



A low cost automatic weather station

Andrea Antonini (1), Gianni Camici (3), Martino Coppola (3), Giuseppe Floriddia (4), Gabriele Rafanelli (3), Alessandro Pinto (3), Luca Bini (2), and Ilaria Cantini (3)

(3) Benvenuto Cellini Firenze - High School, Italy (icantini@cellini.fi.it), (2) Az. Agr. La Capannaccia - Agricultural Farm, Italy (luca.bini@lacapannaccia.com), (1) LaMMA Consortium, Italy (antonini@lamma.rete.toscana.it), (4) Parsec s.r.l - Company, Italy (gfloriddia@parsecsrl.net)

The main objective of the project was to develop a low cost weather station to be used in farms for weather monitoring in crop grow control, viticulture, pest prevention for olives and other agriculture applications. Additional applications are in urban environments and in the integration with existing trust networks for better characterization of weather phenomena on very limited space and time scales, where major problems of extreme weather phenomena occur. Adaptation strategies must start from the knowledge and the availability of additional information. Crowdsourcing of weather data offers a way for the augmentation and densification of data collected in real time. The diffusion of a large number of sensors, can be possible through the use of low cost sensors and technologies.

The project has been fully developed under the supervision of teachers, and experts, involving potential stakeholders interested in the use of sensors in agriculture. Some traditional sensors, tipping bucket raingauges, magnetic reed devices anemometers, capacitive/resistive thermohygrometers, and an innovative impact piezo-element rainauge have been adapted in order to develop the meteorological station. An Arduino-based control system has been implemented. The fully automatic equipment sends real time data using wi-fi. A remote system collects data from different independent measuring points.

This work fits some issues of climate change awareness, experimentation of low cost technologies in environmental monitoring and maker education.

Despite the low nominal cost of meteorological data collections, their current use with alternative precision for applications in smart agriculture and climate change monitoring and adaptation may be possible only through a massive work of sensor calibration to reach the standards of the WMO. In any case also in absence of absolute calibration the quantification of measurements uncertainties is mandatory to give value to the amateur network observations.

All these aspects are included in the presented work, an attempt to develop a low cost weather station for stakeolder and educational purposes, with lateral effects of awareness among students.