conference on Mobile Robots, ECMR 2019, Prague, CZ, September 4-6, 2019*, S. 1–6.

Korthals, Timo u. a. (2019b). "Jointly Trained Variational Autoencoder for Multi-Modal Sensor Fusion". In: *22st International Conference on Information Fusion, FUSION 2019, Ottawa, CA, July 2-5, 2019*, S. 1–8.

Korthals, Timo u. a. (2019c). "Multi-Modal Generative Models for Learning Epistemic Active Sensing". In: *2019 IEEE International Conference on Robotics and Automation, ICRA 2019, Montreal, CA, May 20-25, 2019*. Montreal, Canada.

Korthals, Timo u. a. (2019d). "Multisensory Assisted In-hand Manipulation of Objects with a Dexterous Hand". In: *2019 IEEE International Conference on Robotics and Automation Workshop on Integrating Vision and Touch for Multimodal and Cross-modal Perception, ViTac 2019, Montreal, CA, May 20-25, 2019*, S. 1–2.