Interactive Search Processes in Complex Work Situations

A Retrieval Framework

von Raiko Eckstein

University of Bamberg Press 2011
Contents

I Introduction to the Subject

1 Introduction ........................................... 3
  1.1 Motivation ........................................ 4
  1.2 Problem Statement ................................ 5
  1.3 Goals of the Publication ......................... 7
  1.4 Organization of the Thesis ...................... 9
  1.5 Origins of the Material ......................... 10

2 Background and Basic Concepts .................. 11
  2.1 Human–Computer Information Retrieval .......... 11
  2.2 Exploratory Search ............................... 15
  2.3 Faceted Search .................................... 18
    2.3.1 Definition of Faceted Categories ............. 19
    2.3.2 Creation of Faceted Categories ............... 20
    2.3.3 Description of Faceted Search ................. 22
  2.4 Examples for Exploratory Search Systems ....... 24
    2.4.1 Flamenco .................................... 24
    2.4.2 mSpace Explorer ............................. 27
    2.4.3 Relation Browser ............................ 29
    2.4.4 Freebase Parallax ............................ 32
  2.5 Visualization in Information Retrieval ........ 33
    2.5.1 Visual Query Formulation .................... 34
    2.5.2 Visualization of Search Results ............. 36
  2.6 Enterprise Search and Information Access Technologies ........................................... 40
    2.6.1 Heterogeneous Information Spaces .......... 43
    2.6.2 Internet vs. Intranet Search ................. 46
    2.6.3 Consideration of Content Security .......... 47
    2.6.4 Expertise Retrieval / Expert Search ......... 49
    2.6.5 Evaluation of Enterprise Search ............. 51
    2.6.6 Consideration of Contextual Information .... 51
  2.7 Enterprise Search and IA Technologies: Examples ........................................... 53
    2.7.1 Google Enterprise Search Solutions .......... 53
    2.7.2 Endeca Information Access Platform .......... 56
    2.7.3 Exalead CloudView™ ......................... 62
3 Searching in Complex Work Situations in an Enterprise Context 69
3.1 Introduction to Information Needs 69
3.2 Types of Information in Product Development Processes 71
3.3 Information Seeking Patterns in Product Development Processes 74
3.4 Exemplary Search Scenarios 79
  3.4.1 Search for Existing Parts in the Organization 79
  3.4.2 Project Reviews 81
3.5 Multi-Criteria Search 81
3.6 Summary of the Identified Requirements 87

II Retrieval Model for Complex Search Situations 89
4 LFRP-Search Framework 91
  4.1 The LFRP-Approach to Query Statement 92
  4.2 The Notion of Artifacts 94
    4.2.1 Description of Artifacts 94
    4.2.2 Attributes and Feature Types 98
  4.3 LFRP-Query Model 100
    4.3.1 Facet Types 102
    4.3.2 Selections 104
    4.3.3 Multi-Layer Functionality 107
    4.3.4 Integration of Ranking Functionality 110
    4.3.5 Combination of Faceted Search and Similarity Search 116
    4.3.6 Determination of Query Previews 118
  4.4 Dynamic Facet Provision 118
  4.5 Schema of the LFRP-Search Framework 121
  4.6 Related Work 126

5 Prototypical Realization of the LFRP-Search Framework 127
  5.1 Parallel Coordinates 127
  5.2 Architecture of the Framework 131
  5.3 Description of the User Interface 134
    5.3.1 Controlling the User Interface 134
    5.3.2 Parallel Coordinates for Search Query Formulation 135
    5.3.3 Presentation of Search Results 143
    5.3.4 Layer Switching on the User Interface Level 144
    5.3.5 Potential Enhancements 146
  5.4 Comparison of the LFRP-Search Framework and DWH Systems 152

6 Evaluation 157
  6.1 Evaluation of the LFRP-Search Framework 157
  6.2 Evaluation of the User Interface 160
  6.3 Summary of the Evaluation 163
III 

Outlook 165

7 Conclusion 167

IV 

Appendix 171

A List of Abbreviations 173

B LFRP-Search Framework Schema 177
  B.1 LFRP XML Schema 177
  B.2 Example Schema for the Domain of Product Development 181

Bibliography 203