

# Proceedings of the 4th Workshop on Deep Learning for Knowledge Graphs co-located with International Semantic Web Conference 2021

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## Preface

Knowledge Graphs have been used in various machine learning tasks by deriving latent feature representations of entities and relations. Knowledge Graphs represent formal semantics by describing entities and relationships between them, and can use ontologies as a schema layer of reference. This way, it is possible to retrieve implicit knowledge through logical inference rather than only allowing queries that request explicit knowledge. Deep Learning methods have emerged from machine learning approaches and became essential for the resolution of several tasks within the artificial intelligence spectrum. Recently, Deep Learning methods have been used in conjunction with Knowledge Graphs (i.e., to represent relationship of the graph in a vector space, to allow companies find patterns in real-time between interconnected entities, to keep track of inventories of parts further allowing finding materials used in different products, etc.). Therefore, it has become critical that the Deep Learning and Knowledge Graphs communities join their forces in order to develop more effective algorithms and applications. This workshop aimed at reinforcing the relationships between these communities and intended to be at the center of shared works around topics such as Deep Learning, Knowledge Graphs, Natural Language Processing, Computational Linguistics, Big Data, and so on.

Therefore, the goal of this workshop was to provide a meeting forum where discussions between the relevant stakeholders (researchers from academia, industry and businessmen) could be stimulated within the Deep Learning and Knowledge Graphs domains. As the previous edition, this year we noticed a general attention to our workshop given the more than 10 submissions we received and the high number of participants we noticed during the workshop day. Eight papers have been accepted and discussed within the workshop by authors from different international institutions. They covered topics such as Knowledge Graph embeddings, entity summarization, entity type prediction, semantic entity enrichment. We had as invited speaker Prof. Aldo Gangemi who discussed how knowledge graph embeddings are both an opportunity and a matter of concern for the cognitive scientist, what patterns can be found and what else can be discovered in the direction of human-centred semantics. We really thank him for his great talk. We also thank the program committee for their time and work for reviewing the submitted papers. Although the workshop was held remotely due to the COVID-19 pandemic, it has been successful by more than 60 participants from all around the world. On the workshop website<sup>6</sup> it is possible to see screenshots reflecting some moments of the workshop.

December 2021

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<sup>6</sup> <https://alammehwish.github.io/dl4kg2021/>

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