



A system for Real time monitoring of buildings with cultural heritage importance using wireless sensor networks

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Simultaneously real time monitoring of buildings usually requires several different sensors. Even if the number of monitoring items is small the cost of monitoring devices plus the telemetry needed could increased in excessive values. For this reason the use of autonomous sensors is indicated. These devices are self contained embedded computers capable of hosting several sensors and communication boards and providing local computing processing. The acquisition of high resolution physical quantities using low power wireless sensor nodes consist a Wireless Sensor Network (WSN). By using these systems it is easy to collect different data from different clusters of sensors using low cost sensor nodes. The main concern for these approaches is the optimization of data acquisition regarding the management of energy capacity and available radio bandwidth.

In this study we propose an optimized management scheme for monitoring historical buildings at the city of Chania using sensor nodes connected to high resolution uniaxial and triaxial embedded accelerometers. A number of sensor nodes are placed in every building. Since an event is not a linear process regarding its time occurrence and the produced results in each sensor node (due to sensor temporary malfunction or existence of noise) we followed a non linear approach. The proposed management scheme focus on the optimum self configuration of the network in a hybrid star topology. It is based on public available TinyOS and produces hierarchical rules in order to have at least one central node (the one that sends all the data to the remote data centre). Example policies that demonstrated is thresholding, noise removal, triggering and event correlation which are implemented using wavelet transform techniques.

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