

In addition, please note that the automated methods of the processes mentioned that are oriented toward other approaches (for example, the vector-space approach) are thoroughly addressed in existing literature (see, for example, Salton and McGill, *Introduction to Modern Information Retrieval*, which is fully cited at the end of Chapter 3). Therefore, we decided not to repeat this material in this book.

Because we did not attempt to write our book as an encyclopedia of the subject area, we excluded some technical and applied questions regarding IR systems (questions that would address such applications as reusable software and information filtering, among others). We tried to focus on theoretical questions regarding the creation of IR systems, which are independent of specific methods to be used in practically realized IR systems.

The text should be useful for computer science as well as information science and library science students. It is probably most appropriate for seniors and graduate students. Also, professional readers with academic or practical interest in the information retrieval field will, we hope, find it interesting and useful.

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The System and the Systems Approach

1.1

Introduction

This book is about the satisfaction of one of the most important human needs—the need for information or, more precisely, the fulfillment of this need by information that is found with the help of an *information retrieval (IR) system*. For this reason, this text gives special attention to the creation of such a system and the automatization of all its processes associated with information retrieval. Because the creation of systems presupposes the use of a number of ideas and methods comprising the essence of the *systems approach*, we begin our discussion with a description of the basic assumptions of the systems approach, which will be used extensively in various sections of the book.

1.2

The Notion of “System”

In recent decades, the concept of a “system” has become very popular. There is no area of human activity, whether science, technology, or everyday practice, where it has not appeared. However, the systems approach and systems research are not principally new methods that have arisen only in recent years. The systems approach is a natural and, according to some philosophers, the only scientific method of solving both theoretical and practical problems, and it has been used over the course of centuries. Yet only in the last half of this century have the problems of the systems approach been addressed directly, and this examination has become a separate field of science.

Human knowledge about the surrounding world begins with the concrete individual objects and phenomena that we encounter everywhere. These objects and phenomena at first glance appear to exist by themselves, independent of each other, and the whole world seems to be an accumulation of different ob-