

CHAPTER 1

INTRODUCTION: NEW DIRECTIONS IN COGNITIVE INFORMATION RETRIEVAL

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1. INTRODUCTION

Humans have used electronic information retrieval (IR) systems for more than 50 years as they evolved from experimental systems to full-scale Web search engines and digital libraries. The fields of library and information science (LIS), cognitive science, human factors and computer science have historically been the leading disciplines in conducting research that seeks to model human interaction with IR systems for all kinds of information related behaviors. As technology problems have been mastered, the theoretical and applied framework for studying human interaction with IR systems has evolved from systems-centered to more user-centered, or cognitive-centered approaches. However, cognitive information retrieval (CIR) research that focuses on user interaction with IR systems is still largely under-funded and is often not included at computing and systems design oriented conferences. But CIR-focused research continues, and there are signs that some IR systems designers in academia and the Web search business are realizing that user behavior research can provide valuable insights into systems design and evaluation.

The goal of our book is to provide an overview of new CIR research directions. This book does not provide a history of the research field of CIR. Instead, the book confronts new ways of looking at the human information condition with regard to our increasing need to interact with IR systems. The need has grown due to a number of factors, including the increased importance of information to more people in this information age. Also, IR was once considered document-oriented, but has now evolved to include multimedia, text, and other information objects. As a result, IR systems and their complexity have proliferated as users and user purposes for using them have also proliferated. Human interaction with IR systems can often be frustrating as people often lack an understanding of IR system functionality.

New more holistic directions in CIR are emerging that conceptualize human-IR system interaction at the human-computer interaction level (taking into account interface issues), the information behavior level (taking into account the role of IR system interaction in the total range of people's information behaviors), and the

organizational/societal context (taking into account the information situation, task situation and problem situation of users when they use IR systems).

Researchers are thinking more broadly about information seekers rather than just as users of IR systems and the technical problems that may arise during the use.

In this book we also seek to highlight how the research field of CIR is more interdisciplinary and is now utilizing wider theories and models from sociology, psychology, communications, etc. The chapters in this book seek to stretch our understanding of CIR to incorporate questions of social and spatial factors, multitasking and non-linear dimensions, and relevance and learning issues.

The research in this book is above all conceptual, based on theory and model building. It is not descriptive (although descriptive studies of the user inform the conceptual research of many of the authors in this book).

Chapters in this book explore the conceptual operations, processes and information situation at the nexus between user and IR system, which informs the framework for conceptualizing the interaction between these two principal actors. The IR system is considered by the authors invited to contribute to this volume to be capable of assuming the role of an intermediary when the user utilizes an IR system to access information from the system's database. The role of intermediary was traditionally played by the librarian, who brought to the table knowledge of both cognition and the situation of their users, frequently on an intuitive or experiential level.

Alternatively, how do we build these human-librarian capabilities into IR system design to make these systems truly interactive? Although the perspective of this book is user cognition—the IR system must elicit from the user a special kind of input, creating interfaces that direct and organize the user's cognition so that the data accessed during the interaction has a true potential to be informational—our goal in developing this book has been to facilitate intellectual challenges to traditional IR system design assumptions and to champion new ideas.

These and other important research issues are explored in the following chapters.

2. BOOK OUTLINE

This book has five sections.

Section I: Chapter 1: Introduction

Chapter 1 provides an introduction to the book, setting out intentions and summaries of each chapter. We have divided up the chapters into sections, each with a theme.

Section II: CIR Concepts

Section 2 contains four chapters under the section title *Concepts*. These provide a definitional framework for the study of cognitive IR. Chapter 2 examines the concept of selection, which defines information use in cognitive IR interaction. Chapter 3 examines the concepts of polyrepresentation and the cognitive overlap of these representation states: the user's task, problem situation, cognitive, and information need states. Chapter 4 analyzes the concept of relevance, suggesting a differentiated perspective on the