TECH OFFER

AI-Driven Intelligent Air-Condition Optimisation for Energy-Efficient and Sustainable Indoor Comfort

KEY INFORMATION

TECHNOLOGY CATEGORY:
Sustainability - Sustainable Living
Energy - Sensor, Network, Power Conversion, Power Quality & Energy Management
Green Building - Heating, Ventilation & Air-conditioning
Electronics - Power Management

TECHNOLOGY READINESS LEVEL (TRL): TRL9
COUNTRY: SOUTH KOREA
ID NUMBER: TO175420

OVERVIEW

Modern buildings consume significant amounts of electricity through air conditioning systems. However, many conventional setups rely on static schedules or simple rule-based controls that do not adapt to dynamic factors such as external weather, occupancy, or usage patterns. This often results in higher energy costs, reduced occupant comfort, and unnecessary wear on air conditioning equipment - highlighting the growing need to improve aircon energy efficiency across facilities.

To address these challenges, the technology owner has developed an advanced air-conditioning optimisation system that leverages real-time sensor data, weather forecasts, and machine learning to dynamically regulate operations. The system features

intelligent temperature detection that maintains an optimal balance, neither too cold nor too hot, while automatically controlling air-conditioning and heating in real time, thereby improving aircon energy efficiency, supporting ESG practices, and ensuring a consistently comfortable indoor environment.

Designed for seamless installation and operation via a user-friendly interface, the solution is suitable for both small-scale users and large facilities managing multiple air conditioning systems. When integrated with central air control systems, it reduces manual workload for operators while optimising energy use across entire buildings. Successfully deployed in retail stores, offices, and warehouses in Korea, the technology has demonstrated proven value across diverse environments.

The technology owner is seeking industrial partners for test-bedding and adoption of their AIoT solution. They are also keen to collaborate with HVAC companies and air handling unit (AHU) manufacturers to co-develop integrated solutions that create win-win opportunities and drive sustainable growth.

TECHNOLOGY FEATURES & SPECIFICATIONS

Key technical features of this solution include:

- **Integrated Hardware and Software:** Consists of a hub, controller, and sensors, powered by an AI engine and operating system that enable intelligent management of air-conditioning units
- **Human-Centric Sensing:** Unlike conventional systems, the sensor captures temperature and humidity data directly around occupants, ensuring comfort is monitored and managed where it matters most
- **Comprehensive Data Inputs:** Integrates both indoor sensor data and external weather forecasts, referencing inputs from the nearest outdoor weather station
- **Predictive, Data-Driven Control:** Utilises machine learning to predict changes in indoor temperature, humidity, and heat load. The system determines the optimal operation strategy of air conditioners, such as which units to activate, set-point temperatures, modes, and wind speeds, to maintain stable indoor comfort

POTENTIAL APPLICATIONS

- Government and commercial office buildings
- Retail centres and shopping malls
- Healthcare facilities (e.g., public / private hospitals, clinics)
- Hotels, cinema and theatres
- Education Institutions (e.g., schools, university campus)
- Data centres
- Industrial facilities (e.g., factories, warehouses)

UNIQUE VALUE PROPOSITION

- **Optimised Comfort with Efficiency:** Continuously maintains indoor temperature, balancing thermal comfort with energy savings
- **AI-Driven Adaptability:** Learns from environmental changes and usage patterns, going beyond conventional control systems
- **Economic Benefits:** Delivers tangible energy savings of 10–30%, reducing both operational costs and carbon footprint
- **Ease of Deployment:** Enables quick installation without power disruption and requires minimal maintenance