Contents

Foreword **xiii**

Acknowledgements **xv**

Abstract **xvii**

1 Introduction **1**
1.1 Motivation 1
1.2 Overview and main contributions 2
1.3 Publications 4
1.4 Structure of the thesis 5

2 Related work on computational trust and reputation models **7**
2.1 Introduction 7
2.2 Classification dimensions 8
2.2.1 Paradigm type 8
2.2.2 Information sources 8
2.2.3 Visibility types 10
2.2.4 Model's granularity 11
2.2.5 Agent behaviour assumptions 11
2.2.6 Type of exchanged information 12
2.3 Computational trust and reputation models 12
2.3.1 S. Marsh 12
2.3.2 Online reputation models 13
2.3.3 *Sporas* and *Histos* 13
2.3.4 Schillo et al. 14
2.3.5 Abdul-Rahman and Hailes 15
2.3.6 Esfandiary and Chandrasekharan 16
2.3.7 Yu and Singh 17
2.3.8 Sen and Sajja 18
2.3.9 *AFRAS* 18
2.3.10 Carter et al. 19
2.3.11 Castelfranchi and Falcone 20
2.3.12 Summary 21

http://libros.csic.es

2.4 Trust and reputation test-beds . . . 22
2.4.1 Test-beds based on the Prisoner's Dilemma . . . 22
2.4.2 Castelfranchi et al. . . . 25
2.4.3 SPORAS, ReGreT and AFRAS . . . 26
2.5 Conclusions . . . 26

3 The *SuppWorld* framework **29**
3.1 Introduction . . . 29
3.2 The *SuppWorld* framework, an overview . . . 29
3.3 Markets . . . 30
3.4 Conventions . . . 32
3.5 Entrance of rough material . . . 33
3.6 Production process . . . 33
3.7 Entrance of money . . . 35
3.8 Negotiation process . . . 35
3.9 The agents behaviour . . . 36
3.10 Implementation . . . 37

4 The ReGreT system **39**
4.1 Introduction . . . 39
4.2 Social Network Analysis and agent societies . . . 40
4.3 The ReGreT system, a general view . . . 42
4.4 Direct trust . . . 44
4.5 The reputation model . . . 47
4.5.1 Witness reputation . . . 48
4.5.2 Neighbourhood reputation . . . 57
4.5.3 System reputation . . . 58
4.5.4 Combining reputation types . . . 59
4.6 Putting all together: the trust model . . . 60
4.7 Ontological dimension . . . 61

5 Infrastructure: the agent model **63**
5.1 Introduction . . . 63
5.2 Multi-context agents . . . 65
5.2.1 The basic model . . . 65
5.2.2 The extended model . . . 66
5.3 Modular agents . . . 68
5.3.1 Introducing modules . . . 68
5.3.2 Messages between modules . . . 70
5.4 Specifying a simple agent . . . 72
5.4.1 A high-level description . . . 72
5.4.2 Specifications of the modules . . . 73
5.4.3 Specifications of the units . . . 77
5.4.4 The agent in action . . . 78
5.5 Specifying more complex agents . . . 79
5.5.1 A high-level description . . . 79

http://libros.csic.es

5.5.2 Specifications of the modules . . . 80
5.5.3 Specifications of the units . . . 85
5.5.4 The agents in action . . . 87
5.6 Related Work . . . 88

6 Engineering ReGreT using multi-context systems 91
6.1 Introduction . . . 91
6.2 A high level description . . . 91
6.3 Communication . . . 94
6.4 Impressions generator . . . 94
6.5 Direct trust calculation . . . 95
6.6 Social relations knowledge . . . 96
6.7 Credibility model . . . 96
6.8 Witness reputation . . . 98
6.9 Neighbourhood reputation . . . 99
6.10 System reputation . . . 99
6.11 Reputation and Trust . . . 100
6.12 Operational Semantic . . . 100
6.13 Bridge rules . . . 102

7 Experiments 105
7.1 Introduction . . . 105
7.2 The common framework . . . 105
7.3 Scenario I: Direct trust and witness reputation . . . 108
7.4 Scenario II: Social credibility . . . 112
7.5 Conclusions . . . 114

8 Conclusions and Future Work 117
8.1 Conclusions . . . 117
8.1.1 Trust and reputation . . . 117
8.1.2 Multi-context systems . . . 118
8.2 Future work . . . 118
8.2.1 Trust and reputation . . . 119
8.2.2 Multi-context systems . . . 121

A Unit theories of the ReGreT module 123
A.1 ODB - Unit . . . 123
A.2 DT - Unit . . . 123
A.3 ICR - Unit . . . 124
A.4 SCR - Unit . . . 124
A.5 CR - Unit . . . 125
A.6 Witnesses - Unit . . . 126
A.7 WRep - Unit . . . 126
A.8 NiRep - Unit . . . 126
A.9 NRep - Unit . . . 129
A.10 SRep - Unit . . . 129

http://libros.csic.es

A.11 Rep - Unit 129
A.12 Trust - Unit 130

B Experiments' specification **131**
B.1 Configuration file description 131
B.2 Configuration files of the experiments 135
B.2.1 Scenario I 135
B.2.2 Scenario II 140

Bibliography **142**

http://libros.csic.es