

# Domain Ontology, Probability and Virtual Reality

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**ABSTRACT:** Ontologies are powerful instruments for high-level description of concepts, especially for Semantic Web applications or features classification. In some cases, Ontologies have been used to create high-level description of the Virtual Worlds objects in order to simplify the definition of a Virtual Reality. In this paper, we will describe an hybrid methodology that, starting from a domain Ontology, provides the basis for the creation of a Virtual Reality that could train workers to correct use of protection tools. In addition, starting from real data, we generate a Bayesian Network that calculates the probability of death or injuries in case of misconduct.

**Keywords:** Domain Ontologies, Bayesian Network, Conceptual Description, Occupational Accidents, Virtual Reality.

## 1. Introduction

In 1993, Gruber actualized the ancient definition of ontology given by Aristotle in his *Metaphysics*: «There is a science which studies Being qua Being, and the properties inherent in it in virtue of its own nature»<sup>1</sup>. Gruber replaced the classical definition with a new one: «Ontology is an explicit specification of a conceptualization. A conceptualization is an abstract, simplified view of the world that we wish to represent for some purpose»<sup>2</sup>. While in the ancient definition Aristotle speech about a science of being, that examines what can be asserted about anything that exists just because of its existence and not because of any special qualities it has, in the modern definition, the subject of ontologies is reduced at one part of the world (one *domain*) represented in simplified and abstract view. This reduction of the subject of the ontology is one of the most important features of ontology as Information Science concept.

In Computer Science, ontologies represent the principal way to represent knowledge and are used in Artificial Intelligence (AI) principally to provide systems with a structured and organized knowledge bases that allow it to

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1. ARISTOTLE, *Metaphysics*, Book 4, section 1003a.

2. T.R. GRUBER., *A translation approach to portable ontology specifications*, in «Knowledge acquisition», vol. v, n. 2, 1993, pp. 199–220.