Design and realization of a system based on wireless sensor networks for noise pollution monitoring

Abstract

This thesis concerns the field of environmental monitoring by wireless sensor networks, in particular manner, our objective is the noise pollution monitoring in urban and industrial areas.

At present acoustic pollution measurement is executed by the use of a phonometer, which, for data collection, uses a professional microphone very expensive, with a linear frequency response. Our solution has the objective to realize a distributed sound level meter, or project a low performance sensor node, very cheap if compared to professional phonometer cost.

The phases of our project are:

1) realization of a signal amplification and filtering block;

2) project of an anti-aliasing circuit through a band pass filter;

3) implementation of a circuit which permits the extraction of root mean square value of the signal;

4) project of a comparator block in order to value if happened the overcoming of the noise threshold, for a particular acoustic class.

The final idea of this work is to obtain a distributed network, with a large number of sensor nodes, for realizing a continuous and autonomous acoustic monitoring, without human interventions in the interested zone.