

# Facial recognition and thermography solutions by using the latest AI technology

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## 1. Introduction

In February 2020, Azbil started the business for AI facial recognition and thermography in partnership with Japan Computer Vision Corp.

Azbil has been engaged in the building access control business since 1987, and currently provides access control systems based around non-contact IC card readers for various customers. Facial recognition technology dramatically improves the convenience of access control systems. Thermographic technology has become a means of providing safety and security during the pandemic by detecting people who may have a fever.

## 2. Product overview

Our facial recognition and thermography solutions consist of a dedicated device with a high-speed, high-accuracy facial recognition function based on advanced AI technology, with hardware including two cameras, a detection sensor, and a thermography camera (figure 1), and the software SenseLink to integrate and manage them.



Fig. 1. Dedicated devices for AI facial recognition and thermography solutions

### 2.1 SensePass facial recognition device

SensePass is a device that enables hands-free entry and exit (figure 2), and has the following features.

- Storage of data for as many as 20,000 people and authentication in 0.3 seconds
- Authentication even in dark places (0.5 lux, as in moonlight)

- Authentication even for people wearing a mask
- Detection of the forgery by using photos, etc. instead of the real human face.

SensePass's facial recognition algorithm was developed by SenseTime, an AI company based in Hong Kong. SenseTime's algorithm won first place in five of the eight endpoints of the Face Recognition Vendor Test (FRVT) 2020, a facial recognition benchmark test conducted by the U.S. National Institute of Standards and Technology (NIST).



Fig. 2. Hands-free entry and exit through facial recognition

With SensePass, access control system users no longer need to worry about losing or forgetting their security cards, and administrators can eliminate the cost of dealing with them. In addition, the same facial recognition technology can be used for employee work time management, visitor reception, etc.

### 2.2 SenseThunder thermography device

SenseThunder is a facial recognition device combined with a small thermography camera and equipped with a temperature detection function. The position of the eyes and forehead is identified using the image analysis, the most suitable points for temperature prediction are selected from a large number of temperature points measured by the thermography camera, and body temperature is predicted with high accuracy by AI through deep learning of 3 types of big data on body surface temperature, body temperature, and room temperature. Therefore, the prediction is not easily affected by the background or lighting.

The available versions are the compact SenseThunder-Mini, SenseThunder-E with a large screen and an external monitor output terminal, and SenseThunder-Air, which can measure up to 5 people at the same time.

Table 1. SenseThunder specification comparison

	SenseThunder Mini	SenseThunder E	SenseThunder Air
Screen size	5.5 inch	8 inch	8 inch
Measurement error	±0.4 °C	±0.3 °C	±0.4 °C
Measurement distance	Up to 1.2 m	Up to 1.5 m	Up to 2.5m
Monitor output	None	Included	Included
Number of people measured simultaneously	1	1	5

### 2.3 SenseLink management platform

SenseLink is software that integrates and manages up to 300 facial recognition and thermography devices. It has the following functions.

- Device management  
Checks the status of each registered device, changes settings
- User management  
Registers and updates employee and group information
- Event management  
Manages history of facial recognition, temperature detection, and abnormal temperature alerts

In addition, with the abundant external linkage by application programming interface (API), linkage with external systems for access control, work time management, etc., is easy.

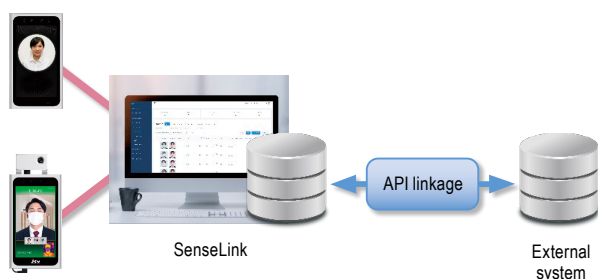


Fig. 3. SenseLink management platform

### 3. Linkage with the access control system

SensePass and SenseThunder can be connected to the controller of our access control system in the same way as a non-contact IC card reader. According to the security level and purpose of each room or area where the access control system is installed, authentication methods are freely selectable, including card reader (when cost has priority), facial recognition (when convenience has priority), and finger vein (when security has priority). In addition, the temperature detection function of SenseThunder can be used to the application like preventing people with suspicion of having a fever from entering a room, or to quickly control the room air pressure and airflow according to people's entry into the room.

At the system level, we are planning to use the SenseLink API to develop and provide a system for centralized management of user's faces and cards, and a mechanism for registering visitors at the reception desk or entrance of buildings.

### 4. Conclusion

In addition to enhancing the convenience of access control systems with AI facial recognition and thermography solutions, we also propose cooperative functions that include user management and history management, in order to provide customers with new value for their access control systems and building automation systems.

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