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Knowledge-infused Statistical Learning for Social Good

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Abstract

Humans are able to provide symbolic knowledge in structured form for potential use by an AI system in learning human-desirable concepts. In clinical settings, for instance, prediction of patient outcomes by an AI can be guided by knowledge from patient history. This history contains concepts such as treatment information, observational and drug-related information, mental health conditions, and severity of disease/disorder. Additionally, there is also often a certain graphical structure to the knowledge among the concepts, for example, "patient symptoms cause certain tests to be taken", which in turn affects the prescription of medication. This type of structure between human interpretable concepts contained in knowledge can aid the AI in an informed prediction.

1 Presenter's biographies and Related Papers

Both presenters have published articles and delivered talks and tutorials at premier venues [1–30].

Kaushik Roy is a Ph.D. student at the Artificial Intelligence Institute South Carolina (AIISC). He has published several articles and conducted talks and tutorials at premier venues such as AAI, IJCAI, KR, NeurIPS, AAMAS, ICLR, ECML-PKDD, KDD, IEEE, KGC, and Frontiers. His interests are in the use of Knowledge Representation, Natural Language Understanding, and Reinforcement Learning for Social Good Applications.

Manas Gaur is currently a Ph.D. student in the Artificial Intelligence Institute at the University of South Carolina. He has been Data Science and AI for Social Good Fellow with the University of Chicago and Dataminr Inc. His interdisciplinary research funded by NIH and NSF operationalizes the use of Knowledge Graphs, Natural Language Understanding, and Machine Learning to solve social good problems in the domain of Mental Health, Cyber Social Harms, and Crisis Response. His work has appeared in premier AI and Data Science conferences (CIKM, WWW, AAI, CSCW), journals in science (PLOS One, Springer-Nature, IEEE Internet Computing), and healthcare-specific meetings (NIMH MHSR, AMIA).

2 Expected background and prerequisite of audience

The audience is expected to have a basic understanding of deep/machine learning, natural language processing, and semantic technologies (e.g., linked open data). We aim to guide attendees through a high-level tour of the most recent approaches proposed by researchers. Also, we expect basic familiarity with social media platforms such as Twitter and Reddit. We expect that by the end of the tutorial, the attendees will understand the use of knowledge graphs to enhance the performance (quality of results), utility, interpretability, and explainability of deep learning and be prepared to apply knowledge-infused deep learning to social good applications.

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