A Service-Oriented MultiAgent Architecture for Cognitive Surveillance

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Abstract. Surveillance systems are being more and more important in a wide variety of environments. In order to obtain better results when analyzing an environment, advanced techniques based on Artificial Intelligence that go beyond segmentation, tracking, and pattern matching are being used. That is, a knowledge layer is needed for improving surveillance. This work describes the architecture of a cognitive surveillance system based on Service-Oriented Principles and Multi-Agent Systems to improve scalability, robustness, and security. Guidelines to expand the surveillance system are covered and the deployment of the architecture in a traffic scenario together with the results obtained are studied.

Key words: Surveillance, MultiAgent, Service-Oriented

1 Introduction

Surveillance systems are gradually being introduced in a wide variety of environments. Both the low price and the high performance of hardware and the evolution of the technologies used for carrying out the analysis are contributing to their expansion. Some authors make this evolution explicit by means of different generations of surveillance systems [12]. Currently, the term *third generation surveillance systems* refers to systems designed for dealing with a high number of surveillance resources. Besides, such elements are often geographically distributed over a specific environment. Thus, this type of systems are inherently distributed, not only in the information distribution, but also in the services distribution. Moreover, the notion of distribution goes beyond the physical field, that is, it also covers the semantic one, to create an environment in which different surveillance resources coexist and the information is scattered.

A complex surveillance system should be able to manage a high number of physical devices in a network, with the main goal of providing the user with useful services. In other words, the system should swap the traditional roles assigned to surveillance systems by taking the most active possible role. For example, a security guard may be interested in being warned of a crowd detected by the surveillance system, which may generate a dangerous situation if not detected on time (for example at the end of an escalator). On the other hand, inferring new