From Post-Response Into Proactive Prevention:

IoT-Based Smart Electrical Safety Monitoring Solution

FireSens

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I. Technology Description

Background

Electrical Fires

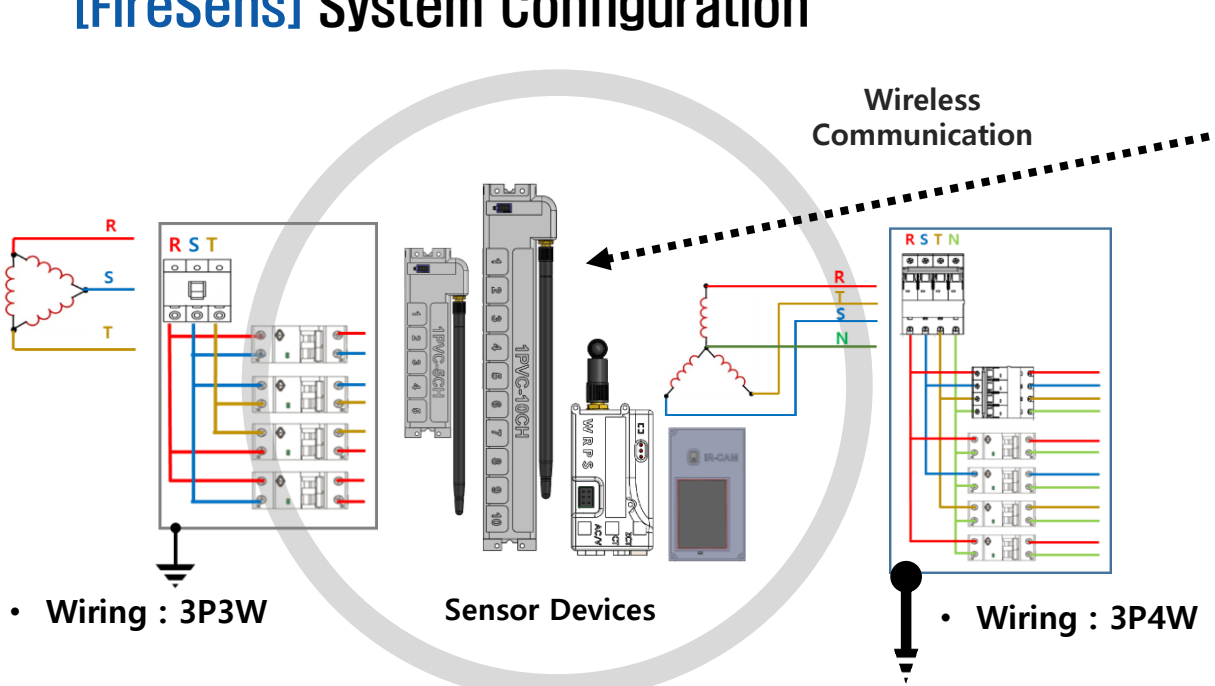
- 10,125 electrical fires in USA (2019)
- $3,137 million loss

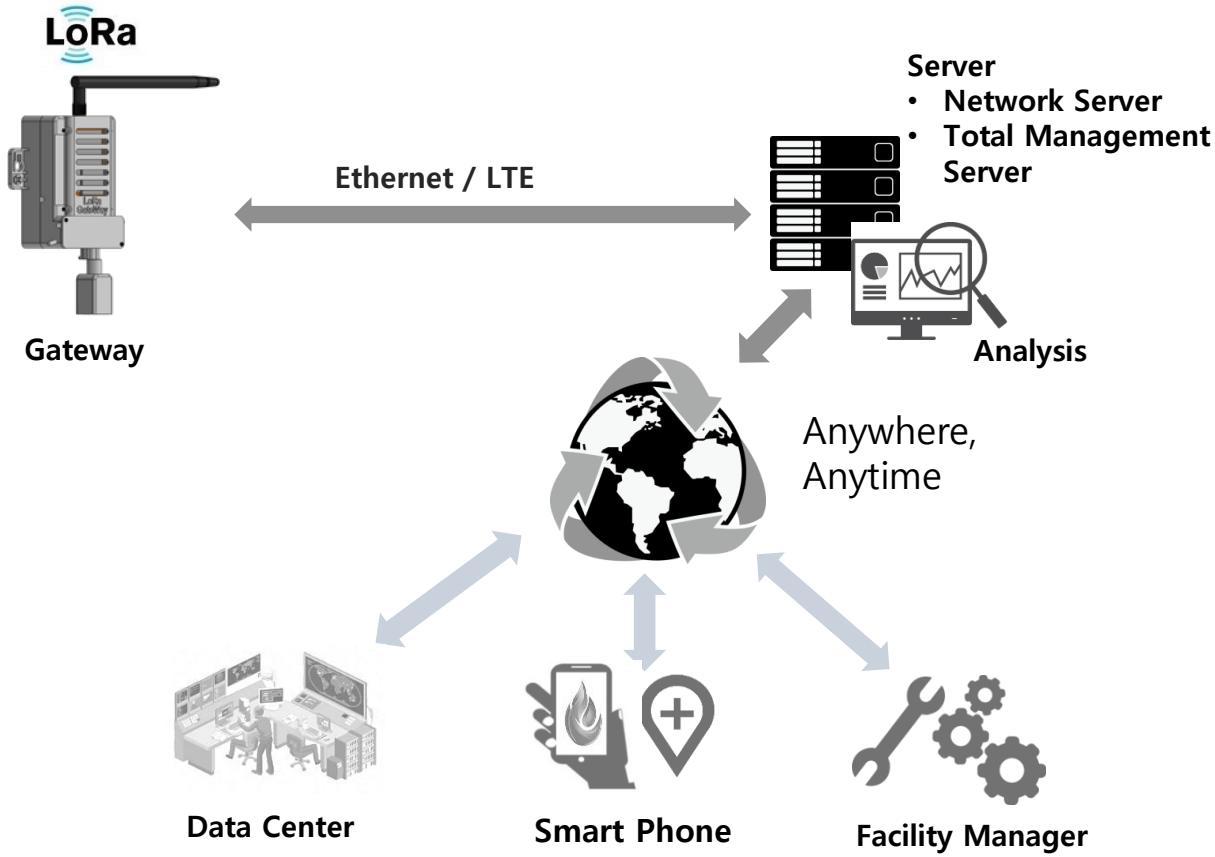
U.S. Fire Administration

"A Thimble of Prevention is Better Than a Bucket of Cure"

I. Technology Description

[FireSens] System Configuration



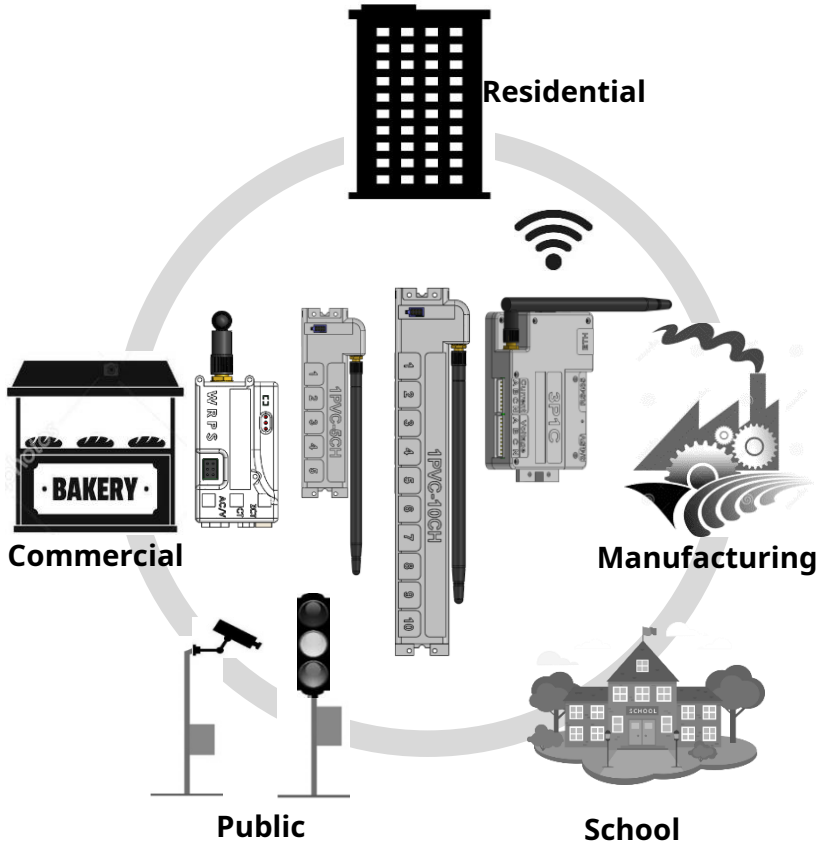


Sensor Devices

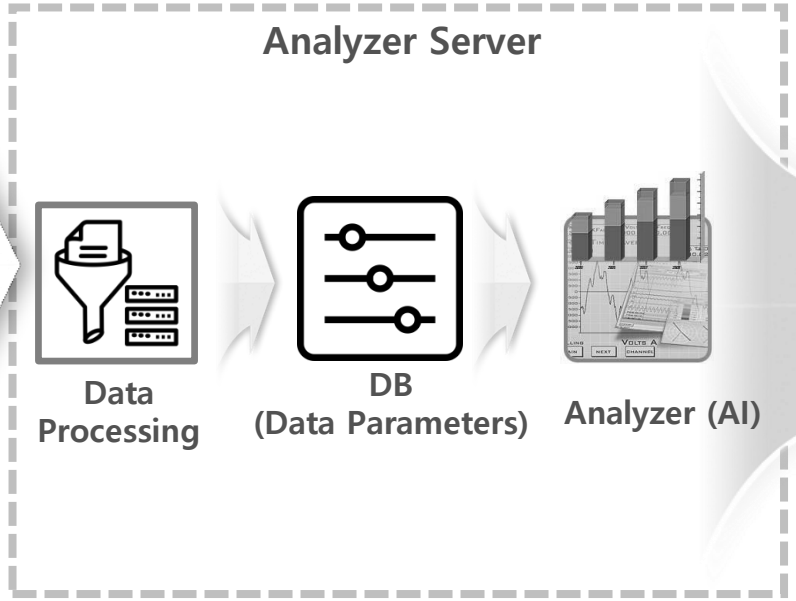
- Sensor-1CH
- Sensor-5CH
- Sensor-10CH
- 3-Phase Sensor
- Thermal Image Sensor

I. Technology Description

[FireSens] Service Platform



IoT-based power and electrical safety Big Data Collection



Prevention of electrical fires

Energy Management

Electrical equipment management

Prevention of facility failures and accidents

I. Technology Description

[FireSens] Key Features

New concept of integrated service

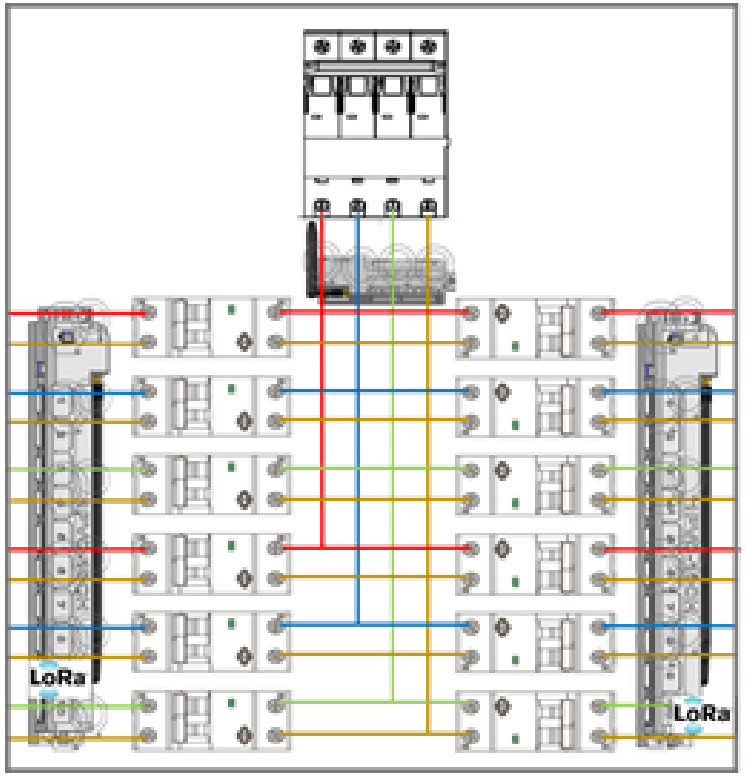
- Energy Management
- Prevention of electrical fires
- Electrical equipment management
- Prevention of facility failures and accidents

The world's smallest sensor device and its multiple advantages

- Multi-branch sensor device installed irrespective of wiring method
- Installed inside the distribution box being the smallest such device
- Structural features that allow simple branch expansion at any time after installation

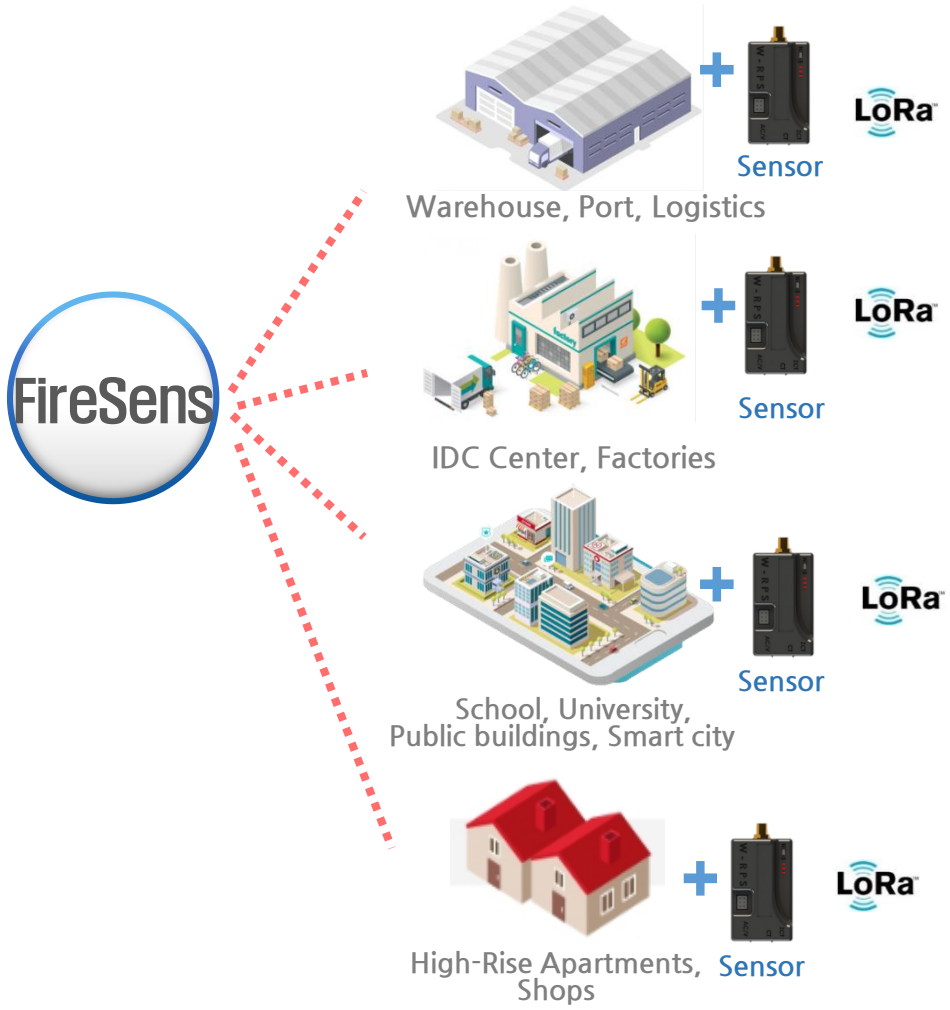
High precision measurement

- Vector sum leakage current : 0.2 mA to 40 mA
- Resistive leakage current : 0.2 mA to 40 mA (1MΩ ~)



Installation Examples
(Sensor Devices)

Benefits / Markets



1. Warehouse, Port, Logistics

2. IDC Center, Factories

3. School, University, Public buildings, Smart City

4. High-Rise Apartments, Shops

2. Benefits / Markets and Market Interest

- Warehouse
- Port
- Logistics

Benefits

1. Top 3 fire occurrence property type 2003-2019 in US
2. Prevention of electrical accidents & fires
3. Management of energy usage & facilities

Market Interest

1. Approached by a Vietnamese company regarding FireSens application to Ho Chi Minh Port
2. Approached by a major, Korean online retailer for logistics and warehouse services

2. Benefits / Markets and Market Interest

- IDC Center
- Factories

Benefits

1. Prevention of electrical accidents and fires
2. Uninterrupted service even during inspection
3. Management of energy usage & facilities

Market Interest

1. Approached by a major, Korean internet service provider regarding FireSens adoption to its IDC Center
2. Approached by a major, Korean motor vehicle manufacturer for their factory; installed 2020

2. Benefits / Markets and Market Interest

- School
- University
- Public Buildings
- Smart City

Benefits

1. Prevention of electrical accidents and fires
2. Management of energy usage & facilities
3. Visualize electrically vulnerable areas for local governments' public policy decision making

Market Interest

1. Selected with Daejeon City as Smart City Challenge Solution 2020–2022 by Korean MOLIT
2. Installed 1600+ sensors in Joongang Marketplace, Daejeon under contract with Dong-gu District Office
3. Installed FireSens at Hanbat Nat. U.
4. Installed FireSens at Daejeon Information & Culture Industry Promotion Agency Building

2. Benefits / Markets and Market Interest

- High-Rise Apartments
- Shops

Benefits

1. Prevention of electrical accidents & fires
2. Management of energy usage & facilities

Market Interest

1. Approached by a Korean construction company regarding installing FireSens at initial construction stage
2. Installed 3,000+ sensors in commercial areas of Daejeon

3. Competition

FireSens

Main Functions

Prediction of Electrical Fire & Facility Failure Based on Electrical Date

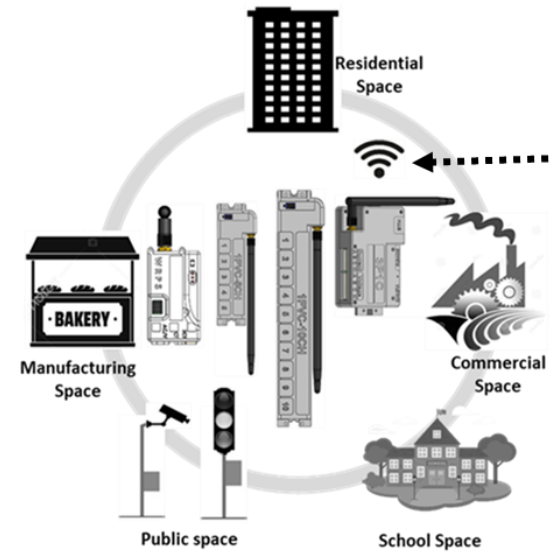
Energy and Facility Management

- **Direct Competition**
  - Proactive Prevention vs. Post-responsive reaction
    - ✓ Traditional fire monitoring systems Lack of new technology for fire prevention and prediction
    - ✓ Existing electrical fire prevention limited to general electrical problems
- **Indirect Competition**
  - Traditional Electrical Solutions
    - ✓ Energy, Facility Fault (GE, Siemens, Eaton, Schneider)
  - Traditional Fire Response Systems (Post-event)
    - ✓ Thermal and smoke detectors
    - ✓ CCTV, video-based fire detection systems

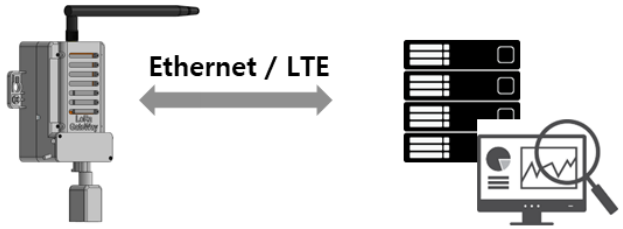
→ FireSens is more flexible, expandable and capable of add-ons to meet clients' new needs.

4. Development Status

Roadmap R&D



FireSens 1.0

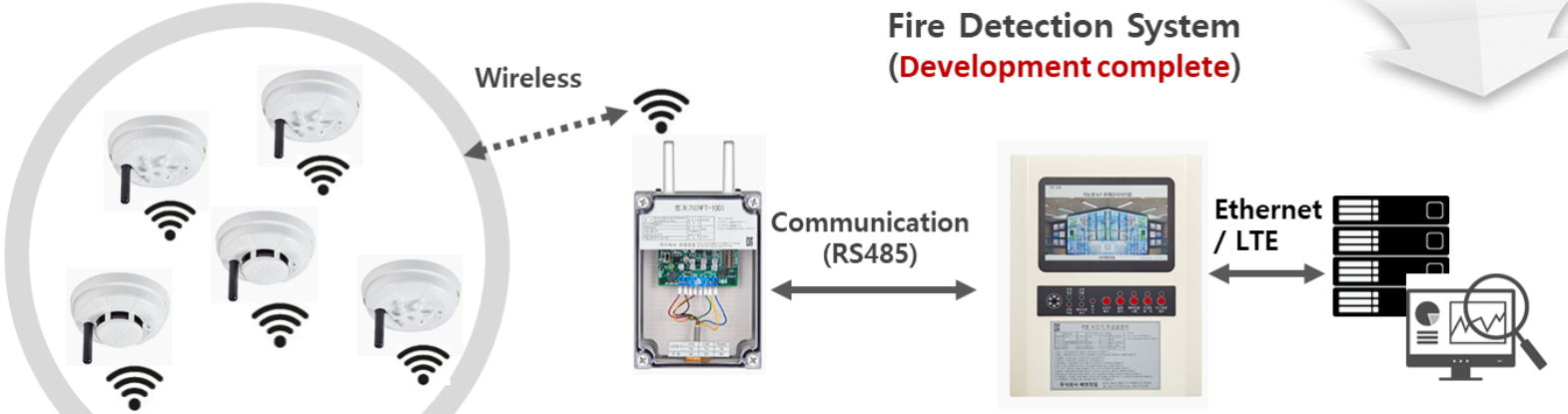


Electrical Safety and Monitoring System
(Development complete)

FireSens 3.0

Hybrid Systems
(under development)

Fire Detection System
(Development complete)



FireSens 2.0

5. IP Status

Patents

- FireSens related patents registrations and applications have been made in Korea, U.S., EU :
  - ✓ **4** Korean Patent Registrations
  - ✓ **1** U.S. Patent
  - ✓ **1** EU. Patent Application-pending
- IP law firm utilized including patent map

5. IP Status

Certificates & Tests

- FireSens related certificates have been acquired in Korea :
  - ✓ **5 KC** Certificates
  - ✓ **K-Mark** (KTL Quality Certification)
  - ✓ **GS** Certificate (Sole South Korean certificate of telecommunications excellence)

❖ All the above are comparable to international standards.

Technology Transfer

- Technology transfer with Kookmin U., Electron. Engin. 2020 on-going

6. Risks and Barriers

- **Risk**

  - Possible new ground-breaking technology
    - ✓ Competitive R&D investment over 30% of revenue for last 6 years
    - ✓ Open to partnerships if required

- **Barriers**

  - Certification: UL
    - ✓ No envisioned conflict to meet UL standards
  - Agency for installation, maintenance, monitoring
    - ✓ Make local partnerships

Thank you
Feel free to talk to us!

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