Keyword-based search engines such as Yahoo and Google are the main tools for using today's Web. However, there are serious problems associated with their use:

• High recall, low precision. Even if the main relevant pages are retrieved, they are of little use if another 28,758 mildly relevant or irrelevant documents are also retrieved. Too much can easily become as bad as too little.

• Low or no recall. Often it happens that we don't get any relevant answer for our request, or that important and relevant pages are not retrieved. Although low recall is a less frequent problem with current search engines,it does occur.

• Results are highly sensitive to vocabulary. Often our initial keywords do not get the results we want; in these cases the documents that we see contains different terminology from the original query.

• Results are single Web pages. If we need information that is spread over various documents, we must initiate several queries to collect the relevant documents, and then we must manually extract the partial information and put it together.

- So it need human labors and become time consuming.

<u>The aim of the SemanticWeb is to allow much more advanced knowledge management systems:</u>

• Knowledge will be organized in conceptual spaces according to its meaning.

• Automated tools will support maintenance by checking for inconsistencies and extracting new knowledge.

• Keyword-based search will be replaced by query answering: requested knowledge will be retrieved, extracted, and presented in a humanfriendly way.

• Query answering over several documents will be supported.

• Defining who may view certain parts of information (even parts of documents)will be possible.

<u>Metadata:</u>

The keyword based problem of the normal web can not be solved by only development of super intelligent agents. Instead it proposes to attack the problem from the Web page side. If HTML is replaced by more appropriate languages, then the Web pages could carry their content on their sleeve. That is, as this technology store data about data, so it can provide the required information that user want.

<u>Ontology:</u>

Ontology is an explicit and formal specification of conceptualization. Typically, ontology consists of a finite list of terms and the relationships between these terms.

The *relationships* typically include hierarchies of classes. ontology provide *a shared understanding of a domain*.
Such a shared understanding is necessary to overcome differences in terminology.

Ontologies are useful for the organization and navigation of Web sites.
Many Web sites today expose on the left-hand side of the page the top levels of a concept hierarchy of terms. The user may click on one of them to expand the subcategories.

Ontology are useful for improving the accuracy of Web searches.
The search engines can look for pages that refer to a precise *concept* in ontology instead of collecting all pages in which certain, generally ambiguous, keywords occur. In this way, differences in terminology between Web pages and the queries can be overcome.

Web searches can exploit generalization/specialization information.
If a query fails to find any relevant documents, the search engine may suggest to the user a more general query. if too many answers are retrieved, the search engine may suggest to the user some specializations

Logic & Inference:
Provide formal languages for expressing knowledge

An important advantage of logic is that it can provide *explanations* for conclusions: the series of inference steps can be retraced.

$prof(X) \rightarrow faculty(X)$

$faculty(X) \rightarrow staff(X)$

$prof(michael)$

Then we can deduce the following:

$faculty(michael)$

$staff(michael)$

$prof(X) \rightarrow staff(X)$

Agent:
Agents are pieces of software that work autonomously and proactively.
A personal agent on the Semantic Web (figure 1.2) will receive some tasks and preferences from the person, seek information from Web sources, communicate with other agents, compare information about user requirements and preferences, select certain choices, and give answers to the user.