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Wireless Visual Sensor Networks for Smart City Applications: A Relevance-based Approach for Multiple Sinks Mobility

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Abstract

Nowadays, the major cities of the world have to solve problems that were unthinkable in past decades. Due to the population growing rate, new issues are still arising, but technology can be used to address such issues and improve life quality in big cities. In that scenario, surveillance is a highly desired service and most governments are already using different types of devices to provide high levels of security. Wireless Visual Sensor Networks (WVSN) can be used to monitor every part of a city without the cost of running cables all over it. However, there must be an efficient way to gather all information collected by the sensors and cameras, with reduced energy consumption and average latency. This work proposes a new algorithm to position multiple mobile sinks in WVSN deployed along roads and streets. A relevance-based approach was designed to position sinks closer to source nodes with higher sensing relevance, since they are expected to transmit more data packets. The proposed algorithm can detect forbidden and disconnected zones, making sure sinks will be positioned in permitted areas, which makes this approach very suitable for realistic smart city applications.

Keywords: multiple sinks, sink positioning, smart cities, wireless visual sensor networks

1. Introduction

Many cities around the world have several issues on resources management, security, urban mobility, etc. Additionally, as more and more people migrate from rural to urban areas, these issues multiply, turning the management of all city infrastructures into a hard task. Technology is being used to support better cities management by automating some tasks and predicting problems before they occur [1]. Through the use of sensors, it is possible to solve critical issues to the creation of efficient and sustainable smart city applications, bringing significant results [2].

Many problems can be solved by smart cities technologies, for example when detecting water leaks in the supply system, enhancing the reading of energy meters for automated

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