

Contents

Preface.....	XI
1 Introduction.....	1
1.1 Background.....	1
1.2 Web Community	4
1.3 Outline of the Book	5
1.4 Audience of the Book.....	6
2 Preliminaries	7
2.1 Matrix Expression of Hyperlinks	7
2.2 Eigenvalue and Eigenvector of the Matrix	9
2.3 Matrix Norms and the Lipschitz Continuous Function	10
2.4 Singular Value Decomposition (SVD) of a Matrix	11
2.5 Similarity in Vector Space Models.....	14
2.6 Graph Theory Basics	14
2.7 Introduction to the Markov Model	15
3 HITS and Related Algorithms.....	17
3.1 Original HITS.....	17
3.2 The Stability Issues	20
3.3 Randomized HITS.....	22
3.4 Subspace HITS.....	23
3.5 Weighted HITS.....	24
3.6 The Vector Space Model (VSM).....	27
3.7 Cover Density Ranking (CDR)	29
3.8 In-depth Analysis of HITS.....	31
3.9 HITS Improvement	35
3.10 Noise Page Elimination Algorithm Based on SVD.....	38
3.11 SALSA (Stochastic algorithm)	43
4 PageRank Related Algorithms.....	49
4.1 The Original PageRank Algorithm.....	49
4.2 Probabilistic Combination of Link and Content Information	53
4.3 Topic-Sensitive PageRank	56

4.4	Quadratic Extrapolation.....	58
4.5	Exploring the Block Structure of the Web for Computing PageRank	60
4.6	Web Page Scoring Systems (WPSS)	64
4.7	The Voting Model	71
4.8	Using Non-Affiliated Experts to Rank Popular Topics	75
4.9	A Latent Linkage Information (LLI) Algorithm	79
5	Affinity and Co-Citation Analysis Approaches	85
5.1	Web Page Similarity Measurement	85
5.1.1	Page Source Construction	85
5.1.2	Page Weight Definition.....	87
5.1.3	Page Correlation Matrix.....	89
5.1.4	Page Similarity	92
5.2	Hierarchical Web Page Clustering	95
5.3	Matrix-Based Clustering Algorithms	97
5.3.1	Similarity Matrix Permutation.....	97
5.3.2	Clustering Algorithm from a Matrix Partition.....	99
5.3.3	Cluster-Overlapping Algorithm.....	101
5.4	Co-Citation Algorithms	104
5.4.1	Citation and Co-Citation Analysis.....	104
5.4.2	Extended Co-Citation Algorithms	106
6	Building a Web Community	111
6.1	Web Community	111
6.2	Small World Phenomenon on the Web	113
6.3	Trawling the Web.....	115
6.3.1	Finding Web Communities Based on Complete Directed Bipartite Graphs	117
6.4	From Complete Bipartite Graph to Dense Directed Bipartite Graph.....	118
6.4.1	The Algorithm.....	119
6.5	Maximum Flow Approaches.....	123
6.5.1	Maximum Flow and Minimum Cut.....	124
6.5.2	FLG Approach.....	125
6.5.3	IK Approach	129
6.6	Web Community Charts	133
6.6.1	The Algorithm	135
6.7	From Web Community Chart to Web Community Evolution ...	138
6.8	Uniqueness of a Web Community.....	141
7	Web Community Related Techniques	145

7.1	Web Community and Web Usage Mining.....	145
7.2	Discovering Web Communities Using Co-occurrence.....	147
7.3	Finding High-Level Web Communities	149
7.4	Web Community and Formal Concept Analysis.....	151
7.4.1	Formal Concept Analysis.....	152
7.4.2	From Concepts to Web Communities.....	152
7.5	Generating Web Graphs with Embedded Web Communities....	155
7.6	Modeling Web Communities Using Graph Grammars	157
7.7	Geographical Scopes of Web Resources	158
7.7.1	Two Conditions: Fraction and Uniformity.....	159
7.7.2	Geographical Scope Estimation	161
7.8	Discovering Unexpected Information from Competitors	161
7.9	Probabilistic Latent Semantic Analysis Approach	164
7.9.1	Usage Data and the PLSA Model	165
7.9.2	Discovering Usage-Based Web Page Categories	167
8	Conclusions.....	169
8.1	Summary.....	169
8.2	Future Directions.....	171
	References	173
	Index.....	181
	About the Authors.....	185



<http://www.springer.com/978-3-540-27737-8>

Web Communities

Analysis and Construction

Zhang, Y.; Xu Yu, J.; Hou, J.

2006, XI, 187 p., Hardcover

ISBN: 978-3-540-27737-8