Machine Learning for the Semantic Web: filling the gaps in Ontology Mining

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Summary

In the Semantic Web view, ontologies play a key role. They act as shared vocabularies to be used for semantically annotating Web resources and they allow to perform deductive reasoning for making explicit knowledge that is implicitly contained within them. However, noisy/inconsistent ontological knowledge bases may occur, being the Web a shared and distributed environment, thus making deductive reasoning no more straightforwardly applicable. Machine learning techniques, and specifically inductive learning methods, could be fruitfully exploited in this case. Additionally, machine learning methods, jointly with standard reasoning procedure, could be usefully employed for discovering new knowledge from an ontological knowledge base, that is not logically derivable. The focus of the talk will be on various ontology mining problems and on how machine learning methods could be exploited for coping with them. For ontology mining are meant all those activities that allow to discover hidden knowledge from ontological knowledge bases, by possibly using only a sample of data. Specifically, by exploiting the volume of the information within an ontology, machine learning methods could be of great help for (semi-)automatically enriching and refining existing ontologies, for detecting concept drift and novelties within ontologies and for discovering hidden knowledge patterns (also possibly exploiting other sources of information). If on one hand this means to abandon sound and complete reasoning procedures for the advantage of uncertain conclusions, on the other hand this could allow to reason on large scale and to to dial with the intrinsic uncertainty characterizing the Web, that, for its nature, could have incomplete and/or contradictory information.

Biography

Claudia d'Amato is a research assistant at the University of Bari – Computer Science Department and she got the Habilitation for the function of Associate Professor for the sector "01/B1 – Informatics" on January 2014 (application: round 2012). She obtained her PhD in 2007 from the University of Bari, Italy, defending the thesis titled "Similarity Based Learning Methods for the Semantic Web" for which she got the the nomination as author of one of the

Best Italian PhD Thesis in Artificial Intelligence from the Artificial Intelligence Italian Commission for the AI*IA award 2007. She pioneered the research on Machine Learning methods for ontology mining that represents her main research interest. During her research activity she won several best paper awards. She is member of the editorial board of the Semantic Web Journal and Journal of Web Semantics. She served/is serving as Program Chair at ISWC 2017, ESWC 2014, Vice-Chair at ISWC'09, Machine Learning Track Co-Chair at ESWC'12-'13-'16, PhD Symposium chair at ESWC'15 and Workshop and Tutorial Co-Chair at ISWC'12, EKAW'12, ICSC'12. She served/is serving as a program committee member of a number of international conferences in the area of Artificial Intelligence, Machine Learning and Semantic Web such as AAAI, IJCAI, ECAI, ECML, ISWC, WWW, ESWC. She was also co-organizers of the International Workshop on Inductive Reasoning and Machine Learning on the Semantic Web at ESCW'09-'11, the International Uncertainty Reasoning Workshop at ISCW'07-'11, the International Workshop on Linked Data for Information Extraction at ISWC'13-15, the International Workshop on Data Mining on Linked Data at ECML/PKDD'13, the International Workshop on Linked Data for Knowledge Discovery ECML/PKDD'15 and the International Workshop on Cross-fertilizing diverse Domains with and within the Semantic Web at ISWC'15. Claudia d'Amato research activity has been highly appreciated within the community, as documented by her comprehensive network of international academic cooperations, including, e.g., INRIA, Sophia-Antipolis, France (Dr. Fabien Gandon), University of Koblenz-Landau, Germany (Prof. Dr. Steffen Staab), University of Oxford, UK (Prof. Dr. Thomas Lukasiewicz), University of Poznan, Poland (Dr. Agnieszka Lawrynowicz), FBK, Trento, Italy (Dr. Luciano Serafini). Claudia d'Amato research activity has been disseminated through 17 journal papers, 12 book chapters, 53 papers in international collections, 27 papers in international workshop proceedings and 13 articles in national conference and workshop proceedings. She edited 27 books and proceedings and 3 journal special issues.