Preface

This joint volume of proceedings gathers papers from the 1$^{\mathbf{st}}$ International Workshop on the Semantic Descriptor, Semantic Modelingand Mapping for Humanlike Perceptionand Navigation of Mobile Robots toward Large Scale Long-Term Autonomy (SDMM19) and the 3$^{\mathbf{rd}}$ International Workshop on the Applications of Knowledge Representation and Semantic Technologies in Robotics (AnSWeR19). SDMM19 held on November 8, 2019 and AnSWeR19 held on November 4, 2019 during the International Conference on Intelligent Robots and Systems (IROS 2019) in Macau, China.

Preface

The 1st International Workshop on the Semantic Descriptor, Semantic Modelingand Mapping for Humanlike Perceptionand Navigation of Mobile Robots toward Large Scale Long-Term Autonomy (SDMM19)

A big portion of our common surroundings was created by humans, for humans. Over the centuries, we shaped the environments surrounding us according to our own conceptions and convenience. With the growing need for robots that can perform tasks on those large-scale dynamic environments, it is paramount that those robots can understand the World in the same fashion as humans do. Being able to reason and perform high-level tasks, with human-like learning and cognitive skills that can enhance their task planning and fast adaptation to highly dynamic surroundings, while also storing and utilizing past experiences are crucial skills for the next generation of robots. However, the current tools still mostly focus on machine-centric environment modeling, which reiterates the need of a new human-like environment and knowledge model.

This workshop will introduce semantic descriptor, semantic modeling and mapping framework for humanlike high-level perception and navigation of mobile robots toward large scale long-term autonomy in global dynamic environment. Based on the understanding of visual sensory information processing of human from cognitive science and efficient and flexible brain GPS model from neuroscience research and physiology*, triplet ontological semantic model (TOSM) has been addressed and used not only in object detection and place recognition but in generating layered semantic object-feature-topology-metric maps. With the framework idea and its extension to AI algorithms, a set of attractive topics will be presented and discussed in the workshop including semantic analysis and semantic information processing with semantic descriptors, space-time independent object detection and place recognition, AI based long-term planning and robot localization, and TOSM based robust semantic SLAM for global long-term autonomy.

The workshop is also aiming at providing a chance to robotic researchers, engineers, and students to review, evaluate, and advance a formal semantic modeling and mapping framework for humanlike high-level environment perception and navigation of robot. The topics covered by this workshop are relevant to the audience not only from robotic researchers but computer vision scientists who study place recognition and localization under visual appearance changes due to weather condition and time.

Topics of Interest

- One entry in the list AI Planning for long-term mission (AI Planning)
- Triplet ontological semantic model(TOSM) for workspace modeling and mapping (Semantic Modeling)
- Semantic analysis and semantic descriptors for object detection and place recognition (Semantic Descriptor, Object Detection, Place Recognition)
- Learning semantic descriptors and object detection by using deep neural network (Semantic Descriptor, Deep Neural Network)
- Global-local semantic SLAM for large scale long-term autonomy (Semantic SLAM)

Preface

The 3rd International Workshop on the Applications of Knowledge Representation and Semantic Technologies in Robotics (AnSWeR19)

This volume gathers papers from the 3rd International Workshop on Applications of Knowledge Representation and Semantic Technologies in Robotics (AnSWeR19), which was held on November 4th, 2019 during the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS2019) in Macau, China.

As robots are slowly approaching our everyday lives, they will need to expose an increasing capability to deal with different sources of knowledge about the world, in order to accomplish complex tasks based on Planning, Computer Vision, Natural Language Processing and many other techniques.

While the problem of enabling robots to use available sources of knowledge has attracted attention relatively recently in the robotics community, the Knowledge Representation community has been studying techniques to model, integrate and exploit heterogeneous sources of knowledge for a long time.

The aim of the workshop is to promote and strengthen the dialogue between the Knowledge Representation and Robotics communities that are working on connected, overlapping topics, and to find answers to common research questions. The stimulated debate served as a background in fostering the application of Knowledge Representation techniques in Robotics, and in highlighting Robotics as a fertile application field for the KR community.

Three papers were accepted in this third edition of AnSWeR; all of these are presented in this volume. Additionally, the workshop hosted 5 invited talks around the combination of KR and Robotics, namely :

1. Lars Kunze (UK) : Autonomous Robots in a Connected World;
2. Todor Stoyanov (SW) : Semantic mapping for robots and by robots: the role of high-level information
3. Yuke Zhu (US) : Learning How-To Knowledge from the Web
4. Mathieu d'Aquin (IE) : Virtualized knowledge for robot understanding
5. Vera Ragavan (US) : An overview of IEEE 1872.2 WG "Autonomous Robotics Ontology Progress" and "Towards an Ontology driven Design and Development Process"

The editors would like to thank all the authors for their insightful contributions to AnSWeR. A special thank goes also to members of the program committee, which ensured a high quality standard for the workshop through their review assessment.