

SemDeep-6

**Proceedings of the 6th Workshop on Semantic Deep Learning  
(SemDeep-6)**

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## SemDeep-6

Welcome to the 6th Workshop on Semantic Deep Learning (SemDeep-6), held in conjunction with IJCAI 2020. As a series of workshops and a special issue, SemDeep has been aiming to bring together Semantic Web and Deep Learning research as well as industrial communities. It seeks to offer a platform for joining computational linguistics and formal approaches to represent information and knowledge, and thereby opens the discussion for new and innovative application scenarios for neural and symbolic approaches to NLP, such as neural-symbolic reasoning.

SemDeep-6 features a shared task on evaluating meaning representations, the WiC-TSV (Target Sense Verification For Words In Context) challenge, based on a new multi-domain evaluation benchmark. The main difference between WiC-TSV and common WSD task statement is that in WiC-TSV there is no standard sense inventory that systems need to model in full. Each instance in the dataset is associated with a target word and single sense, and therefore systems are not required to model all senses of the target word, but rather only a single sense. The task is to decide if the target word is used in the target sense or not, a binary classification task. Therefore, the task statement of WiC-TSV resembles the usage of automatic tagging in enterprise settings.

In total, this workshop accepted four papers, two for SemDeep and two for WiC-TSV. The main trend, as it has been the norm for previous SemDeep editions, has been the combination of neural-symbolic approaches to language and knowledge management tasks. For instance, Chiarcos et al. (2021) discuss methods for combining embeddings and lexicons, whereas Moreno et al. (2021) present a method for relation extraction and Vandenbussche et al. explore the application of transformer models to Word Sense Disambiguation. Finally, Moreno et al. (2021) also take advantage of language models for their participation to WiC-TSV. In addition, this SemDeep edition had the pleasure to have Michael Spranger as keynote speaker, who gave an invited talk on Logic Tensor Network, as well as an invited talk by Mohammadshahi and Henderson (2020) on their Findings of EMNLP paper on Graph-to-Graph Transformers.

We would like to thank the Program Committee members for their support of this event in form of reviewing and feedback, without whom we would not be able to ensure the overall quality of the workshop.

Dagmar Gromann, Luis Espinosa-Anke, Thierry Declerck, Anna Breit, Jose Camacho-Collados, Mohammad Taher Pilehvar and Artem Revenko.

Co-organizers of SemDeep-6.

January 2021

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**Invited Speaker:**

Michael Spranger, Sony Computer Science Laboratories

## Invited Talk

### **Michael Spranger: Logic Tensor Network - A next generation framework for Neural-Symbolic Computing**

Artificial Intelligence has long been characterized by various approaches to intelligence. Some researchers have focussed on symbolic reasoning, while others have had important successes using learning from data. While state-of-the-art learning from data typically use sub-symbolic distributed representations, reasoning is normally useful at a higher level of abstraction with the use of a first-order logic language for knowledge representation. However, this dichotomy may actually be detrimental to progress in the field. Consequently, there has been a growing interest in neural-symbolic integration. In the talk I will present Logic Tensor Networks (LTN) a recently revised neural-symbolic formalism that supports learning and reasoning through the introduction of a many-valued, end-to-end differentiable first-order logic, called Real Logic. The talk will introduce LTN using examples that combine learning and reasoning in areas as diverse as: data clustering, multi-label classification, relational learning, logical reasoning, query answering, semi-supervised learning, regression and learning of embeddings.

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