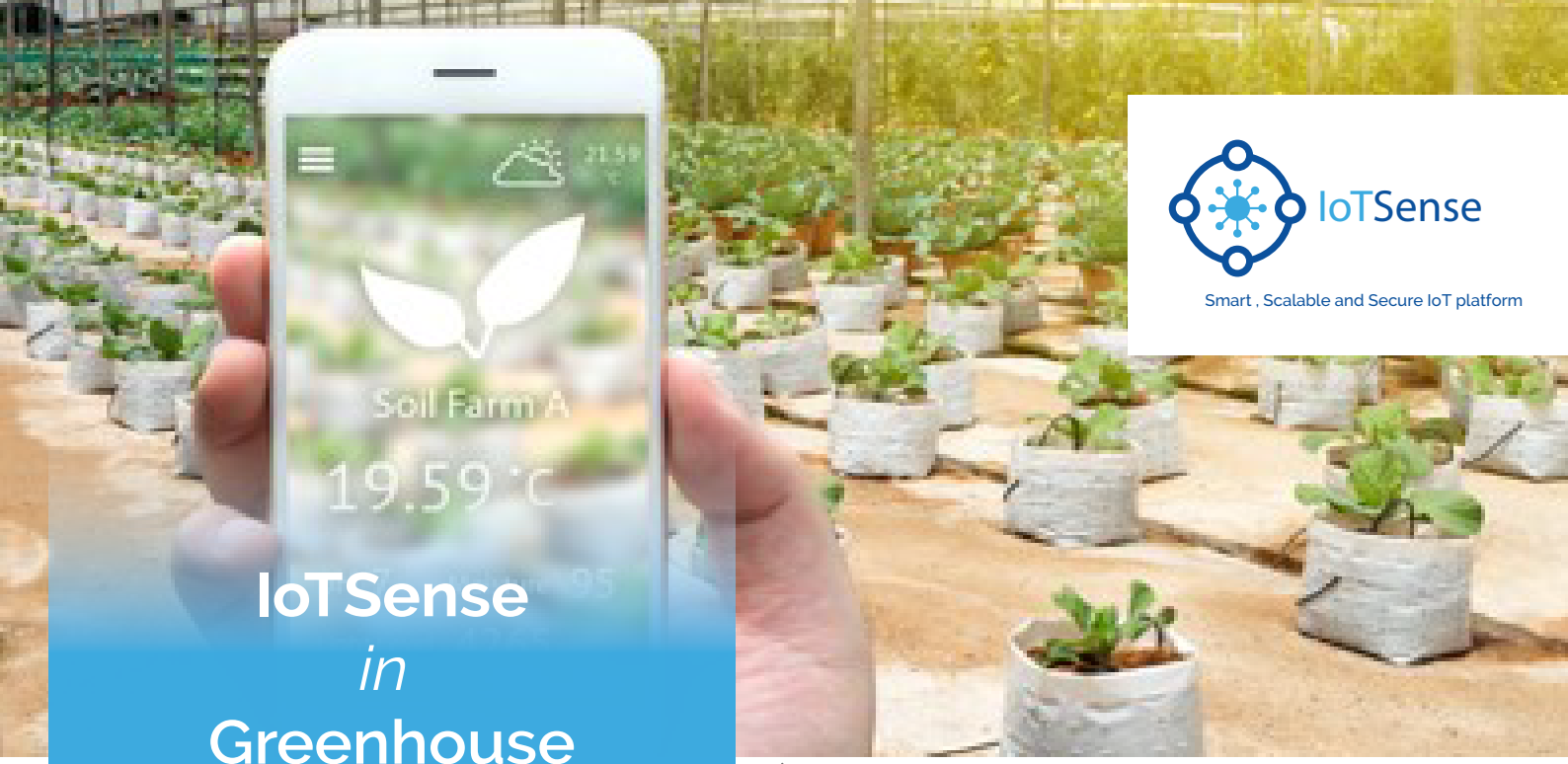


IoTSense

Smart , Scalable and Secure IoT platform

# IoTSense *in* Greenhouse

## Introduction

The Internet of Things (IoT) describes the implementation of artificial intelligence and smart technology, in common household and industrial applications. This results in creating an innovative environment capable of making the right decisions. Here we focus our attention on IoT enabled greenhouse which has the capacity to revolutionize farming and improve the efficiency of this industry. An IoT enabled greenhouse can certainly provide the best performance, since it may employ decentralized data processing to make important decisions in a smart manner, without human intervention.

> This case study showcases how Winjit's IoTSense can leverage technology for smart IoT implementation in greenhouse.

## Customer

A leading agriculture industry-based company wanted to implement IoT enables greenhouse for its agricultural needs.

## Requirement

A key problem in agriculture is to gauge the exact amount of required water, plant conditioning and maintain an ideal atmosphere. The customer wanted to create an IoT enabled greenhouse to install modern, smart sensors that can be managed and controlled through an IoT application.

## Challenges

- Getting different data from all over the greenhouse
- Connecting each sensor to cloud will

increase data and cloud costs

- Sensor data needs to be stored locally in case of connectivity loss
- Collect Images of leaves for further analytics
- Syncing two different camera nodes to act as a single stereo camera
- Configure sensors/devices in runtime
- Maintaining proper CO2 levels
- Human errors in watering and light schedule
- Human Errors in written records for growth and feeding cycles

## Solution

- Deployed multiple devices (100+) each consisting of 5-6 different sensors
- Used MQTT to collect data on a field gateway
- Provided real-time customizable edge analytics, no need to send data to cloud just for that!
- Tracking growth of plants using machine vision
- Tracking health of plants using machine vision on leaves
- Tracking temperature zones using thermal cameras and machine vision
- Provided a way to send commands to the field devices
- Selective device data syncing to cloud
- Set device and data level alerts
- Turn CO2 generators ON/OFF based on readings all over the greenhouse

## Benefits

- **Minimizing Water Use** - A key problem in agriculture is to gauge the exact amount of required water. Minimizing the use of water was done by installing smart sensors.
- **Plant Conditioning** - Another advantage available in an IoT enabled greenhouse is the ideal conditioning of the plants. This is possible with the use of cameras and other sensors that can regularly monitor the state of the plants and even automatically issue an alert, if a problem is recognizable.
- **Ideal Atmosphere** - There are various parameters that combine to create the ideal atmosphere for a specific plant. Temperature, ventilation, oxygen and the carbon dioxide levels must be maintained within strict limits. This is possible in an IoT enabled greenhouse where smart devices can share their information with each other, allowing for improved decision-making.

## Achievements

- Connectivity with different devices, protocols, clouds everything at one place.
- Saved cloud and data costs 45%
- Produce rejection reduced by 27%
- No data loss on loss of connectivity
- Reduction in manpower as watering and lights are controlled automatically based on pre-configured schedule
- Master Grower gets customized alerts on mobile device

# Conclusion

This is a Long-term solution which operates independently, IoTSenseallows you to look at the available data analytics and set up policies for automatic actions to ensure the best agricultural conditions.

IoTSense is a smart, secure and scalable software gateway platform which enables businesses to move from traditional technology implementation to smarter, real time and advanced technological transformation. It is best example of how legacy devices and existing eco-system can be transformed into smarter businesses.

IoTSense is powered by Winjit Technologies which is an award-winning technology company for providing IT product and solutions globally.

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