
Contents

Preface	ix
List of Acronyms	xi
Introduction	xvii
Chapter 1. Literature Review on an End-to-End Video Surveillance System for Public Safety	1
1.1. General description: human threats in urban areas and abnormal situation detection	2
1.2. Analytics for video surveillance	2
1.2.1. Crowd behavior analysis	4
1.2.2. Traffic analysis	9
1.2.3. Environment analysis	11
1.2.4. Individual behavior analysis	12
1.2.5. General human threat-centric urban situation analysis	14
1.3. System architecture for video surveillance	21
1.3.1. Network architecture	21
1.3.2. Computing infrastructure	23
1.4. Analytics and architecture: studies and reflections	24
1.4.1. Threats: from cyber-to-physical space or physical-to-cyber space?	25
1.4.2. Video quality impact on video surveillance: from monitoring to task-specific analytics	27
1.4.3. End-to-end measurement: from traditional QoE to task-specific QoE	28
1.5. Challenges	29
1.6. Conclusion	31

Chapter 2. A Development Platform for Integration and Testing	33
2.1. Introduction	33
2.2. Proposed framework – QoE-driven SA-centric DSS	34
2.2.1. High-level view of the system: reinforcement signal and QoE	34
2.2.2. Detailed system framework: SA-centric DSS	36
2.3. Use case – Airbus DS SLC’s target market	48
2.3.1. Introduction	48
2.3.2. Challenges	48
2.3.3. Purposes	49
2.3.4. Application case: Airbus DS SLC’s business opportunity	49
2.3.5. Target system: Airbus DS SLC’s flagship product	53
2.4. Conclusion	54
 Chapter 3. A Multi-Criteria Enriched Corrective Signal with Endogenous, Exogenous and Human Factors	 55
3.1. Context	55
3.2. Problem statement	57
3.3. Proposals	58
3.3.1. QoP for endogenous factor assessment	61
3.3.2. Task-specific QoE for endogenous, exogenous and human factors	66
3.4. Conclusion	74
 Chapter 4. A Situational Awareness-centric Predictive System for Anomaly Detection	 77
4.1. Context	77
4.2. Baseline	78
4.3. Problem statement	79
4.4. Proposals	81
4.4.1. Feature extraction experimentation and reviewing	82
4.4.2. Capability-oriented classifier study	83
4.4.3. Result-oriented classifier study	101
4.5. Conclusion	117
 Chapter 5. Towards an Autonomic Intelligent Video Surveillance System .	119
5.1. Context	119
5.2. Problem statement	120
5.3. Proposals	121
5.3.1. Time-based control	122
5.3.2. Event-triggered control	124
5.4. Conclusion	142

Conclusions and Perspectives	143
References	149
Index	161