

formation retrieval. For example, researchers from this camp propose to automatically extract from the text some statements that do not appear explicitly in the text, that is, to create new text (and meaning) from semantically connected segments contained in different texts. Simplifying the representation of information also includes automatic abstracting, mentioned earlier, which is considered one of the directions for NLP research. Today, in a somewhat different form, this direction is called "text summarization," and it uses some methods that are not part of NLP. For example, in the research done by Kupiec and associates, the elements of learning are used for this purpose. Unfortunately, it is too early to talk about practical methods, and the main problem concerns the absence of reliable methods of semantical analysis.

The second direction of research, namely, the development of new methods for automatic information retrieval and feedback, includes many problems that are analogous to the ones discussed in Chapters 7 and 9. Indeed, in the construction of query formulations in learning systems it is assumed that the marked documents are used (in this case the pertinence is called the expert's evaluation). The created algorithms are the attempts of researchers to adapt for IR systems the existing algorithms for learning (for example, there is an attempt to use an algorithm developed for playing checkers, called Interactive Dichotomizer 3 [ID3]). As a rule, on the basis of "examples," different classifications are constructed and then used for a search. A good survey of the approaches in machine learning can be found in Chen (1992).

It should be pointed that the work in this direction also has very few practical applications. One of the main drawbacks is that it does not take into account many of the important properties and characteristics of information retrieval.

Thus, we have considered how some of the research directions in AI influence IR development. However, we strongly believe that resources of the information science itself are far from being exhausted. The future development of IR systems primarily lies in the utilization of such resources. Next we will consider one of the practical directions (Frants, Shapiro, & Voiskanskii, 1996) for utilizing these resources.

12.3

Satisfying IN: Additional Possibilities

As has been shown, any informational activity is connected directly or indirectly with satisfying IN. The activity includes a variety of methods and forms that actually exist and that, in the end, allow for the satisfaction of IN. These methods and forms supplement, rather than duplicate, each other in the sense that only together can they take into account (to a certain degree) IN properties and characteristics known to date.

Because IR systems (like any other form) are created only because IN exists and only in order to satisfy it, we will consider as evident the thesis that *the fuller the IN properties and characteristics are taken into account during the creation of IR systems, the more successful the satisfaction of IN will be*. In other words, if one succeeds in widening the range of IN properties that are taken into account during the creation of an IR system, one will arrive at a new qualitative level of servicing users.

It should be noted that this important thesis was mentioned in Chapter 4 during the discussion of IR system structure. However, of utmost significance is the fact that discovering new characteristics of IN with subsequent consideration of their influence, both on the nature of servicing users and on IR system construction, is an important and promising way of developing these systems (Frants & Brush, 1988). In fact, we already discussed IN in detail in Chapter 2. Now we will try to further develop the existing concept and discuss IN properties not previously mentioned.

It seems clear that a human being does not need information in general but instead needs rather specific information that pertains to his or her current situation. In other words, to choose the most successful line of behavior (in terms of survival) in a particular situation, a person should have the information about this situation, which is required for such behavior. But in order to have such information, a person should have a desire to have it; that is, the person should feel the need for such information. Hence, on the one hand a need may be considered a mechanism that pushes a person to seek necessary information, whereas on the other hand, it can be considered a tool that helps to determine the usefulness (significance) of signals among the multitude of signals perceived by a human being. Furthermore, a person's need is always the result of that person's present situation. It is the situation that gives rise to such a psychological state as IN. But how does this occur? How does IN originate?

A whole host of signals about both the status of the organism itself and its habitat are perceived by human beings through their receptors. These signals enter the brain where they are used for assessing the situation. If the assessed situation contains a problem—for example, if it is understood that the organism needs a supply of food or that a direct hazard exists in the habitat—then an instinct for solving the problem arises inside the human being. Since solving a problem is possible only via some line of behavior, and the behavior itself is dictated by a behavioral algorithm (which in turn is created on the basis of information), then in the event that the human being does not have a ready-made algorithm, the very realization of the existing problem itself creates a mental state that is perceived as a need for information required for creating a behavioral algorithm. Physically, such a state arises when receptors use signals to stimulate the brain, and it is determined by a section and a form of this stimulation in the brain. In summary, we underline once more that a mental state, such as an information need, precedes any activity and is its indispensable partner in satisfying any physiological need.