

DEFINITION-BASED KNOWLEDGE-BASE FOR EDUCATION, MANAGEMENT AND TRANSLATION

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Abstract. *Students may not understand the meaning of the main concepts and the difference between closely related terms. Managers and employees may not understand the meaning of the actions they have to take, the acts, facts, and documents they are dealing with. As a result, managers make decisions based on intuition, translators do translations according to their individual preferences, employees implement the decisions as they want. All this involves high costs and leads to bad results. A definition-based approach is the key to success in education, management, translation, and in all aspects of life. Management decision support systems are expensive to develop, besides, they imply maintenance costs. Therefore, at a lower level, a definition-based knowledge-base can be the first step to decision-making optimisation.*

Key words: *definition, concept system, knowledge-base, knowledge management, intelligent information system.*

I. Introduction

Companies and organisations seek to reduce costs, to improve customer satisfaction, to achieve speed-to-market gains, to reduce fraud and to insure consistency and agility of their actions. Actually, they need end-to-end, decisions-based approach to address key business priorities: cost competitiveness, differentiation, customer retention and growth. If they want to become a predictive enterprise based on analysis, with decision management, use their business rules management system at full capacity, and become a decision-centric organization, the best solution would be a management decision support system.

Nevertheless, even having an intelligent information system, they must, first of all, operate with the right terms and understand them in the right way. Therefore, we have developed a definition-based knowledge-base that can serve for many purposes, such as: education, management and translation; it has a user-friendly interface, is easy to use and to adjust to the customer's needs to ensure effectiveness in communication.

II. A Definition-Based Knowledge-Base for Education, Management and Translation

People usually understand the same term in a different way, depending on their level of education, speciality, professional and life experience. Misuse of colloquial terms can lead to confusion. Misinterpretation of official documents (legal, technical, scientific, medical etc.) may have grave consequences and result in administrative and/or criminal responsibility. Usually, in the preamble of international treaties, statutes, laws, even contracts we can find the legal definition of the main terms. Such documents as user guides and manuals usually cover one or several doctrinal definitions of the main concepts. In some cases, only one definition can be found (doctrinal or legal). In other cases, several doctrinal definitions may apply. Or for a certain context, there may be no official (legal) definition at all. All this can mislead not only the student, but also the manager, employee, translator/interpreter or other interested party. For this reason, we consider that it is useful to create concept systems with definitions based on monolingual, bilingual or multilingual corpora of official documents, or better, a definition-based knowledge-base.

The glossary of terminology management developed by the Terminology Coordination Unit of the European Parliament contains the main concepts that we have used for our system [1]:

Concept: A unit of thought constituted through abstraction on the basis of properties common to a set of objects. NOTE – Concepts are not bound to particular languages. They are, however, influenced by the social or cultural background.

Definition: Statement which describes a concept and permits its differentiation from other concepts within a system of concepts.

Designation: Any representation of a concept.

Glossary: collection of words that have special meaning in a project.

Term: Designation of a defined concept in a special language by a linguistic expression. NOTE – A term may consist of one or more words [i.e. simple term, or complex term] or even contain symbols.

Termbase: database that contains a collection of words that have special meaning in a given subject field.

Terminography: The recording, processing and presentation of terminological data acquired by terminological research.

Terminology: collection of words that have special meaning in a given subject field.

Terminology management: effort to control the usage of words that have special meaning in a given subject field.

Terminology management system: strategic methods of terminology planning, as well as methods and tools to create, maintain and use terminological data most efficiently and effectively.

Terminology science: The scientific study of the concepts and terms found in special languages.

Terminology work: Any activity concerned with the systematization and representation of concepts or with the presentation of terminologies on the basis of established principles and methods.

Special language: Linguistic subsystem, intended for unambiguous communication in a particular subject field using a terminology and other linguistic means.

Validation: process of checking that an entry (or a part thereof) complies with certain established requirements.

At present, there are many standards for terminology work, among which the following:

Terminology work – Principles and methods (ISO 704:2000)

Terminology work – Vocabulary – Part 1: Theory and application (ISO 1087-1:2000)

Terminology work – Harmonization of concepts and terms (ISO 860:1996)

Lexicographical symbols and typographical conventions for use in terminography (ISO 1951:1997)

Translation-oriented terminography (ISO 12616:2002)

Standardization and related activities - General vocabulary (ISO/IEC Guide 2:1996)

German standards: DIN 2330 and DIN 2331.

For our purposes, we have also used the following standards: ISO 12620:1999(E) for Computer Applications in Terminology – Data Categories [2] and ISO/R 1087-1990 for Terminology – Vocabulary [3].

Citing ISO 12620:1999(E), a term is a designation of a defined concept in a special language by a linguistic expression. Terms can consist of single words or be composed of multiword strings. The distinguishing characteristic of a term is that it is assigned to a single concept. ISO/R 1087 refers to the concept as the mental representation not only of beings and things ... but, in a wider sense, also of qualities ... actions ... and even of locations, situations or relations.

Concept systems can be built by using different kinds of relations between individual concepts: generic relation, partitive relation, sequential relation, temporal relation, spatial relation,

associative relation. Citing ISO 12620:1999(E), a concept relation is a semantic link between concepts. Concept relations form the basis for concept systems.

In our view, a generic relation is the most suitable one for a concept system as it shows a hierarchical concept relation in which the intension of the superordinate concept is contained as a subset of the intension of the subordinate concept. Generic relations can be characterized in that all concepts that belong to the category of the narrower concept (the species) are part of the extension of the broader concept (the genus).

Any individual concept is related to a large number of other concepts within that particular subject field. According to the theory of terminology, concepts should always be viewed together with other similar concepts, i.e. within the framework of a relevant concept system. In order to build a concept system, it is necessary is to establish the relationships between closely related individual concepts.

Subject field, also known as domain or subject label is an area of human knowledge to which a terminological record is assigned. Within a database or other terminology collection, a set of subject fields, domains or classification codes will generally be defined. More than one subject field can be indicated for a given concept, and subject fields can be designated hierarchically as subfields by indicating a level index.

ISO 12620:1999(E) refers to definition as a statement that describes a concept and permits its differentiation from other concepts within a system of concepts, and a concept system is viewed as the structured set of concepts established according to the relations between them, each concept being determined by its position in the set. In a concept system, each concept is determined by its position in the set of concepts. Concept systems are used to represent concept structures in terminology and information management. Types of concept position can include: broader concept, superordinate concept, subordinate concept, coordinate concept.

Taking all this into consideration, also based on our scientific research and every day practical needs for professional activity, we have developed the following definition-based knowledge-base, mainly designed for education, management and translation purposes. The System Architecture is shown in Fig. 1 below. It includes three tags that are presented in more details in Fig. 2, Fig. 3, and Fig. 4, with the description of their functionality.

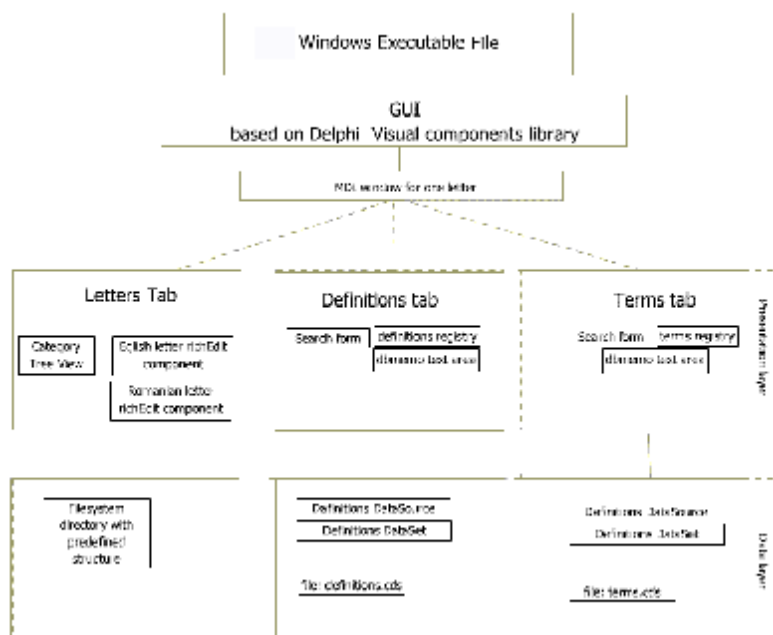


Fig. 1. System Architecture

Fig. 2. shows the “Main Screen” of the system developed, called “Business Letter”.

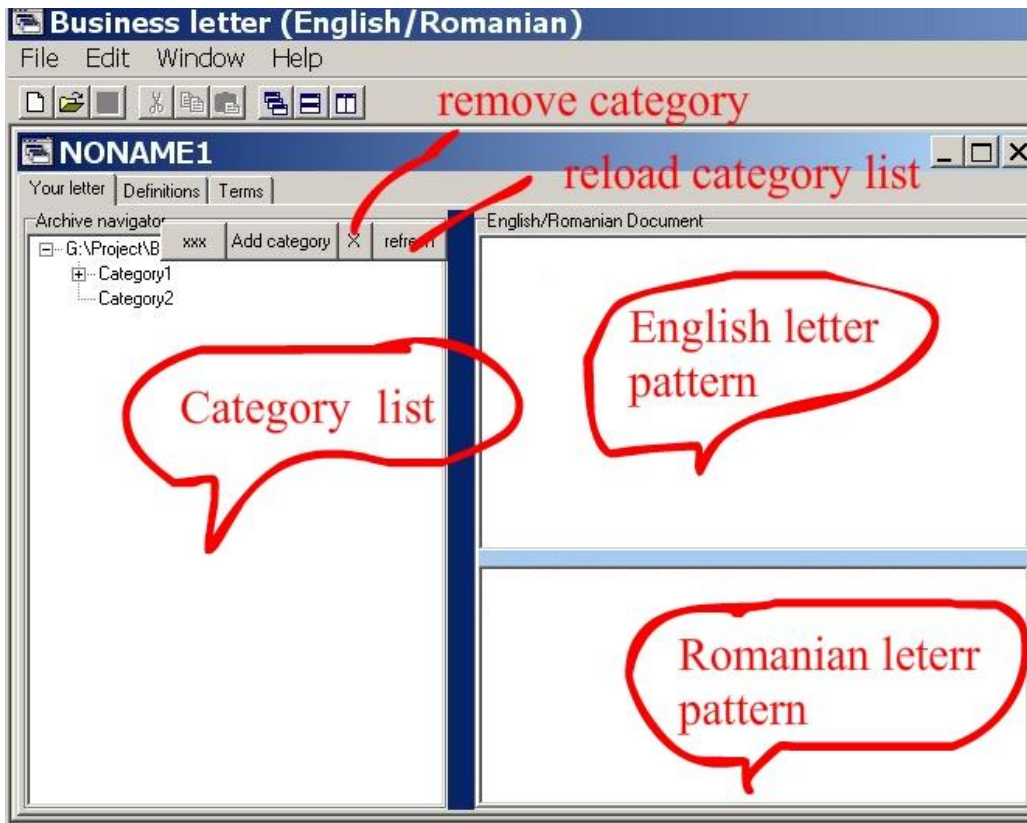


Fig. 2. Main Screen

The “Definitions Tab” of the definition-based knowledge-base is presented in Fig. 3. below.

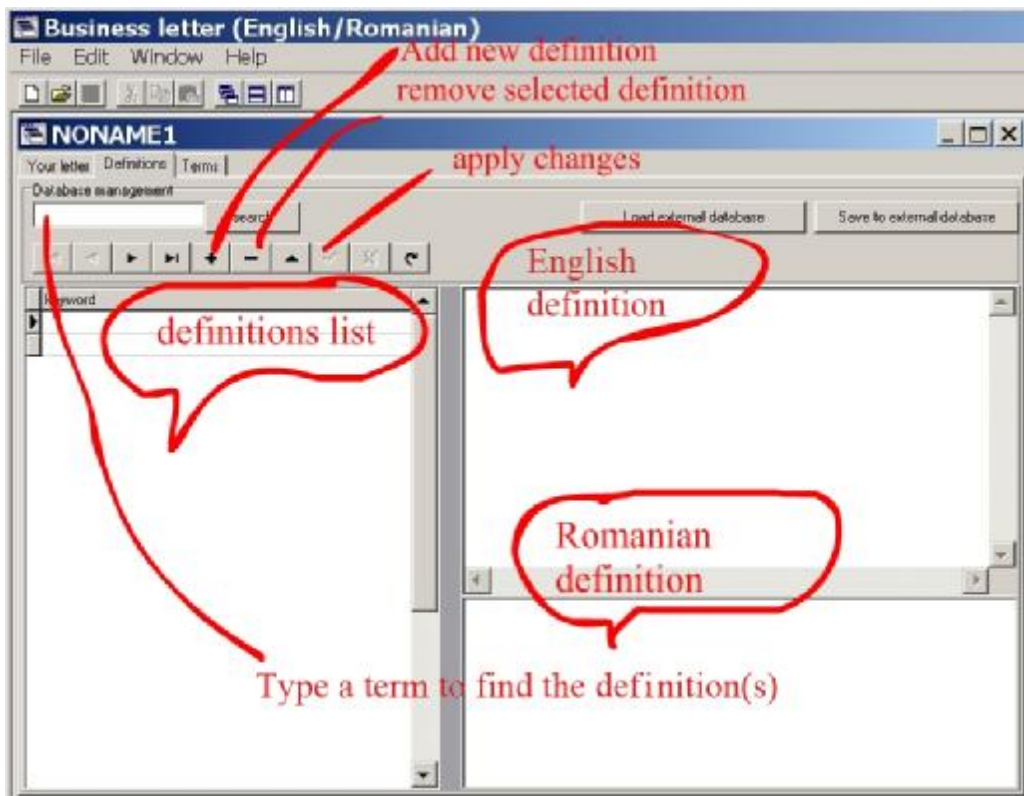


Fig. 3. Definitions Tab

The “Term Tab” allows adding terms with their definition(s) as shown in Fig. 4.

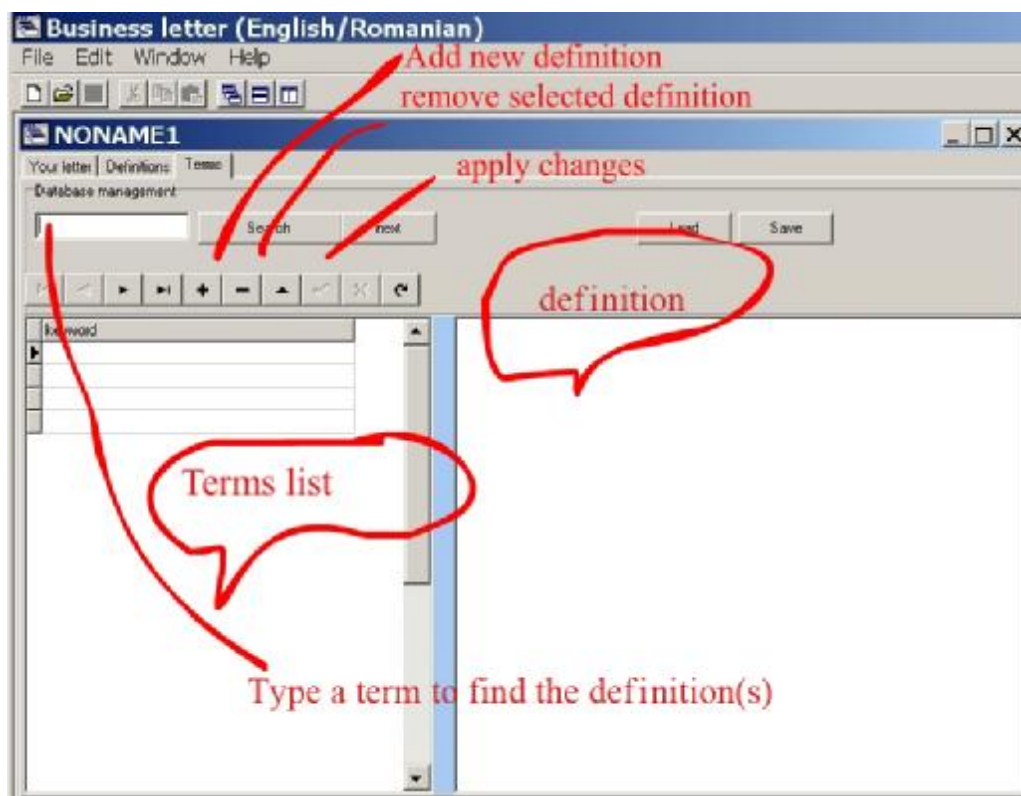


Fig. 4. Term Tab

The system developed allows locating, finding, editing and saving a document. For this, one should browse the document folders located in the left-hand window pane. If the document tree is not visible, one should click the “*View Document Library*” button in the top-left corner. The “*Browse*” tab in the left-hand pane should be selected.

All the documents can be edited by typing directly in the text window. All the templates can be edited thanks to “*Business Letter’s*” embedded word processing capabilities. One should simply open the document and type the text. One can use a template as many times as he/she needs, and the modified version will be saved with a new file name. To save a document in “*Rich Text Format*” (.rtf), one should use the “*File > Save As*” function. Terms with their translations can be added, edited and saved by using the “*Term Tab*”. Legal, doctrinal and user’s definitions in one, two or several languages can be added, edited and saved by using the “*Definitions Tab*”.

III. Conclusions

The majority of documents are written in specialist language and are designed for specialist communication. Such documents contain highly specialised terminology known as Language for Special Purposes, and are intended for the communication of specialised information to experts and other interested party. Terminology is the main vehicle by which facts, ideas, opinions and other units of knowledge are represented and conveyed. The appropriate use of terminology is crucial to successful communication of people, enterprises, organizations, institutions, and states.

Sound terminology work reduces ambiguity and increases clarity. Effective communication means that the parties involved use the same terminology that is well defined and standardised. In other words, the quality of specialist communication depends on the quality of the terminology employed, and terminology can thus be a safety factor, a quality factor and a productivity factor. Terminological resources are created consciously and unconsciously in controlled processes and spontaneously in all facets of life, at all language levels and in all fields of speciality.

Enterprises, organizations, and institutions use and create terms on a daily basis as a part of monolingual, bilingual or multilingual communication within a particular enterprise or country, and in multilingual environments. In such surroundings, knowledge-based systems and intelligent systems based on definitions can serve as useful tools for understanding specialized terminology since they allow a quick study and understanding of the terms and the relationships between closely related terms.

Management and decision management technologies such as business rules management systems, predictive analytics, data mining and optimization are being developed worldwide [5, 6]. Decision management systems improve business performance by identifying the key decisions and improving them. Decision management systems define a new architectural approach so that the existing IT systems, analytics and business rules technology can be effectively used together.

Nevertheless, good results in education, management, translation / interpreting and decision implementation cannot be achieved without the proper understanding of the meaning. The definition of the term should serve as the basis for interpretation of its meaning in the given context.

Monolingual, bilingual and multilingual texts corpora of official and internal documents for the enterprise needs can be used as samples for the students and staff training, knowledge management, decision-making, and at all the stages of the decision implementation. For instance, for carrying out the daily routine of an organization such as writing correspondence and making either human or computer-assisted translations, for studying terms and their definitions by the employees, and for the purposes of knowledge management within the organization.

We have built a concept system as described in the guidance manual [4] by V. Cijacovschi, based on definitions, and presented the terms and their definitions in a definition-based knowledge-base with samples of documents. The system developed has a user friendly interface, is easily adjustable to the client needs, can be handled and extended by an employee who is not a specialist in IT – the fact that makes it a perfect solution for the organization / company needs. Besides, we consider that such knowledge-based systems can serve as intelligent systems thanks to the definitions that contain certain rules enabling the derivation of new knowledge.

The communication of specialist knowledge and information is irretrievably bound up with the creation and dissemination of terminological resources and with the terminology management. In this context, concept systems and definitions, presented as a definition-based knowledge-base, can serve as useful tools for understanding specialised terminology since they allow to quickly understand the terms and the relationships between closely related terms, make better decisions, cut the implementation costs and obtain better results. Thus, well thought-out terminological resources ensure knowledge representation and transfer cultural diversity, safety, and the quality of goods, of services, and of life within the emerging information society. As a result, they have a considerable strategic and economic impact, and produce a higher synergy effect.

IV. References

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