Preface

Human problem solving in many fields is based on extensive experience. A long time ago, business organizations recognized the concrete value of knowledge, but only recently have they started to systematically introduce measures to grow, capture, explore, and maintain their knowledge. The interdisciplinary research field that deals with these issues is called *knowledge management.*

Experience management is a special kind of knowledge management that is limited to the management of *experience.* Experience is valuable, stored, *specific knowledge* that was acquired by a problem-solving agent in a problem-solving situation. Today it is recognized that experience covers large portions of the knowledge in an organization that need to be managed and reused in a systematic manner.

From the computer science point of view, artificial intelligence provides methods for experience representation and experience processing. Case-based reasoning, which has been an active research and application field for the past 20 years, addresses these issues in particular. With the recently growing importance of knowledge-management applications, the case-based reasoning branch providing appropriate methods is raising increasing attention. At the same time the former frontiers to related areas such as machine learning, information theory, organizational learning, or process modeling have started to vanish. Moreover, Web technologies are playing an important role in experience management. They provide the connectivity that is required to share experiences. Although the Internet is primarily a new medium, it enables the development of new applications implementing services that support humans during different kinds of complex problem solving.

Content of This Book

This book primarily addresses the computer science view of experience management and presents methods for building experience-management software systems. However, managerial and organizational issues involved when implementing an experience-management system in an organization are also touched on.

Starting from the requirements of complex problem solving the main conceptual questions for experience management are identified and an experience-management framework is proposed. Following the structure of this framework, the theoretical foundations for experience management are laid down. To this end, a large body of principal methods for experience representation and reasoning with experience are analyzed and presented for the first time in a unified and concise terminology. This can be considered the theory of experience-management technology.

Furthermore, the process of application development is highlighted, pointing out successful practically proven ways of obtaining and operating experience-management applications. In this way the theory is put into industrial practice. Three divergent and significant application areas are discussed in detail in this book: *electronic commerce*, *diagnosis of complex technical equipment*, and *electronic design reuse*. For each area, a specialized architecture for implementing experience-management applications is described and assessments of the effectiveness of fielded example applications are presented.

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Enjoy reading!

Hildesheim, June 2002   *Ralph Bergmann*