

Contents

Part I Outline

1	Introduction	3
1.1	Motivation	3
1.2	Aims and Objectives	5
1.3	Structure of the Work	6
2	Related Work	11
2.1	Foundations and Terms of Crisis Management	11
2.2	Research Domain and Technologies of Crisis Informatics	15
2.3	Adoption of Social Media Analytics in Crisis Informatics	18
2.4	Towards Information Refinement in Crisis Informatics	21
2.5	Research Gaps and Potentials	23
3	Research Design	27
3.1	Research Field and Foundations	27
3.2	Research Approach	30
3.3	Research Context	33
3.4	Methods	35

Part II Theoretical and Empirical Findings

4	Retrospective Review and Future Directions for Crisis Informatics	47
4.1	Introduction and Brief History	47
4.2	Published Cases of Social Media in Emergencies	49
4.3	Usage Patterns—Types of Interaction in Social Media	54
4.4	Role Patterns—Types of Users in Social Media	61

4.5	Perception Patterns—Views on Social Media	66
4.6	The Past and the Future: Discussion and Conclusion	70
5	Survey on Media Perception and Use During Infrastructure Failure	75
5.1	Introduction	76
5.2	State of the Art	77
5.3	Methodology	79
5.4	Results	81
5.5	Discussion and Conclusion	87
5.6	Appendix: Survey Questions	90
6	Survey on Citizens' Perception and Use of Social Media	93
6.1	Introduction	93
6.2	Perception of the Use of Social Media in Emergencies	95
6.3	Methodology	98
6.4	Empirical Results	102
6.5	Discussion and Conclusion	111
6.6	Limitations	117
6.7	Appendix: Survey Questions	117
7	Survey on the Adoption, Use and Diffusion of Crisis Apps	119
7.1	Introduction	119
7.2	Background and Related Work	121
7.3	Representative Study: Methodology	128
7.4	Results	130
7.5	Discussion and Conclusion	138
 Part III Design and Evaluation Findings		
8	Design and Evaluation of Social Media Guidelines for Citizens ...	147
8.1	Introduction	147
8.2	Related Work: Challenges of Social Media in Emergencies and Existing Guidelines	149
8.3	Methodology	154
8.4	Results	158
8.5	Discussion and Conclusion	168
8.6	Appendix: Visualization of the Guidelines	172
8.7	Appendix: Correlations between Responses for all Guidelines	173

9	Design and Evaluation of a Cross Social Media Alerting System	175
9.1	Introduction	175
9.2	Conceptual Framing and Related Work	177
9.3	Requirements Analysis: Methodology, Pre-Studies and Workshops	189
9.4	Development and Architecture of a Cross-Platform Social Media Based Alerting System	191
9.5	Methodology of the Systems' Evaluation	197
9.6	Results of the Systems' Evaluation	202
9.7	Discussion	208
9.8	Conclusion	212
10	Design and Evaluation of an Active Relevance Classification System	215
10.1	Introduction	216
10.2	Literature Review	218
10.3	Technological Basis: Social Data Management and Analysis	230
10.4	Evaluation I: Relevance Classification via Batch Learning	240
10.5	Evaluation II: Relevance Classification via Active and Online Learning	257
10.6	Discussion and Conclusion	265
11	Design and Evaluation of a Mobile Crisis App	273
11.1	Introduction	274
11.2	Related Work and Comparison of Crisis Apps	275
11.3	Development and Architecture of the Emergency Mobile App	279
11.4	Evaluation of the Emergency Mobile App	284
11.5	Discussion and Conclusion	293
Part IV Conclusion and Outlook		
12	Information Refinement Technologies for Crisis Response	299
12.1	Overview of the Information Refinement Framework	299
12.2	Event Perspective	301
12.3	Organisational Perspective	305
12.4	Societal Perspective	308
12.5	Technological Perspective	312

13 Conclusion and Future Work 333

13.1 Main Findings 333

13.2 Empirical and Theoretical Contributions 339

13.3 Design and Practical Contributions 341

13.4 Limitations and Future Work 343

References 347