

# Knowledge Engineering and Intelligence Gathering

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## Knowledge Engineering and Intelligence Gathering

A process of intelligence gathering begins when a user enters a query into the system. Several objects can match the result of a query with different degrees of relevance. Most systems estimate a numeric value about how well each object matches the query and classifies objects according to this value. Many researches have focused on practices of intelligence gathering. Much of this research was based on the work of Leckie, Pettigrew and Sylvain, who in 1996 carried out an extensive review of the information science literature on the search for information by professionals. The authors have proposed an analytical model of the behavior of search professionals seeking to be generalizable across the profession, thus providing a future research platform in the field. The model was designed to "prompt new insights... and give rise to more

refined and applicable theories of information seeking." (Leckie, Pettigrew, and Sylvain 1996, 188)The distinctive sign of the intelligence activity is to find the type of information others want to conceal.

Knowledge engineering was defined by Edward Feigenbaum, and Pamela McCorduck as follows: (Feigenbaum and McCorduck 1984)

"Knowledge engineering is an engineering discipline that involves integrating knowledge into computer systems in order to solve complex problems normally requiring a high level of human expertise."

Currently, knowledge engineering refers to building, maintaining and developing knowledge-based systems. Knowledge engineering is related to mathematical logic, and heavily involved in cognitive sciences and socio-cognitive engineering where knowledge is produced by socio-cognitive aggregates (especially human) and is structured according to our understanding of how human rationality and logic work.

In knowledge engineering, knowledge gathering consists in finding it from structured and unstructured sources in a way that must represent knowledge in a way that facilitates inference. The result of the extraction goes beyond establishing structured information or transforming it into a relational scheme, requiring either reuse of existing formal knowledge (identifiers or ontologies) or generating a system based on source data. (Sfetcu 2016)

Traditional information extraction is a natural language processing technology that extracts information from language texts and their typically natural structures in an appropriate way. The types of information to be identified must be specified in a model before the process starts, so the entire process of extracting traditional information is domain dependent. The extraction of information is divided into the following five secondary tasks: (Cunningham 2006)

- Named Entity Recognizing (REN) - Recognizing and classifying all named entities contained in a text, using grammar-based methods or statistical models.

- Coreference resolution (CO) - identifies equivalent entities that have been recognized by REN in a text.
- Construction of the template element (TE) - identifies the descriptive properties of the entities, recognized by REN and CO.
- Construction of the template relationship (TR) - identifies the relationships that exist between the template elements.
- Production of the script template (ST) - will be identified and structured according to entities recognized by REN and CO and relationships identified by TR.

In ontology-based information mining, at least one ontology is used to guide the process of extracting information from the text in natural language. The OBIE system uses traditional information extraction methods to identify concepts, cases and relationships of ontologies used in the text, which will be structured in an ontology after the process. Thus, entering ontologies is the model of information to be extracted. (Wimalasuriya and Dejing Dou 2010, 306–23) Ontology learning automates the process of constructing ontologies in natural language.

Information published in media around the world can be classified and treated as secret when it becomes an intelligence product. All sources are secret, and intelligence is defined to exclude open sources. (Robertson 1987)

Closed or secret sources involve "special means" to reach information, and the technique may include manipulation, interrogation, the use of technical devices, and extensive use of criminal methods. These techniques are costly, time consuming and labor intensive compared to open source methods. In some cases, hidden collection methods have a strong association with the criminal world. Noam Chomsky noted that there are good reasons why intelligence services are so closely linked to criminal activities.

"Clandestine terror," he argued, "requires hidden funds, and the criminal elements to whom the intelligence agencies naturally turn expect a quid pro quo." (Chomsky 1992)

The discovery of knowledge involves an automatic process of searching for large volume data, using data mining, and based on similar methodologies and terminologies. (Wimalasuriya and Dejing Dou 2010, 306–23) Data mining creates abstractions of input data, and the knowledge gained through the process can become additional data that can be used later. (Cao 2010)

Investigations in the data collection process are aimed at enriching information, eliminating some doubts, or solving problems.

The process of intelligence gathering from people (abbreviated HUMINT) is achieved through interpersonal contacts. NATO defines HUMINT as "a category of intelligence derived from information collected and provided by human sources." (NATO 2018) Typical HUMINT activities consist of queries and conversations with people who have access to information. The way HUMINT operations are conducted is dictated by both the official protocol and the nature of the information source.

Sources may be neutral, friendly or hostile and may or may not be aware of their involvement in intelligence gathering.

The HUMINT gathering process involves selecting source people, identifying them and conducting interviews. The analysis of information can help with biographical and cultural information. Lloyd F. Jordan recognizes two forms of culture study, both of which are relevant to HUMINT. (Jordan 2008)

Coverage methods are complicated and dangerous but raise ethical and moral questions as well. A well-known technique, for example, is the manipulation of human agents to obtain the information. The process, known as "the development of controlled sources," may involve extensive use of psychological manipulation, blackmail, and financial rewards. (Godfrey

1978)Intelligence gathering applying these techniques work in hostile environments. But intelligence, Sherman Kent argued, could be likened to familiar means of seeking the truth. (Kent 1966)Intelligence, unlike any other profession, does not work according to known moral or ethical standards. Some of these standards tend to be, at best, cosmetic. The argument is that anything vital to national survival is acceptable in any situation, even when the method provokes everything that is democratic. Clandestine operations remain unclear in international law and there is very little scientific research to cover the subject.

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