



sensedge

developing innovative IoT solutions

Sensedge is founded on strong research, entrepreneurship and open source foundation. The team has +15 experience in IoT, mass production of electronic devices and experimental methods. Sensedge started as microclimate.network initiative – featuring dedicated sensor for monitoring microclimatic conditions and open platform for sharing and visualization of data.

Sensedge started its way to IoT with LoRaWAN as a great example of accessibility of technology. Due to the requirements from the market Sensedge is developing support for its sensors also for other LPWAN technologies.

Sensedge aims to be the leading IoT solution provider. The key elements of the mission are sustainability and continuous development through the innovation in technology and strategy. Our devotions to the mission has been recognized by several entities. European commission provided funding of innovation projects, LoRa Alliance recognized us as top 5 innovative companies in 2019.



Our start with microclimate.network initiative.

Sustainability

At Sensedge we are bound to develop sustainable IoT solutions. We are investing in research and development of new materials for sensor. We are developing new generation of sensors that will use bioplastic, recycled and ocean plastic. We are on the mission to help the planet not to produce more waste.



“

Creating a sustainable future.



watersense lacuna



Innovation

Always on the edge of possibilities. At Sensedge we love new and interesting projects that bring value to society and business. Our solutions are customizable at scale. We work closely with partners to develop IoT solutions that integrate in verticals. We help cover entire path from sensor to service.



Our offering

- Standardized IoT sensors,
- Supporting LoRaWAN, NB-IoT
- Innovative sensor solutions
- Customization of sensor functionalities
- Sensor maintenance platform

Use cases

We are bound to work with partners that create value for customers. We are keen to help customers with their unique challenges.

So far we have been helping:

- koalas in wildfires,
- improving air quality in cities,
- reducing use of pesticides
- optimize energy use in buildings,
- increase efficiency in manufacturing,
- cope with negative impacts of covid-19 measures,
- ensure safety of bridges,
- reduce disposal of medicines.

Why Sensedge?

- Easy deployment
- Reliable partner with rapid support
- Customization of sensors at scale
- Sustainability
- Engineered and Made in EU



Senstick

Senstick is an award-winning LoRaWAN sensor. It is designed to generate reliable and quality data in harsh indoor and outdoor environments. Reliability of data is ensured with high quality design and extensive testing in extreme environments. Data quality starts with controlled measurements and is supported with notifications in case of manipulation of sensors.

Senstick is designed as customizable IoT solution at scale. The Senstick family has already several sensors that you can choose from and will continue to grow. Senstick sensor functionalities include but are not limited to:

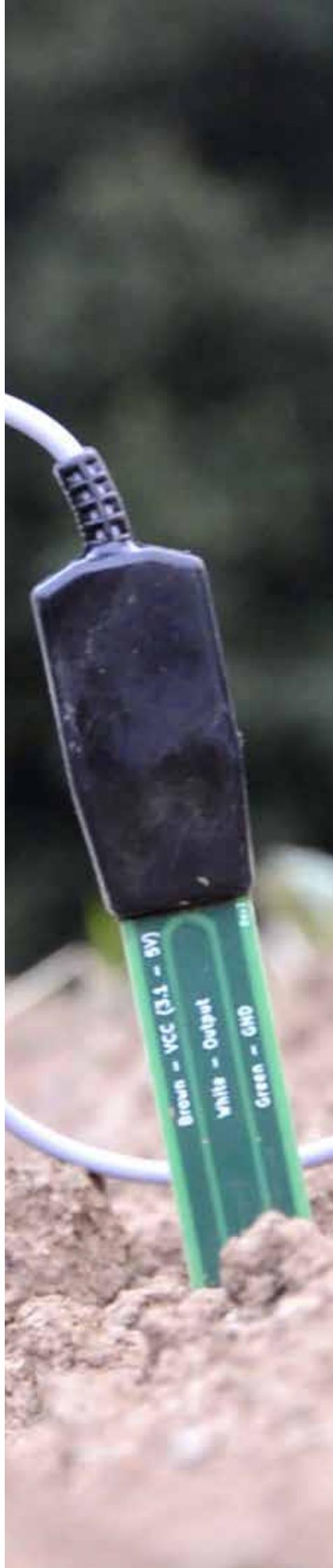
- environmental parameters (air temperature relative humidity and pressure),
- air quality (VOC, CO₂, NO_x, O₃),
- solids parameters (temperature, moisture).

More information on corresponding sensors are available in the technical specification.



Senspuck

Senspuck is the latest among our sensors. It has been designed as response to the market requirement on a cost-effective and reliable level meter. It has been developed for wide range of applications, such as water level monitoring in tanks and narrow pipes, trash bins and silo. For more information regarding can be found in technical specifications.



Reduction of medicine disposal

A refrigerator full of vaccines can be worth 20.000 EUR. They can be ruined if the exact temperature is not maintained while in storage. In addition, you face other “costs” like compromised health from using inactive vaccines.

Human error occurs when vaccine refrigerators and freezers are left unmonitored. Perhaps the staff was too busy to record log files or accidentally left a door open. Beyond human error, mechanical and power failures can happen at any time.

Challenges

- The current solution for the temperature measurements are barely or not functioning,
- Medicine quality in question due to opening of the refrigeration units

Solution

The solution was build based on the requirements set by the maintenance personnel at University Medical Center Groningen, Netherlands, a regional hospital with 1500 beds, 10k personnel.

- The measurement should be accurate to 0.5°C,
- The temperature measurement range from -2°C to +16°C for the fridges,
- Detection and alerting of open doors of refrigeration units.

Proof of concept included 10 refrigeration units followed up by the full deployment of 300. Senstick Microclimate sensors are used together with 2 indoor TTN gateways. Datastream is integrated with AWS IoT, where thresholds for alerting via email and SMS were set and reporting on health and utilization of the refrigerators.

Responsible personnel received SMS alerts in the case of temperature drop greater than 5°C in a combination of detection of opening the door. Also, digests on temperature swings for maintenance inspections and trend of utilization are issued on a weekly basis.



Senstick Microclimate installed inside the refrigeration unit.



Refrigeration unit in UMCG hospital, NL.

40%

time saved on manual inspections

5%

reduction of medicine disposal

Frost protection in vineyards

During the growing season, all green parts of the grapevine are susceptible to frost. Spring is a particularly delicate period for the vines, since spring frost often damages opening buds and young shoots, and hazards the crop load. In some regions, fall frost that occurs prior to the harvest, can lead to premature leaf fall, and increase susceptibility pests.

In order to prevent vineyard frost damage active methods, such as heaters, can be used. Weather stations across the vineyard which provide measurements that can be utilized to warn on extreme weather conditions. However, the local microclimate measurements are just a partial solution.

Challenges

- Reduced yield due to frost
- More pesticide use
- Time spend on interventions

Solution

The objective of the project was to reduce the use of heaters by increase the relevance of the warning for frost protection. The concept of the solution is to utilize national weather forecasts and measurements of the local microclimate in vineyard together with artificial intelligence to produce localized weather forecasts and pass relevant warnings to the user.

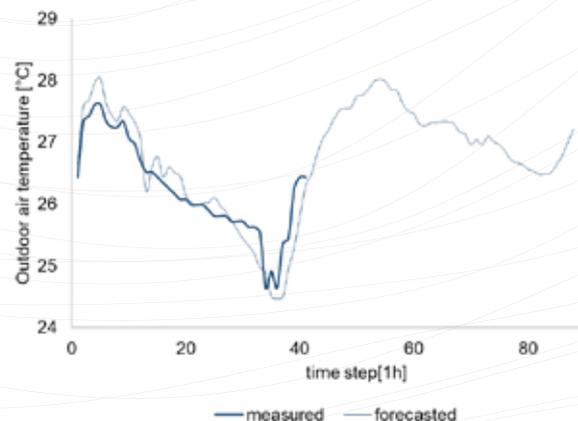
In the project, we have dispersed 20 Sensticks Microclimate units with solar shields on 5 ha of vineyards on 4 different locations. We have used 1 LoRaWAN gateway to ensure connectivity for sensors.

The data was gathered and processed on the microclimate network platform. Advanced algorithms were used to adjust weather forecasts from a national agency according to a local microclimate. As a result, 20 different local weather forecasts were generated every 24h.

The user received a warning for the part of the vineyard where the forecast overcome the threshold of the dew point temperature. Based on the warning, heaters were utilized to reduce to prevent frost.



Senstick Microclimate with solar shield in the vineyard, South Australia.



Forecasted outdoor temperatures based on the national weather forecast and measured local microclimate.

30%
increase in reliability of alerts

15%
time saved on inspections

10%
reduction of active frost protection



SMC20

LoRaWAN Sensor for temperature, relative humidity and air pressure.

Key features:

- Indoor and outdoor use
- Temperature, relative humidity and air pressure
- Motion detection
- High and Low parameters alarm values
- Sensor manipulation alert
- Battery level feedback
- Reconfiguration Over The Air
- Standardized sensor enclosure - IP65 rated
- Easy to install with included mounting kit
- Up to 15 km of range (LOS)

Technical specification:

- Temperature: Range -40°C to $+85^{\circ}\text{C}$; Accuracy $\pm 0.3^{\circ}\text{C}$
- Relative Humidity: Range 0% to 100%; Accuracy $\pm 2\%$
- Atmospheric pressure: Range 880 to 1080 hPa; Accuracy ± 1 hPa
- Accelerometer: Range ± 2 g to ± 16 g; Accuracy ± 40 mg
- Dimensions: 18 mm x 210 mm

Connectivity:

- LoRaWAN 868 MHz, 915 MHz and 923 MHz

Power supply:

- 2x AAA batteries (up to 5 years of operation)

Potential applications

- Harsh industry
- HVAC
- Smart cities
- Cold chain management
- Temperature-controlled supply chain
- Data centers
- Smart buildings
- Energy audits
- Precision agriculture
- Environmental conservation and preservation



LoRaWAN™

CE FC

STP20

LoRaWAN temperature sensor.

Key features:

- Indoor and outdoor use
- High and Low parameters alarm values
- Sensor manipulation alert
- Battery level feedback
- Reconfiguration Over The Air
- Standardized sensor enclosure - IP68 rated
- Easy to install with mounting kit
- Up to 15 km of range (LOS)

Technical specification:

- Temperature: Range -40°C to $+125^{\circ}\text{C}$;
Accuracy $\pm 0.3^{\circ}\text{C}$ 1.5 m cable
- Senstick dimensions: 18 mm x 210 mm

Connectivity:

- LoRaWAN 868 MHz, 915 MHz and 923 MHz

Power supply:

- 2x AAA batteries (up to 5 years of operation)



LoRaWAN™

CE FC

Potential applications

- Monitoring soil temperature
- Notification in temperature rise in wine barrels
- Measuring temperature of roads

SSM20

LoRaWAN soil moisture indicative sensor.

Key features:

- Indoor and outdoor use
- High and Low parameters alarm values
- Sensor manipulation alert
- Battery level feedback
- Reconfiguration Over The Air
- Standardized sensor enclosure - IP68 rated
- Easy to install with mounting kit
- Up to 15 km of range (LOS)

Technical specification:

- Operating temperature range +2°C to +45°C
- 75Mhz capacitive sensor
- 1.5 m or 5 m cable
- Probe dimensions: 170x25x15mm
- Senstick dimensions: 18 mm x 210 mm

Connectivity:

- LoRaWAN 868 MHz, 915 MHz and 923 MHz

Power supply:

- 2x AAA batteries (up to 5 years of operation)



LoRaWAN™

CE FC

Potential applications

- Monitoring soil moisture in field
- Automated irrigation system: Greenhouses, Urban agriculture, Green roofs

WS100

LoRaWAN Sensor for Level Measurements.

Key features:

- Indoor and outdoor use
- Distance Measurements
- Motion detection
- High and Low parameters alarm values
- Sensor manipulation alert
- Battery level feedback
- Reconfiguration Over The Air
- Standardized sensor enclosure - IP67 rated
- Easy to install
- Up to 15 km of range



Technical specification:

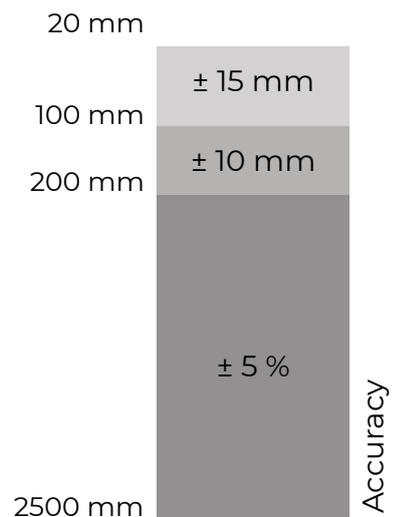
- Level: Range 20 mm - 2500 mm;
- Temperature: Range -40°C to +65°C; Accuracy $\pm 0.5^\circ\text{C}$
- Accelerometer: Range $\pm 2\text{ g}$ to $\pm 16\text{ g}$; Accuracy $\pm 40\text{ mg}$
- Dimensions: 75 mm x 28 mm

Connectivity:

- LoRaWAN 868 MHz, 915 MHz and 923 MHz

Power supply:

- 2x AAA batteries (up to 5 years of operation)



Potential applications

- Water tanks
- Waste bins
- Silos
- Drainage pipes

SIAQ30

LoRaWAN Sensor for indoor air quality and microclimate.

Key features:

- Indoor use
- Indoor air quality (Index)
- Temperature, relative humidity and air pressure
- Made of sustainable materials
- Battery level feedback
- Reconfiguration Over The Air
- NFC configuration
- Easy to install with mounting kit or desk stand
- Up to 15 km of range (LOS)

Technical specification:

- IAQ: Range 0 to 500; Accuracy $\pm 5\%$
- Temperature: Range 0°C to $+65^{\circ}\text{C}$; Accuracy $\pm 0.5^{\circ}\text{C}$
- Relative Humidity: Range 10% to 95%; Accuracy $\pm 3\%$
- Atmospheric pressure: Range 300 to 1100 hPa; Accuracy ± 0.6 hPa
- Dimensions: 18 mm x 120 mm

Connectivity:

- LoRaWAN 868 MHz, 915 MHz and 923 MHz

Power supply:

- 1x AAA batteries (up to 10 years of operation)



Potential applications

- Schools
- Smart buildings
- HVAC
- Offices



sensedge