

Wireless network monitoring systems for cultural heritage buildings

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ABSTRACT

This paper focuses on the use of wireless sensors networks (WSN) on cultural heritage buildings for long-term monitoring purposes. This technology is highly attractive because of both the reduced dimensions of the sensors and the absence of cables, that ensures a small visual impact. In this way, the need of a long-term monitoring is addressed without significant impact on the features of the cultural heritage. Nevertheless, this technology is still growing, and several issues still need to be addressed: wireless connection of signals is not even simple because of the thickness of the structural elements, size of the transmitted packages could not be too large, thus implying low frequency resolution and small length signals, etc.[1] [2].

In this emerging scenario, this paper discusses and reports on an automated procedure setting-up for the Modal Tracking (MT) of the Modal Parameters (MP) obtained from long-term monitoring data. The considered data were recorded through a WSN recently installed on a representative historic structure: an ancient masonry tower [3]. The monitoring system has been built with cheap devices, ensuring a wide applicability to the cultural heritage. As shown by several authors [4] [5], the tracking of the frequency across a suitable time span allows to identify possible structural anomalies and/or checking the effectiveness of a specific retrofitting. The results of the first six months are discussed in detail, showing performances and criticism of the monitoring system.

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