SAVE
grape protection

The Internet of Things in the vineyard: the advanced monitoring system for an efficient and profitable management

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AURORAS
YOUR NEXT SENSE

THE PROBLEMS IN THE VINEYARDS

The climate always influences the viticulture. The unpredictable weather often requires preventive interventions beyond the normal scheduling.

The grape grower has based his work on the basis of experience and field observation with subsequent increase in costs and waste of time and energy.
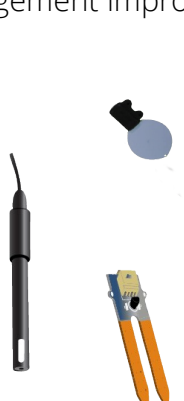
Not only, in view of an organic farming - choosen by always more farmers – and because of more stringent rules, the use of pesticides and fertilizers should be decreased, showing respect for the environment and the consumer. So the treatments should be made only when are necessary.

Aimed treatments and a in-depth knowledge

of your own vineyard are important for a more profitable management and an high protection of grapevine.

Now technology is a valid support for the grape grower and a precision viticulture. This is why Auroras S.r.l. created SAVE, the Internet of Things for the vineyard.

SAVE, the technological ally

SAVE is an advanced monitoring system (equipped with wireless sensors) of **the environmental and patho-physiological conditions of the vineyard.** The SAVE wireless sensors make it possible to constantly monitor the real-time conditions of the vineyard.

The micrometeorological data, collected through the sensors, are stored in order to allow Long-Term Analysis for business management improvement.

The system is flexible and modular, and comprises a set of wireless sensors installed on the field.

These sensors send the data to a gateway which, in turn, forwards them to the Auroras Services Centre without manual activity.

The photovoltaic panel, which powers SAVE, and the data transmission **via GSM/GPRS/3G** allow the system to work self-sufficiently and autonomously. All the data collected from the vineyard and transmitted to Auroras Services Centre can be **consulted in real time** from any internet-connected computer, tablet or smartphone.

sensors → multi-sensor group → devices

HOW IT WORKS

SAVE allows the vine grower to deliver actions based both on the **experience** and the **scientific parameters** provided by wireless sensors.

The data are transmitted from the multisensor group to Auroras Services Centre where they are collected and protected in a database. Later they are processed by the monitoring system.

SAVE is able to automate the alert sending by sms and emails on the occurrence of planned events.

The data collection and processing allow **to plan the intervention times** according to predictive models of grape diseases (for example: downy mildew and powdery mildew) and to support the decision-making.

The principal purpose of the monitoring system SAVE is to cut down on the intensive use of phytosanitary treatments and to contain the environmental and health risk.

The data, collected on the field by wireless sensors, provide accurate information which allows:

- to estimate the probability of incubation and development of **grape diseases** such as downy mildew, powdery mildew and botrytis, in the different areas of the vineyard.

- to create **predictive models** depending on the phenological phases of the grapevine. These models are very reliable thanks to exact data collected in the vineyard.

- to monitor **microclimatic conditions**. The high-accuracy measurement of temperature and humidity together with prediction models allow, for example, to evaluate the frost risk. The night frost prediction model estimates, in the afternoon, the probability that the event will occur.

- to monitor irrigation and **soil** moisture at different depths.

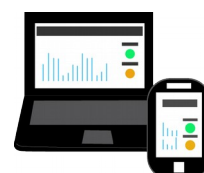- to monitor and manage **servomotors**

Collection of micro-climate data

Processing of predictive models

Intervention planning

Data transmission to pc/tablet/smartphone

WIRELESS SENSORS

The wireless sensors are located on the field where they constantly collect data concerning the micro climate conditions of the vineyard.

They measure temperature, air relative humidity, soil moisture, wind, atmospheric pressure, rainfall, light intensity, dew point, leaf bathing, diametric growth, ph and conductive soil.

Wireless sensors available:

Thermo-hygrometer, integrated sensor which measures temperature, air humidity and dew point.

It's recommended in calculating the Evapotranspiration, the dew point, the soil and climate criteria and for predicting frosts. It's useful in signalling heat stroke and pathogens development.

Soil humidity sensor calculates the volumetric water content of soil according to the dialetric constant measurement. The sensor allows to control the water content of soil in order to optimise irrigation and treatments as well as to support agronomic studies.
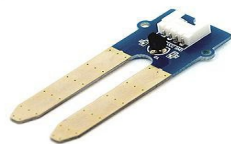
Tensiometer measures the effort of the roots to extract water from the soil. It's useful to optimize irrigation and treatments.

Luximeter, reveals illuminance. It's useful for agronomic studies.

Camera module – Camera I.R. - Thermo

Weather station includes an anemometer, a barometer, a thermo-hygrometer and a rain gauge in order to reveal wind, atmospheric pressure, temperature, relative humidity, dew point, frost and rainfall. It's useful to optimize irrigation and treatments.

EC, measures conductive soil. It's useful to optimize treatments and agronomic studies.

Leaf wetness sensor reveals the bathing on the lower and upper side of a leaf in order to verify and monitor the fungal diseases. A well-timed intervention can limit damage.

Sensore UV reveals UV rays which affect the plant growth and the control of pathogens.

Solar radiation, measures the radiation intensity which affect atmospheric temperature, soil temperature and, indirectly, humidity.

Diametric growth sensor controls the plant health and physiology in addition to periods of hydric stress.

SAVE SYSTEM IS MODULAR SO THE SENSORS CAN BE CHOSEN ON THE BASIS OF THE CUSTOMER NEEDS.

USE AND ANALYTICAL TOOLS

How to use:

SAVE is *accessible*, for management and consultation, *from any internet-connected computer, tablet or smartphone*, thanks to a simple and intuitive web-based graphical interface.

The data can be consulted and examined by owner, technicians and consultants which can access through *authentication*.

No installation of additional software requested: the interface is usable by internet connection.

It's also available the local installation.

Auroras provides design, supply and implementation services for SAVE system.

Tools:

CONTROL

SAVE web interface is the point of access to monitor the meteorological data in real time. The software allows to control the **accuracy of the system and the proper acquisition of data by sensors**.

SAVE makes it possible **to manage remote irrigation system** by operating the connected solenoid valves without going to the field.

REPORTS

The data processing can be consulted by means of the web interface. The data are available in graphs and reports.

Reports are customizable and exportable to a spreadsheet in order to be stored for any subsequent consultation
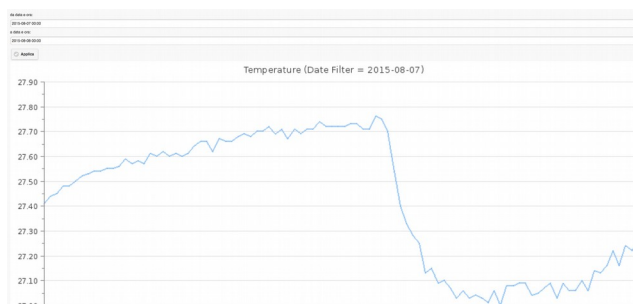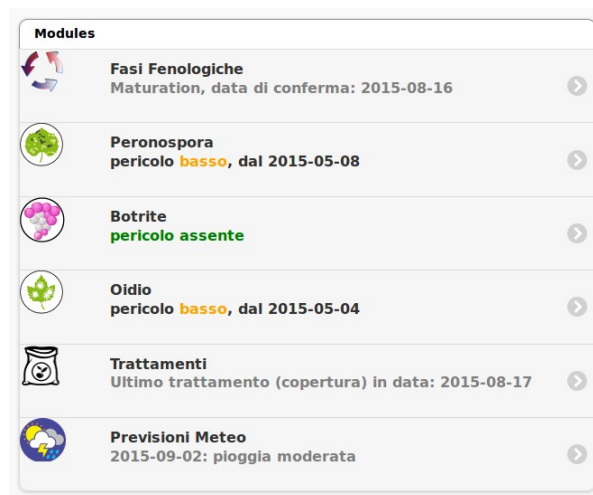
GRAPHS

The graphs on different time intervals are based on the analysis of historical data. They are exportable in a image format.

By the web interface, you can see **the map of your vineyard and where sensors are installed**.

THE MODULAR PROACTIVE SYSTEM

SAVE supports the decision-making, thanks to effective analysis of data.

It's a modular monitoring system which guarantees flexible implementation. Save is perfectly customizable, according to specific needs.

The central unit can be **supplied by mains or photovoltaic system** and can be equipped with different solutions for connectivity such as ethernet, wi-fi. wi-max and GSM.

INSTALLATION SERVICE

INSTALLATION
The installation is preceded by a survey in order to find the ideal place for sensors on the basis of specific features of soil and cultivations.

SIZE AND POWER SUPPLY
SAVE system includes a central unit (multisensor group) and any wireless sensor located on the field.
You can choose different solutions.
The central unti can be supplied by mains or photovoltaic panel.

SERVICE
Auroras Services Centre controls constantly the system efficiency in order to prevent malfunctions and undertake the tasks of reactivation.

Auroras provides service and maintenance. Timescale for actions and maintenance frequency vary depending on the commercial offer purchased.

According to the sensors installed, SAVE provides different predictive models such as **prediction of pathogen, grape quality and analysis of soil moisture balance**.

The SAVE system can be used for **different types of vineyard** in terms of topography, pedology and climatic conditions.

Auroras wants to achieve important objectives: development, research and larger opportunities in viticulture.
We think to reach them, combining the experience and competence of grape grower and SAVE.

- **it monitors the vineyard in real time**
- **it reveals microclimatic data**
- **it collects soil information**
- **it processes predictive models**
- **it warns of the specific events**

- **it's modular**
- **it's suitable for any tipe of soil**
- **it can be implemented**
- **it doesn't require manual work**
- **it's equipped with advanced technology**

- **easy to use**
- **web data transmission**
- **protection by authentication**
- **system control to avoid malfunctions**
- **continuous system upgrade**

COMPETITIVES ADVANTAGES

SAVE makes the difference

SAVE is the ideal IoT (Internet of Things) system for the wine-growers that want

- SAVING
- PRODUCTION IMPROVEMENT
- MORE SAFETY
- And so,
- TO BE MORE COMPETITIVE.

The viticulture is going in this direction. Adopt intelligent systems such as SAVE, then, it has become a necessity to keep up with the market.

Why choose SAVE:

1 IWSAN SYSTEM

SAVE is a system of wireless sensors and actuators to detect any problems and trigger automatically alert or solutions

2 CUSTOMIZABLE ALGORITHMS

Each vineyard has its own characteristics. On the basis of these, it is realized a software for processing the data. The rules of programming are in fact completely customizable.

3 EASY AND ADVANCED

SAVE is easy and convenient to use. The control panel is designed to represent clearly the data collected. Neither the sensors or actuators need manual intervention. Auroras provides a remote service.
And finally: the data can be viewed at any time and in real time by PC, smartphone and tablet.

Once you have SAVE, you can enjoy the benefits without dealing with it.

4 SUPPORT IN DECISION-MAKING

SAVE provides reliable and continuous information of the vineyard that allow you to act in a more targeted way, saving hours of work, as well as energy.

5 DEDICATED TEAM

Auroras provides its professionalism from the outset with supervision of the vineyard and subsequent customization of rules,the team also offers a remote support.
The data are stored in the service center and are available at any time to the grower.

6 NO LIMITS

For each type of vineyard. Thanks to SAVE, the IoT power becomes easy to use with simplicity and maximum convenience.

ESTIMATED COSTS of pesticides and fertilizers
Cost reduction in a season with good weather (example)

Cost of treatment
950 Euros per hectares

Saving
475 Euros per hectares

SUMMARY SHEET

APPLICATIONS

SAVE realizes the fully integrated **control** of various conditions in the vineyard. Not only that, on the basis of the data processed by software forecasts, estimates the probability of inoculum of dangerous infections.

Environmental conditions: conductivity of the soil, temperature, humidity, wind speed, diametric growth, soil moisture, leaf wetness, brightness.

Diseases: downy mildew, powdery mildew, botrytis.

BENEFITS

- cost savings,
- higher quality and wholesomeness of the product,
- more productivity,
- forecast of fungal diseases,
- preventive and targeted interventions,
- Big Data Strategy,
- defense of the vineyard,
- Support in decision-making,
- environmental protection,
- in-depth expertise of the processes,
- data protection.

FEATURES

- **Modular:** sensors and actuators are integrated according to individual needs at any time. It is custom-built.
- **Plug and play:** ready to install and to be operational.
- **Remote control** via tablet, smartphone and PC.
- **Control Panel:** data is accessible in real time, and only after authenticating through a simple and intuitive interface.
- **Connected sensors:** several sensors simultaneously.
- **Flexible:** the needs are implemented carefully in order to carry out a project aimed, with custom rules, based on the specific characteristics of an environment or vineyard. SAVE is suitable for land with any type of morphological characteristics.

INSTALLATION SERVICE

The team Auroras provides a **preventive supervision** of the vineyard in order to better understand the specific needs and maximize performance.

SAVE is composed of a central unit and possibly other **wireless sensors with a very low consumption**. SAVE can be powered by long-life batteries. Optionally, the batteries can be recharged by solar panels of a few square centimeters of footprint. The central unit can also be powered from the mains.

The footprint is minimal thanks to wireless technology that does not require the laying of cables. This allows the arrangement also in places "difficult".

Auroras gives remote support once SAVE became operational.

SAVE
the control of the vineyard
for the excellence of fruits.

CONTACTS

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