

Machine Learning for Ontology Mining: Perspectives and Issues

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Abstract. 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 deal with the intrinsic uncertainty characterizing the Web, that, for its nature, could have incomplete and/or contradictory information.