Appendix
Collaborations

Parts of the technical concepts on which the contributions of this thesis are based result from research collaborations with undergraduate and graduate students at Karlsruhe Institute of Technology (KIT). The author of this document was the main advising researcher for all student theses which resulted from this collaboration. The degree of support he received in defining research problems and developing solutions for them is detailed out in the following. We have only taken into account assistance he received on the conceptual level, leaving it to the respective source code to name the persons involved in implementing our concepts.

- An initial version of our Implicit Shape Models (ISMs) for modeling spatial relations—see Sect. 3.4—was jointly devised with Reno Reckling [8]. We conceived a more sophisticated final version of this technique with the support of Heinrich Heizmann [3] and Patrick Stöckle [10]. Various visualizations that make demonstration data and learnt models for scene categories visible were developed jointly with Florian Heller [4]. The same is valid for the techniques with which accumulator verification, acceptance ranges and recognition results are visualized.
- With Fabian Hanselmann [2], we developed the algorithm for generating ISM trees—the major contribution of this thesis to Passive Scene Recognition (PSR),—and with Reno Reckling [8], we jointly devised an initial approach for recognizing scenes. We refined the latter with the assistance of Heinrich Heizmann [3]. Both ISM tree generation and scene recognition with them are explained in Sect. 3.5. The visualizations for individual ISMs were extended to the compound ISM trees in joint collaboration with Florian Heller [4].
- We started conceiving our method for Relation Topology Selection from Sect. 3.6 with Fabian Hanselmann [2]. An improved final version of it was developed with Jonas Mehlhaus [7].
- The decision-making system for Active Scene Recognition (ASR) presented in Sect. 4.1 was conceived with the support of Robin Hutmacher [5]. The direct search mode of ASR was initially developed by Jocelyn Borella [1] whose work was continued by Oliver Karrenbauer [6].

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- In Sect. 4.2, we gave an overview of the modules which our robot software architecture for ASR consists of. Among other things, the module "Online World Model" was conceived with the assistance of Patrick Stöckle [10]—and those for "Passive Scene Recognition" and "Object Pose Prediction" with the support of Robin Hutmacher [5] and Patrick Stöckle [10].
- The techniques we use for predicting object poses—see Sect. 4.5—were devised with the assistance of Patrick Stöckle [10]. The visualization with which we make their results visible is a joint effort with Florian Heller [4].
- The optimization problem for estimating Next-Best-Views as well as the algorithm to solve it were at first been jointly devised with Ralf Schleicher [9]. The visualizations of the individual iterations of this algorithm as well as of its results were developed with Jocelyn Borella [1]. Its parallelization was conceived with Daniel Stroh [11]. While we devised the final version of our approach to Next-Best-View estimation with the support of Jeremias Trautmann [12], Milena Walter contributed to its realization [13]. The concept on which this approach is based can be found in Sect. 4.6.
- We designed the experiments with which we evaluated our approach to PSR in Sect. 5.2 with the assistance of Jonas Mehlhaus [7]. Conducting these experiments was a joint effort with him.
- The experiments in Sect. 5.3 regarding our ASR approach were defined with the support of Oliver Karrenbauer [6], Jonas Mehlhaus [7], Daniel Stroh [11] and Jeremias Trautmann [12]. We conducted them in the course of an extensive collaboration with the aforementioned students. The alternative approaches with which we compare ours were developed by Oliver Karrenbauer [6].

Further supervised student theses which did not directly contribute to our concepts but are used by them as tools are briefly introduced in Sect. 1.2.

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