Sensor Technology in Agro Processing: AGRICULTURE 4.0

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Content

Agriculture 4.0 - A Digital Inventory in the North

- Sensors
- Smart Systems: Intelligence at the Edge of the IoT
- Industry 4.0
- Agriculture 4.0
Sensors

Sensors in the IoT: Definition, Volume and Relevance

- The Internet of Things (IoT) is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.

- According to Cisco, **500 billion** devices are expected to be connected to the Internet by 2030. Each device includes sensors that collect data, interact with the environment, and communicate over a network.

- The IoT is a **critical part of business strategies** going forward. Based on an IDC study of 2300 executives in 15 countries, 48 percent of those surveyed have already deployed IoT solutions, and 58 percent said that the IoT is strategic to their business strategy.
Smart Systems

Intelligence at the Edge of the IoT, Service Definition by Cisco

Services:
- Secure authentication and management of gateways
- Application of intelligence at point of data generation to enable decisions at the edge
- Automated connectivity, deployment, and management of sensors
- Streamlined extraction, processing, and delivery of data
- Cloud analytics, data visualization, and insights

Key Feature:
- The 2nd service “Application of intelligence …” is a novel feature and exceeds the original IoT definition by Gartner. **Local embedded intelligence marks the transition to emerging novel IoT applications generating smart systems.**

Industry 4.0

Industrial Revolutions

1st
Mechanization, water power, steam power

2nd
Mass production, assembly line, electricity

3rd
Computer and automation

4th
Cyber Physical Systems

Courtesy: Wikipedia, Industry 4.0

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Industry 4.0

Industrial Cyber Physical System

- Permanent optimization processing
- Physical factory and cyberspace linked by sensor layer
Agriculture 4.0

A Stimulus

Merging farming and industrial processing in a strongly connected ECO system


2. World Government Summit & Oliver Wyman, Agriculture 4.0, The Future of Farming Technology
Agriculture 4.0

The Agricultural Cyber Physical System

Confused Farmer (Overwhelmed by data)

PRESENT

FUTURE

DATA INSIGHT

NEW GROWTH POTENTIAL FOR FARMERS

Confused Farmer (Overwhelmed by data)

Connected Ag Weather Stations

Doppler Weather Forecast

Plant Sensors (e.g. sap flow)

UAV with Sensor Payload

cyber space

sensor layer

Courtesy: Accenture
Agriculture 4.0

Sensor Challenges Agro Processing

• Tag and track raw materials/products throughout processing chain
  – Global coordinates
  – Internal coordinates

• Allow for mobile processing units, tag and track units
  – Global coordinates

• Allow for modular processing units, tag and track configurations
  – Internal coordinates

• Real-time process/quality monitoring at remote locations
  – Smart edge sensor technology, energy efficiency, …
Agriculture 4.0

Sensor Challenges Agro Processing

• Your feedback
• Your input
• Your applications
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