



Smart Sensing for Agriculture



Version 02

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or visit www.yuktix.com for more information and downloads.

Executive Summary

Two billion people depend on agriculture for sustenance on this planet. A growing population, climate change, dependency of production on high usage of fertilizer, pesticide, and water is raising sustainability concerns for existing agriculture practices. Agriculture deploys a majority of the population yet it remains one of the industries with the least digital adoption. The spectacular agriculture production increase of the sixties and green revolution is showing signs of stress. The world needs better ways to do agriculture in wake of unstable weather, global warming, increased urbanization, and resource depletion.

Talking of India, 30-35% of annual crop yield in India goes waste because of pests as per ICAR (Indian Council of Agriculture Research) data. Indian produce is banned from export due to high pesticide traces. The operational efficiency and yield per hectare in India would be the lowest in the world. The rampant borewell and free electricity are pushing us towards a future where there will be no water left. We are not followers of sustainable practices and have little mechanization and data-driven decision systems.

The current practices are based on guesswork and there is little emphasis on improving decisions using data. The lack of primary data itself is glaring. The question then is, how can we develop better agriculture practices, develop solutions for climate controlled agriculture, reduce resource usage, avoid post-harvest waste, reduce pesticide and fertilizer dependency and improve quality along the whole value chain?

The solution to the above problems will be multifaceted. No one organization is capable of addressing all the concerns. We need solutions in farm mechanization, better testing kits, better varieties of crops, organic and urban gardening practices, better market linkages, better warehouses, better government policies, and better instruments. We need improvements in sensor technologies, satellite data acquisition, imaging technologies, supply chains, and logistics, market platforms and right regulatory frameworks to address all the challenges.

The good news is that technology is at an inflection point where cost-effective solutions can be deployed to address many of the above concerns. This document details the solutions offered by Yukti technologies and how they are helping the agriculture value chain.

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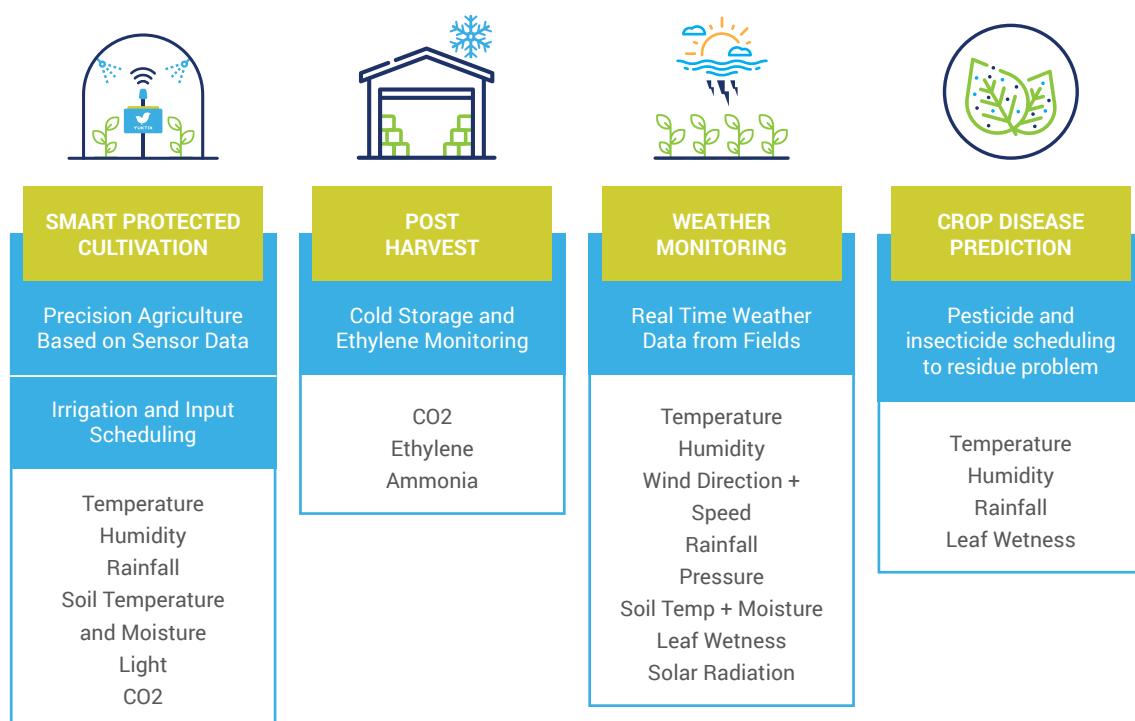
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About Yuktix

Yuktix is a Government of India recognized DIPP startup and a registered manufacturing MSME based out of Bangalore, India. We are developing smart sensing solutions for agriculture and continuous environment monitoring.

Data based decision systems are improving outcomes in all industries and agriculture is no exception. The practitioners and researchers in agriculture can benefit from the timely availability of data. A large class of problems due to non-availability of the data in agriculture can be solved by utilizing sensors and associated ICT systems. Examples are early pest warning systems, disease identification, micro weather trends, frost prediction, process optimizations in climate controlled systems and applying soil data to regulate water supply. Agriculture is affected by the environment at all stages. During production, The change of seasons determine the sowing and harvest time, the availability of nutrients in soil affect plant health, the micro weather conditions lead to disease onset and spacing of light pulses decide the size of petals in floriculture. The problem is not confined to open field agriculture but affects aquaculture, animal husbandry, and related areas as well.

We make sensor based devices that provide data for better decision making across the agriculture value chain.



Yuktix provides devices that can measure variables critical for agriculture practitioners like temperature, humidity, light, rain, leaf wetness, soil temperature, and soil moisture. We believe cost input is one of the biggest obstacles to adoption and we provide the best price reliability ratio solutions. Our devices are equipped for modern networking and we provide connectivity and computations out of the box.

Yuktix hardware is optimized for low power consumption. The devices can run on batteries or solar power for years without requiring a change. We provide GPRS, Sub Giga Hz long-range radio and Wi-Fi out of the box. The plan to add a low orbit satellite communication is a work in progress.

Yuktix ankiDB™ cloud software provides device management and continuous monitoring tools to store and analyze data out of the box. We provide the ability to run computations and distribute it via REST API for product dashboards or downstream integration.



Micro Weather Station

Micro weather monitoring is important for open field plantations and is one of the best-understood data capture requirements in agriculture. The micro weather data comprises of temperature, humidity, pressure, rain, wind speed, wind direction, solar radiation, evaporation, soil moisture, and temperature etc.



Temperature and humidity are common across most of the requirements. The plants require a certain temperature and humidity range to thrive. The fungi and pathogens also thrive in certain environmental conditions. Like, mildew worms in grapes happen in certain leaf wetness, temperature and rain conditions. Open field agriculture practitioners may also need evaporation and solar radiation data.

Rain and soil are also critical variables. Soil needs to be monitored at different depths. Water intensive crops need soil moisture sensors to check if the roots are getting water or not. Soil nutrients like NPK need to be monitored to check soil health. Different soil can have different pH and thus suitability for different crops.

Temperature and humidity can be done with help of semiconductor sensors. The way to measure rain is via gauges or tipping rain buckets. Wind speed and direction sensors are analog sensors. The rate of evaporation can be monitored using an evaporation PAN. A depth sensor can be used for automatic pan depth measurements. For disease onset and prediction, four sensors, namely, Rain, Leaf wetness, temperature, and humidity are critical. Leaf wetness sensors try to mimic the presence of water on leaves using conductive or capacitive measurements.

The availability of the hyper local weather data is critical to scope out the farm level conditions. The data captured from satellites are at a much lower resolution and cannot help answer farm level questions. A grid of weather stations capturing micro weather data can be deployed to collect real-time data from the field that can be used to analyze weather conditions and develop advisories.

The micro weather data can help agriculture practitioner answer questions like.

Did plants get sufficient light?

Do we need to plant seeds now?

Are conditions conducive for pathogens and onset of diseases?

Do we need to irrigate?

Do we need to spray pesticide?

Yuktix Weather Stations are available in three versions.

Citizen Grade	Temperature, Humidity, Pressure, and Rainfall.
Professional Grade	Temperature, Humidity, Pressure, Rainfall, Wind Speed, and Wind Direction.
Research Grade	Temperature, Humidity, Pressure, Rainfall, Wind Speed, Wind Direction, Soil Moisture, Soil Temperature, Leaf Wetness, and Solar Radiation.

Yuktix Advantage

The current mode of measuring hyper-local climate is an instrument model where costly sensors are deployed in a weather observatory. The cost and time implications prohibit collection of hyperlocal data with sufficient resolution and frequency. The lack of availability of data in real time in a consumable format forces data silos and prevents timely actions.



Manage Multiple Stations



Mobile App + Website



Made In India



Accessing Data
is Simple



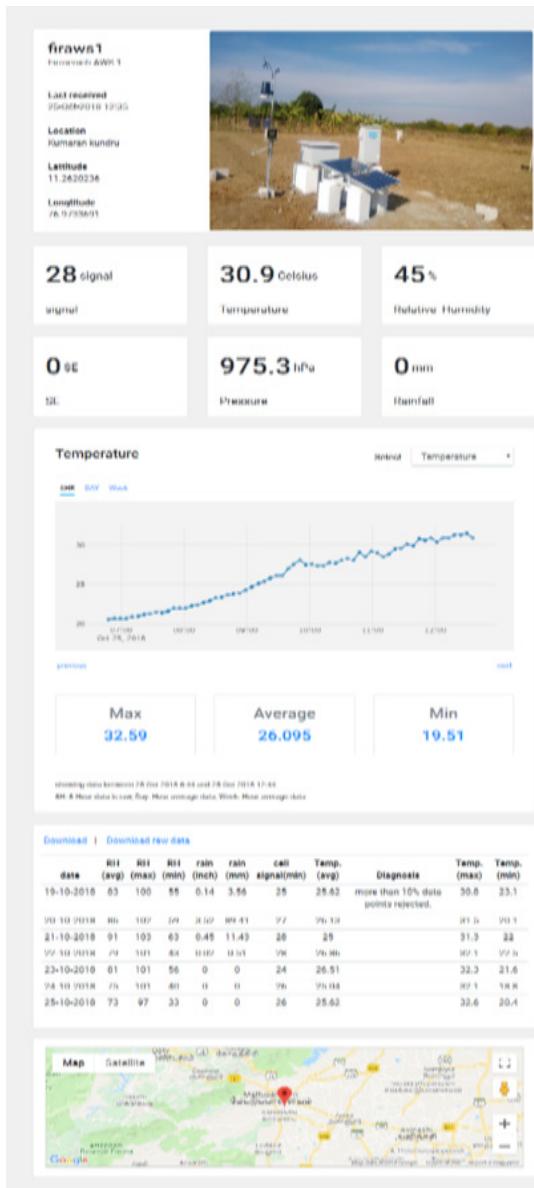
Off Grid
Capabilities



Always On

Yuktix has developed indigenous solar powered micro weather stations that are capable of providing data in real time anytime and anywhere.

Micro Weather Dashboard



Key Highlights of Micro Weather Dashboard

View latest trends and reports on your dashboard.

Create multiple users and restrict access to the data.

Local weather prediction and satellite data integration.

Reports integration. You can view and download daily, weekly and monthly reports.

Compare data from different weather stations.

Access last 6 hour, last 24 hours, last 7 days data graphs.

Download raw data as well as report data between any 2 dates.

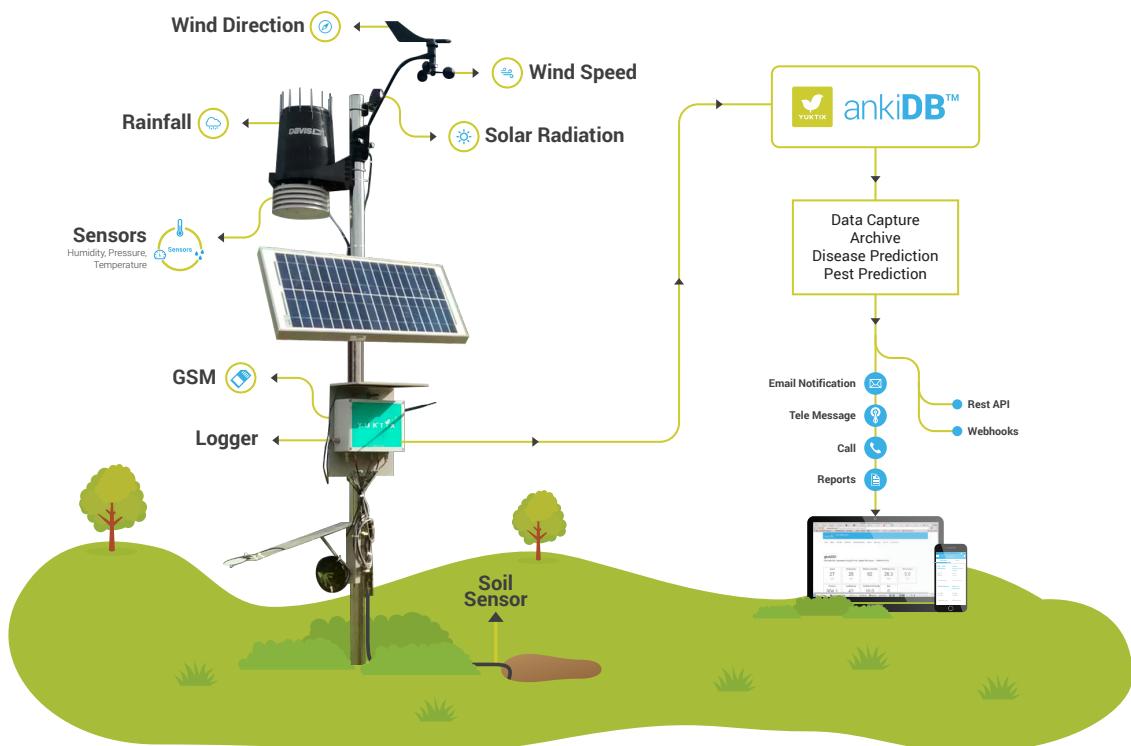
Set alerts for individual sensors.

Receive reports in your email.

Salient Features

-
- 01** High price to reliability ratio allows to deploy more units in the same budget.
-
- 02** Networked system to allow access to all stations from a single dashboard.
-
- 03** Easy to install and operate using a single pole design.
-
- 04** Solar power stations are suitable for off-grid deployments. Yuktix has been running the weather stations in far-flung locations, on lake fronts, in forests and in the jungles of Nilgiri Mountains.
-
- 05** GPRS and satellite connectivity to cover all the locations.
-
- 06** Real time data collection and distribution.
-
- 07** Out of box reports and analysis. Run computation like ETO, disease models and customized reports from the same dashboard.
-
- 08** Redistribute data to other stakeholders using REST API or push gateway.

How It Works



Yuktix micro weather board collects data from different sensors and sends it to the Yuktix ankiDB™ cloud using a data SIM card. The ankiDB™ collects the incoming data in a time series database. Different computations and reports are run on top of the collected data to come up with actionable intelligence.

Micro Weather Hardware

Yuktix Weather Station is built using following components:.

- 👉 A powered optimized micro controller board for sensor interfacing.
- 👉 Solar charger with an integrated Battery Management System (BMS)
- 👉 Communication interface to incorporate GPRS, satellite modem and other communication options.



Specifications of Micro Weather Hardware

- 👉 Low power optimized, idle consumption is in micro amperes.
- 👉 Micro controller based modular design to accommodate different communication options like GPRS, Wi-Fi, low orbit satellite and LORA.
- 👉 Provides interface for commonly used weather and agriculture sensors.
- 👉 SD card for local data storage and online synchronization.
- 👉 Weather proof enclosure (IP 67) for outdoor usage.
- 👉 Long time battery backup of 7 days.
- 👉 Real Time Clock (RTC) for accurate timestamping of data.
- 👉 Solar charging and battery backup.
- 👉 Single pole mounting design for easy installation.

Micro Weather Sensors



Temperature

-40 to 123.8°C with an accuracy of ± 0.1 degree centigrade.



Relative Humidity

$\pm 2\%$ variation measured.



Solar Radiation

Spectral response of 400 to 1000 nanometer with an accuracy of $\pm 5\%$ full scale (PYRA 300V)



Rainfall

Tipping bucket accuracy of 0.01 inch or 0.02 mm



Pressure

Range: 300 - 1100 hPa, resolution of ± 0.12 hPa at 25°C, ± 0.02 mm



Wind Speed

± 2 meter/hour, 0.1 km/h.
max. speed 160mph



Wind Direction

$\pm 5\%$ accuracy.



Soil Moisture

Dielectric premittivity range 0-81.88 can be calibrated for Mineral Soil, Potting Soil, Rockwool, and Perlite.



Soil Temperature

Minus 40°C to 50°C with resolution 0.1°C and 50°C to 110°C with resolution 0.5°C



Leaf Wetness

Dew, Wet, and Dry Calibration

Applications

Disease Prediction	ETO Calculations	Vegetation Index	Hyper Local Weather Prediction
Pesticide Scheduling	Rain Data Analysis	Pest Prediction	

• Satellite Imaging

Yuktix agriculture dashboard provides images.

NDVI (Normalized Difference Vegetation Index)

Land Cover and Health Change Map

Soil Moisture

Using NDVI images, one can locate the hotspots and so preventive care like pesticide spraying with precision.

Yuktix GreenSense - ICT tool for agriculture

Yuktix GreenSense is an off-grid precision agriculture product for open field agriculture, climate controlled agriculture, orchards, and vineyards. Smart decision systems in agriculture would require timely availability and real-time number crunching of data. Yuktix GreenSense product helps cover a plantation, orchard, farm or greenhouse with battery-powered sensor nodes and solar powered routers to create multipoint sensing solutions.

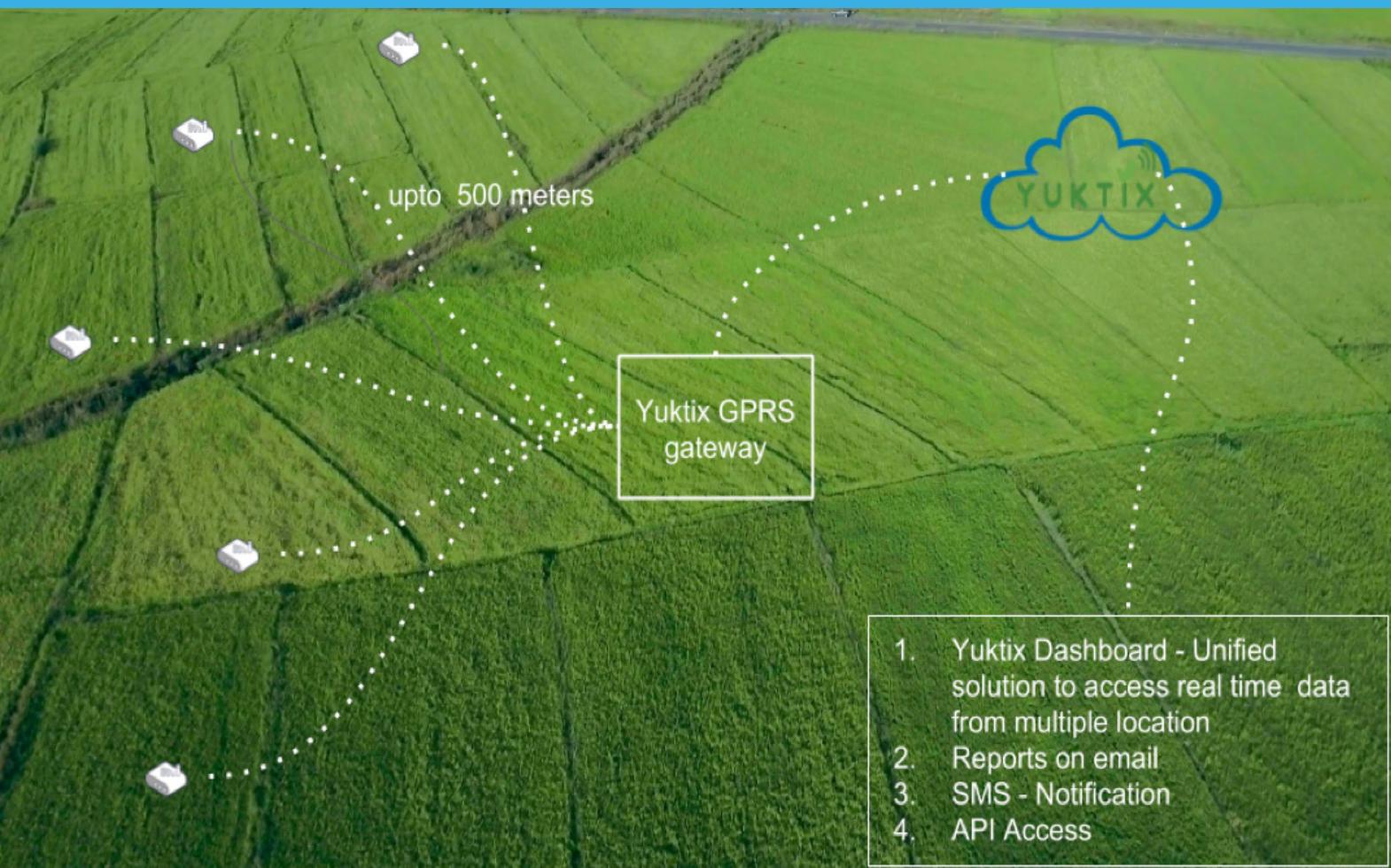


A tea plantation can need rain data across the rolling hills, a kiwi orchard needs soil moisture data from multiple points, a greenhouse needs to measure temperature and humidity to automate ventilation, a coconut plantation will need to measure soil moisture at different depths to save irrigation water and disease onset in grape will need leaf wetness measurement from canopy.

Yuktix GreenSense makes such sensing from multiple points possible by providing sensor nodes that automatically create a network and can run on batteries for years. They continuously monitor the variable of interest using the sensor and make it available for further processing.

How It Works

Yuktix GreenSense nodes with air temperature, humidity, and soil moisture sensors can be deployed in different patches of the land. These nodes can communicate to a Yuktix router. The Yuktix router can receive data from different nodes and upload to a central server using a data SIM. When a direct to backhaul network connection is available (e.g. satellite modem, Sigfox), the nodes are also capable of communicating directly to the central server.



The collected data is pushed to Yuktix cloud where it is processed by ankiDB™ computation modules. The computations and algorithms are run over the collected data that results in actionable data such as prediction of diseases and hotspot identification. NDVI images collected by either satellite or drone can further be used to verify the hotspot. Hotspot detection allows more accurate spraying of pesticides.

Features & Benefits

01 ICT tool for accessing real-time data from anywhere.

02 Comes bundled with most often used sensors. More can be added on demand.

03 Data visualization tools and a dashboard.

04 The coverage can be expanded easily by adding more nodes and routers.

05 Hyper local weather prediction using machine learning.

06 NDVI analysis using either satellite or drone.

07 Irrigation Control

08 Sensor based soil moisture map.

09 Daily, weekly and monthly reports over email.

10 Regulate pesticide spraying schedule.

11 Raw and aggregated data download.

12 Alerts over email and SMS

Crop vs. Sensing Requirements

Kiwi	Soil Moisture, Air Temperature and Air Humidity.
Apple	Air Temperature and Air Humidity.
Tea/ Coffee	Leaf Wetness, Solar Radiation, Air Humidity and Air Temperature.
Coconut/ Sugarcane	Soil Moisture, Rain, Air Temperature and Air Humidity.
Pomegranate	Air Temperature and Air Humidity.
Potato, Tomato and Gherkin	Air Temperature and Air Humidity.
Potato Seeds	Air Temperature and Air Humidity.

GreenSense Hardware

Yuktix GreenSense is built using following components.



- 👉 Low power optimized board
- 👉 Onboard Single Cell Solar Charger (SSC) and Battery management system (BMS)
- 👉 Long Range radio communication (500-2000 meters in open space) in Sub Giga Hz band.
- 👉 Onboard temperature and humidity sensor.
- 👉 Interface option for Leaf wetness, lux and soil sensors.
- 👉 IP 67 enclosure for harsh environmental conditions.
- 👉 Easy to install, operate and maintain.

Applications

Irrigation Scheduling and Control.

Greenhouse Monitoring

Open Field Monitoring

Pesticide Spray Scheduling in Fruit Orchards.

Disease Prediction

Development of Prediction Models for Researches

Enforce Contract Farming Templates

Smart Irrigation System

Water is a precious resource and Irrigation consumes 90% of the groundwater in India. Water-intensive crops like coconut and sugarcane can benefit from a smart irrigation system that can regulate water based on soil moisture content at different depths.

The amount of water present in the soil affects the growth of the plants. Waterlogging can lead to rot and diseases whereas lack of water can lead to stunting and slow growth.

Status Quo

Current solutions in the market work as DTMF / IVR based system where a call is made to a phone number and a motor can be turned on and off by pressing a key.

Soil moisture is impacted by Irrigation schedule, type of soil, Evaporation, and Rainfall. A smart system has to factor in all the four variables to qualify as a smart system.

Top Examples of Water Sensitive Crops.

Coconut plantation in the southern part of India.

Sugarcane production in Chennai part of India.

Kiwi production in New Zealand.

Key issues with the current systems are:

There is no security.

Irrigation control is guess work without any data input.

Features & Benefits

01 Easy Installation

02 Wireless Communication obviates the need for expensive wiring around the field.

03 Solar powered operation with battery backup.

04 40% Water savings and 10% electricity savings

Yuktix Advantage

Yuktix GreenSense nodes measure soil moisture at two depths near the root zone. The soil moisture data is pushed to the router in real time. The router is also receiving data from the weather station in real time. The decision to irrigate a specific patch of the land is taken after factoring in ETO calculations, Rainfall data, and soil moisture data.

Yuktix Smart Irrigation System

Yuktix GreenSense Nodes with Soil Moisture Sensors.

Yuktix Weather Station with Rainfall sensor

Router to collect data from weather stations and soil moisture sensors at different depths.

Feedback to the controller to turn on or turn off irrigation using data from sensors and weather station.

— Cold Sense

Yuktix cold sense is the next generation battery powered wireless monitoring solution for Cold Storages, warehouses, and cold chambers

Post-harvest needs constant monitoring of stored produce. Environment conditions should not stray from prescribed limits during storage and transport across the supply chain. That is required for quality assurance. For example, potatoes sprout buds if the temperature is above 4 degrees Celsius and wheat will develop mold if humidity is high.

Yuktix Advantage



Yuktix GreenSense nodes measure soil moisture at two depths near the root zone. The soil moisture data is pushed to the router in real time. The router is also receiving data from the weather station in real time. The decision to irrigate a specific patch of the land is taken after factoring in ETO calculations, Rainfall data, and soil moisture data.

Yuktix ColdSense is an award-winning, next-generation wireless sensing solution for cold storage and warehouses that use math, affordable sensing and computation to deliver the continuous monitoring and actionable intelligence for produce in the post-harvest stage.

Current Solutions The current status quo is to use PLC-based wired automation that can cost significant amount of money and may not justify the investment for warehouse operators.

Yuktix ColdSense fills a gap by being an ad-hoc wireless networking solution that can be deployed at 1/5 to 1/10 of the wiring cost. The complete autonomous units obviate the need to do costly wiring. The sensor nodes can be deployed anywhere in the warehouse. The sensor nodes talk to a router that can use a data SIM to push data online in real time.

The software to view data and reports comes bundled with the product. There is a provision to set alerts so that operations teams can be notified of deviations in real time. We provide modeling solutions to predict the onset of deviations before they occur. We provide facilities to create a single point of view for the team and the ability to group assets across different categories. The solution can be accessed from anywhere and proves an ideal tool for distributed teams.

Yuktix ColdSense was awarded the winning solution for "Reducing post-harvest loss and improving market linkages" for its innovative wireless and battery powered solution to measure hyper-local environment in the cold storages.

Key highlights of Yuktix ColdSense

Easy to use ad-hoc wireless solution.

Tremendous reduction in power.

Continuous quality control of stored produce.

Prediction of mold and rodents to save the produce before onset of issues using modeling

How It Works

Yuktix ColdSense is low power wireless sensing device that can operate on battery for years and provides long-range communication to penetrate through the concrete walls. The sensor nodes can be deployed anywhere in the storage area. Multiple of sensor nodes talk to a router that can use Data SIM card or Ethernet to push data online. The sensor nodes come with temperature, humidity, and CO₂ sensors. There is a facility to add more sensors on demand, like ammonia.

Out of the box, it comes with Temperature and Humidity sensors. Data from these nodes are collected by Yuktix GPRS/ Wi-Fi gateway from where it is sent to Yuktix cloud in real time. The product come bundled with Yuktix Cloud software which allows users to create different users, location/crop specific groups, visualize sensor data over a period of time using graphs, set alert rules so that if any sensor reading goes beyond a range users for that specific cold storage are notified via SMS, email and voice call.

Features & Benefits

01 Low power solution.

02 Easy to install and operate. Turn it on and start receiving information.

03 Ad-hoc wireless solution.

04 Weather proof enclosure to withstand high humidity environments.

05 Accurate Temperature and humidity sensing.

06 Made for distributed teams for quality control.

07 Set alerts for every floor or at sensor node level.

08 Get notifications via SMS and email.

09 Daily, weekly email reports with performance index calculated for each floor and warehouse.

10 Complete off-grid solution.

11 Local data storage and synchronization to avoid loss of data.

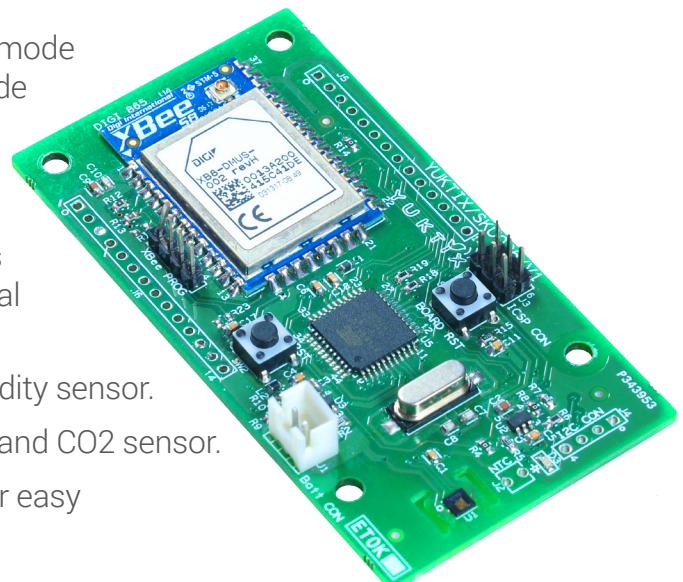
ColdSense Hardware

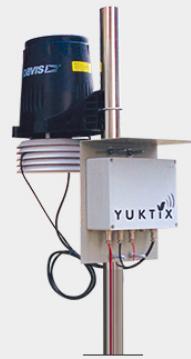
Yuktix ColdSense is built using following components.

- 👉 Low power device
 - 25 micro amperes during sleep mode
 - 15 milli ampere during ideal mode
 - 50 milli amperes during radio transmissions.

- 👉 Wireless communication -
Sub GHz open ISM band that has long range compared to traditional Wi-Fi solutions.

- 👉 On board Temperature and Humidity sensor.
- 👉 Provision of on board thermistor and CO2 sensor.
- 👉 Battery life is more than a year for easy annual maintenance.





Dear Customer,

Here is the weekly report for your Yuktix Cold Sense devices.
Report generated on 14 February 2018 19:57:23.
From 7/2/2018 09:00 GMT +5:30 to 14/2/2018 9:00 GMT +5:30.

Location	Active (Total)	Average Temperature	Average Humidity	Score
Guntur	6 (6)	11.82	72.0	15.0
Ongole	5 (5)	12.58	66.0	13.0
Vigneshwara	6 (6)	7.51	72.0	92.0
Paritala	10 (10)	13.62	72.0	9.0
Warangal	0 (5)			

Location	Floor	Score	Temp. (Avg.)	RH (Avg.)	Temp. (Min)	Temp. (Max)	RH (Min)	RH (Max)
Guntur	F1	17.0	11.14	72.0	10.77	11.46	71.0	74.0
Guntur	F2	17.0	11.01	72.0	10.68	11.36	72.0	74.0
Guntur	F3	16.0	11.3	72.0	10.97	11.62	70.0	73.0
Guntur	F4	15.0	11.88	73.0	11.19	12.47	71.0	76.0
Guntur	F5	7.0	14.64	70.0	12.61	15.78	68.0	74.0
Guntur	F6	18.0	10.94	72.0	10.69	11.23	72.0	73.0

Methodology

1. The scale is between 0-100. 100 is the best possible score.
2. Score routine first filters outliers depending on the MAD values and then assigns weights to filtered points depending on their distance from ideal interval 6C-8C.
3. To calculate distance, we plot histograms using bins of unequal sizes in 0C-15C range. Final count times weight is normalized over all filtered points.

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Produce Quality Monitoring

Client Profile

Commodities Trader Company

Product Used

Yuktix ColdSense and ankiDB™



The Problem

The user was storing raw produce red dry chili in cold storages across Telangana and Andhra Pradesh. Cold Storages are of the conventional type with floors separated by wooden floors. Chiller is on the top floor and cold air circulates down from there to the basement to maintain the desired temperature. The user was unable to track the real-time temperature of each floor for deviations from prescribed norms. Long term deviation can alter the quality of chili stored and affects the quality of the end product.

The Challenges

- 👉 Multiple floors with different temperature profiles.
- 👉 Wires carrying current are prohibited inside the cold storage
- 👉 Thick concrete walls. After packing the produce, a signal needs to come out that rules out Wi-Fi and blue tooth.
- 👉 A lot of power fluctuations, also uninterrupted power supply is not guaranteed.
- 👉 Multiple warehouses spread in the state. Data aggregation on one platform required for a distributed team.

Yuktix Solution

ColdSense devices were installed in each floor at two different locations. The data capture is happening from twelve different points capturing accurate hyperlocal variations. The data collected from ColdSense devices is made available to different stakeholders of the organisation in a distributed team. ankiDB™ computation modules provide statistical modules to compute and rank the cold storage performances as a an index for the management. Daily report to operations team and monthly reports to management with different warehouse rankings is generated.

Impact
Quality of produce stored was maintained as per the prescribed norms.
Alerts to warehouse operators to correct operations in real time.
Reduction in power consumption of the cold storage.
Streamlined and automated the process of data capture from multiple location.

Collaborative Weather Network

Client Profile

Research Institutes and NGO

Product Used

Yuktix Micro Weather Station and ankiDB™



The Problem

Bangalore is one of the fastest growing urban areas in the world. A major hindrance to any microclimate studies is the easy availability of weather data that can be shared easily between researchers and agencies. Bangalore open weather network is the largest open urban weather network in India that uses Yuktix micro weather stations to provide free weather data to any researcher.

The Challenges

- 👉 IMD data is available only after paying a fee.
- 👉 The density of stations is not suitable for microclimate studies.
- 👉 Data is not open to the public and is difficult to access. The data is available only as a file download.
- 👉 Create a cheap and robust network of stations requiring little or no maintenance.
- 👉 Provide real-time data from multiple locations.
- 👉 Data storage should scale with more deployments.
- 👉 Data access via API required for other system integration.

Yuktix Solution

Solar powered Citizen and Professional weather stations were installed in a different location across Bangalore to capture real-time weather parameters. Collected data was made available to the public using Bangalore open weather dashboard. REST API was made available to users who want to do research. Data was also plugged to weather underground using a push gateway.

Impact

Real-time weather information was captured from 25 different locations in Bangalore.

Data was used to verify the observed temperature change and effect of concrete structures

Data was used to analyze when it rains more, on which day it rains more and at what time of the day does it rain i.e. in the morning or night or afternoon.

NGO was able to use the data for different research purposes.

An example of project supported by the public and smart city was established.

Case Study

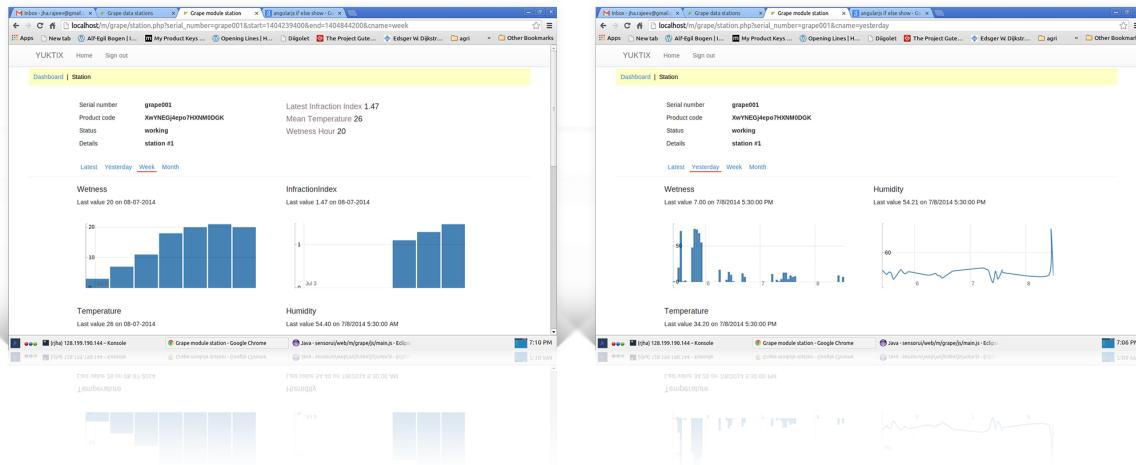
Downey Mildew Prediction for Grape

Client Profile

Table Grape Grower in Karnataka

Product Used

Yuktix GreenSense and ankiDB™



The Problem

Downey mildew is one the most common disease in Grapes. Pathogens thrive in certain weather conditions and access to weather data and pathogen lifecycle can predict diseases in crops. The user wanted an economical solution to accurately predict the onset of disease so that pesticide spraying can be regulated more effectively.

The Challenges

- 👉 Remote location.
- 👉 An integrated economical solution was required.
- 👉 24x7 real-time data capture was required.
- 👉 Reduction in usage of pesticide.

Yuktix Solution

Hyperlocal data was captured using GreenSense nodes (air temperature, humidity and Leaf Wetness). The data collected from the nodes was analyzed using ankiDB™ computation engine running Broome Model. The onset of Downey mildew was calculated and assigned a probability. A report was generated on daily basis and shared with users over email and SMS.

Impact

30% pesticide reduction.

Pesticide spraying was regulated using alerts.

Soil Moisture Absorbent Molecule Trials

Client Profile

Food FMCG Company

Product Used

Yuktix GreenSense and ankiDB™



The Problem

The client wanted to test the effectiveness of a new soil moisture absorbent molecule by running tests across vast tracts of lands in a remote location. The claim from molecule manufacturers was to increase the soil water holding capacity by up to 30 percent. However, there was no data available to test the claim under different and varying conditions. It was a challenge to collect data manually from such a vast tract of land in a remote location.

The Challenges

- 👉 Remote off-grid locations in Orissa.
- 👉 Limited Network
- 👉 Harsh Environment
- 👉 No power. Solar power with battery back-up for 10-15 days was required.

Yuktix Solution

Yuktix deployed GreenSense nodes with onboard single-cell solar charger (SSC) and battery with soil moisture sensors. The nodes were deployed in fields that have absorbent molecules (treatment group) as well as the ones without (control group). The data from all the fields were collected and Volumetric water content was computed in real time. The result showing side by side comparison of both treatment and control groups was published and passed to the client team daily. The client could see the variation across groups in real time. The nodes kept working without any maintenance during the entire project lifecycle.

Impact

Real-time data capture thus removing the dependency on on-field staff.

Yuktix GreenSense remove chances of human error.

Quick report publishing leads to quick decision making.

Farm Asset

Management

Client Profile

Agriculture Farm Management Co.

Product Used

Yuktix GreenSense and ankiDB™



The Problem

The client is in the business of developing farming lands. They are managing farms across Andhra Pradesh in remote locations. Farms have different crops, fruits, vegetable, and trees. The requirement was to have a single dashboard with weather and other relevant data from the farms to help the operations team and be an eye and ears for the management.

The Challenges

- 👉 Real-time data capture.
- 👉 Provide actionable intelligence from data.
- 👉 Farms were located in remote locations with poor power and network.
- 👉 Different crops in different farms.

Yuktix Solution

Solar powered GreenSense Nodes with crop need-based sensors were deployed in different farms to collect 24x7 data without deploying a staff. The data collected by sensors was pushed to the Yuktix ankiDB™ for analysis.

Yuktix ankiDB™ processed the collected data and ran it through crop specific computation modules to provide a possibility of disease happening to the crop. The data was made available on the GreenSense dashboard along with weather data, NDVI images, and local weather prediction.

Impact

Reduction in usage of pesticide by 25%.

Water saving.

Increase in production.

Reduction in wastage.

Effective utilization of man power.



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