PERCEPTION INTELLIGENCE

AI VIDEO PLATFORM

Face Recognition

Traffic

Customizing

Safety·Security

PINTEL
Perception Intelligence

BE CONNECTED ON AI VIDEO PLATFORM WITH
PINTEL

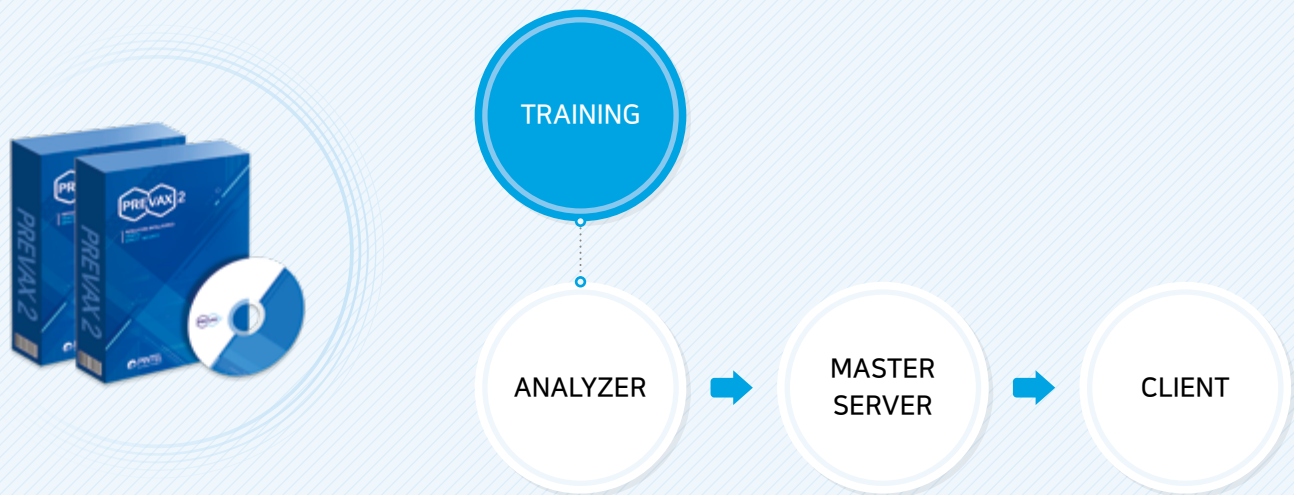## Value Beyond the Times, Intelligent Video Analysis

In the era of the Fourth Industrial Revolution, artificial intelligence technology is a key technology that is leading new markets. In particular, the importance of intelligent image analysis technology, which is an area of AI technology, is increasing by the day.

PINTEL started its business with the goal of providing the No.1 intelligent video analysis system in the world, and we are targeting the market by developing and securing our own core technologies through bold R&D investments and applying them to various industrial fields such as life security, life safety, transportation, retail, and facility management.

PINTEL is promoting its business by strategically responding to changes in the technology and business environments in the market for the future society. In the future, PINTEL will grow into a global No.1 company based on our rich experience in the system and solutions business by protecting the company's integrity, securing high competitiveness in the market, and pursuing technological innovation that delights humanity.

Thank you.

CEO **Dong-Key, Kim**

TRAINING

ANALYZER ➡ MASTER SERVER ➡ CLIENT

PRODUCT FEATURES

PINTEL provides a platform-based all-in-one integrated system including intelligent video, security, and information management.

Optimization   High Memory Efficiency   High Speed   Customer Oriented

COMPANY HISTORY

2015-2016

I Commenced development of high-resolution intelligent image analysis solution (AVAX, Smart HBR Comprehensive Video System)

I Established corporation (PINTEL Co., Ltd.) in September 2015

I Relocated head office, established factory

I Venture business registration

I Acquired direct production certification (Video surveillance, unmanned transportation system)

I Selected as K-Global 300

I Certified as an excellent company in compensation for employee inventions

I ETRI face recognition / Deep learning technology transfer

I Acquired Q Mark Certification (Quality certification), and Small and Medium Business Administration Performance Certification

2017

I Korea Invention Patent Exhibition Minister Award

I Research Project Excellence Award

I Product selected as Priority Purchase Product for Excellent Inventions (High resolution)

I Selected as a First Penguin start-up by the Korea Credit Guarantee Fund

I Product selected as a venture start-up innovation product by the Public Procurement Service (Smart Video Pedestrian Detection System)

I Acquired Excellent Product by Public Procurement Service / Small and Medium Business Administration Performance Certification (Object Recognition-type Crime Prevention Based on Full HD Resolution CCTV System)

I GS (AVAX ver2.0) Certification

I K Mark Certification

2018

I Selected as a Technology Specialized Company (K-ESP, Apr. 2018)

I Awarded by the Minister of Land, Infrastructure and Transport at the Smart City Summit Business Fair

I KISA Certification: Face Recognition

I Acquired software copyright (8 types)

I Product selected as Technology Development Model Purchase Product

I Selected as a promising company to enter the overseas procurement market (G-PASS)

I Signed MOU: Asiana IDT

I Acquired information and communication construction business license

I Awarded the Challenge K Startup Grand Prize

I Acquired patents (2 cases)
  - Access Door Control Method and Device
  - Vehicle Camera System

2019

I GS (PREVAX v1.0) Certification

I K Mark Certification

I Certified as an excellent company in compensation for employee inventions

I Data Voucher Support Business (Software) Excellence Award

I Technology Innovation SME (Inno-Biz) Certification / TTA Certification

I Acquired patents (3 cases)
  - Deep Learning-based Vehicle and Pedestrian Detection Image Analysis Device and Method
  - Road Guidance Method and Device Based on Image Analysis
  - Free Ride Detection Method

2020

I TTA Certification

I Acquired T2 grade in TCB Technology Credit Evaluation

I Automated Incident Detection System (Tunnel video) Certification

I Acquired software copyright (2 types)
  - Concluded MOU: Parking Cloud Co., Ltd.
  - Concluded MOU: Hebron Star Vietnam Corporation

I Acquired patents (3 cases)
  - Object Area Detection Method, Device and Computer Program
  - System for Counting Boarding and Unboarding of Public Transportation Using Deep Learning and Method
  - Free Ride Detection System and Method of Public Transportation Using Deep-Learning-based Face Recognition

2021

I KICT(KICT(Korea Institute of Civil Engineering and Building Technology) family business

I TTA Certification(TTA-V-21-029)

I Achieved highest level of Certification in VDS(Vehicle Detection System) Performance

I NET(New Excellent Technology) Certification

I Patents(Registration 6cases, Application 5cases)

I Certificate of Innovative Product

I Achieved highest level of Certification in Automated Incident Detection System(100M, 200M)

I Selected as Top 1000 innovative companies

I Selected as GEP(Global Enterpreneur Programme) by the Department for International Trade(DIT) in UK

INTELLIGENT
ANALYSIS COMPANY
PINTEL

Pintel Video Analytic solution

Security

Trespassing	Recognition of people invading marked territory
Wandering	Walking or moving aimlessly and suspiciously for a certain period time
Violence	Recognition fight/other aggressive behavior
Falling	Detection of person(s) falling/collapsing
Gesture recognition	Recognition of predefined gestures (wave arms in front of CCTV)

Safety

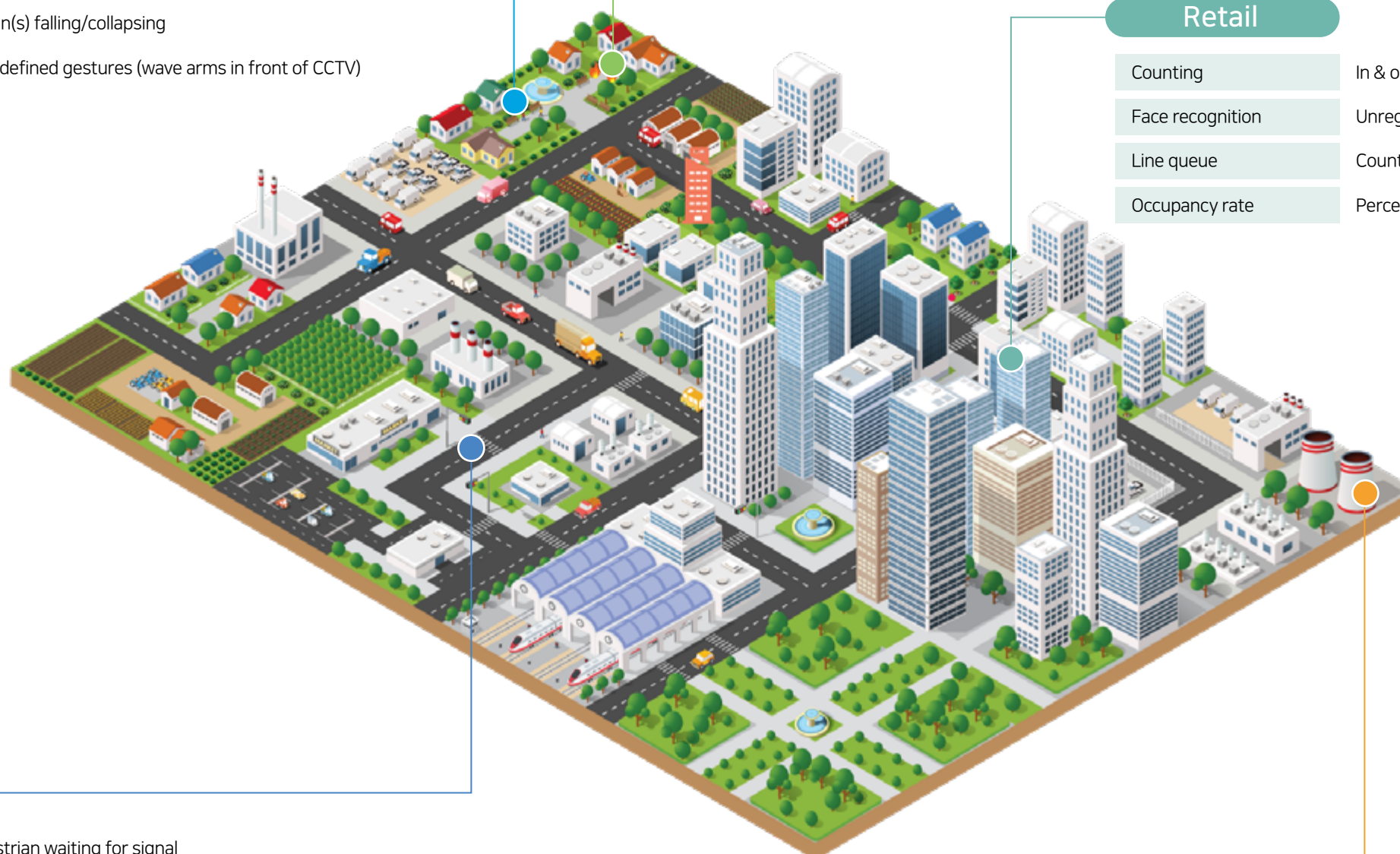|	
Fire/smoke detection	Intended/unintended fire detection
Escalator abnormal behavior detection	Automatic detection of falling/emergency stop/inversion, etc.

Retail

Counting	In & out count
Face recognition	Unregistered/registered, identification/age/gender recognition
Line queue	Counting people waiting at the counter
Occupancy rate	Percentage of people staying in and out

Transportation

Pedestrian detection	Detection of pedestrian waiting for signal
Traffic monitoring	Count by car/direction, unauthorized crossing, vehicle queue, parking/stop, number of pedestrians
Weather detection	Rainy/snowy/sunny/foggy classification, visible distance and fog density recognition
In & out count	Counting entering/exiting vehicle in the parking lot
Parking lot monitoring	Checking available parking slots

Facility Management

Evaluation of bridge condition	Detection and evaluation of cracks, peeling off

TRAFFIC

01 ▸ Smart Intersection System

The Smart Intersection System is an intelligent traffic system that collects real-time traffic information by applying an artificial intelligence-based algorithm and can link this information to the signal control part.

Total traffic volume by direction	Jaywalking detection
Space occupancy information of detection target transportation	Stopped vehicle detection
	Occupancy rate measurement
Vehicle classification	U-turn vehicle detection
Number of initial queueing vehicles	

02 ▸ VDS, Vehicle Detection System

VDS is a system that collects traffic information through intelligent image analysis in environments such as highways or secondary roads that have no external influence, such as traffic lights that control traffic flow.
PINTEL Co., Ltd.'s VDS system provides such functions as detection of vehicle traffic speeds at specific points of traffic, as well as detection of vehicles that cause accidents at pedestrian crossings and vehicles stopped on pedestrian crossings.
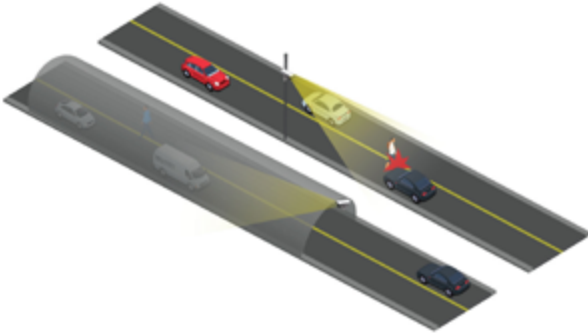

Traffic volume	Pedestrian detection
Vehicle speed measurement	Stopped vehicle detection
Occupancy rate measurement	Accident vehicle detection

03 ▸ Automated Incident Detection System

The Automated Incident Detection System detects and alerts of various unexpected situations such as stationary vehicles and reversing vehicles that occur in road environments such as tunnels, bridges, and highway general sections through real-time video analysis.

- Stopped vehicle detection
- Pedestrian detection
- Reversing vehicle detection
- Driving against oncoming traffic

04 ▸ Crosswalk Pedestrian Safety System

The Crosswalk Pedestrian Safety System improves the safety of pedestrians crossing crosswalks.

- Automatic pedestrian recognition signaller
  - Detection of pedestrians waiting to cross
  - Detection of walking pedestrians
- Automatic walking signal extension system
  - Detection and tracking of pedestrians on crosswalks
  - Detection of various types of pedestrians
    (Information on persons with disability/difficulty walking)
  - Pedestrian detection information

05 ▸ Road Pedestrian Safety System

The Road Pedestrian Safety System improves pedestrian traffic safety in various road sections.
Automatic detection and tracking and collision prediction of pedestrians are necessary to improve pedestrian traffic safety.

- Collision prediction situation detection
- Collision prediction notification

Pedestrian Image Detection System Test Report

The Road Traffic Authority

KoROAD

100%

Automated Incident Detection System Test Report

Intelligent Traonsport Society of Korea

ITS KOREA

97.7%

VDS (Vehicle Detection System) Test Report

Ministry of Land, Infrastructure and Transport

Ministry of Land, Infrastructure and Transport

Korea Institute of Civil Engineering and Building Technology

KICT

Grade A
Grade A
Grade B

SAFETY·SECURITY

PREVAX

01 Intelligent Video Surveillance System

The intelligent video surveillance system enables smart security in various fields (residential, industrial, government & public infrastructure, commercial).
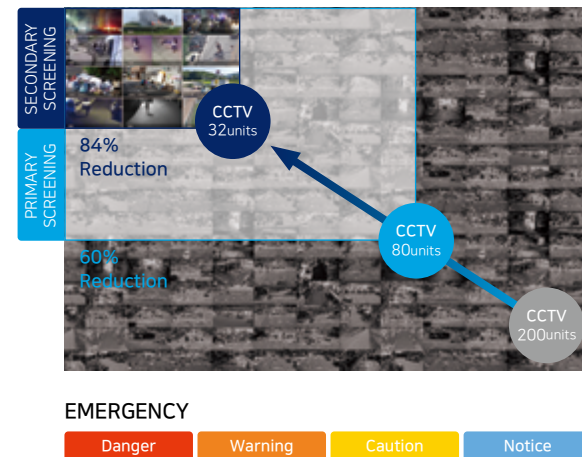
I Discover undetected objects
I Reduce false detection

02 Identifying Moving Object & Rule Based Event Detection System

After identifying moving object information with primary motion selection technology, separation of motion area among various images and secondary event selection technology detects events based on rules, and supports the quick decision-making of users. The screen UI is designed by arranging rows according to emergency situations enabling rapid recognition.
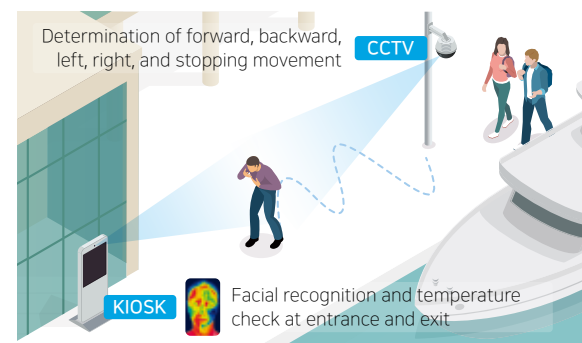
I Primary movement selection
I Secondary event selection

SECONDARY SCREENING
PRIMARY SCREENING

CCTV 32units
84% Reduction
CCTV 80units
60% Reduction
CCTV 200units

EMERGENCY

Danger	Warning	Caution	Notice

03 Intoxicated Person Detection System

The Intoxicated Person Detection System detects persons under the influence of alcohol based on object detection and tracking algorithms after acquiring image data via CCTV. It checks forward, backward, left, right, and stopping movements based on CCTV images, and restricts the entrance of persons under the influence of alcohol using facial recognition and temperature check at the kiosk.
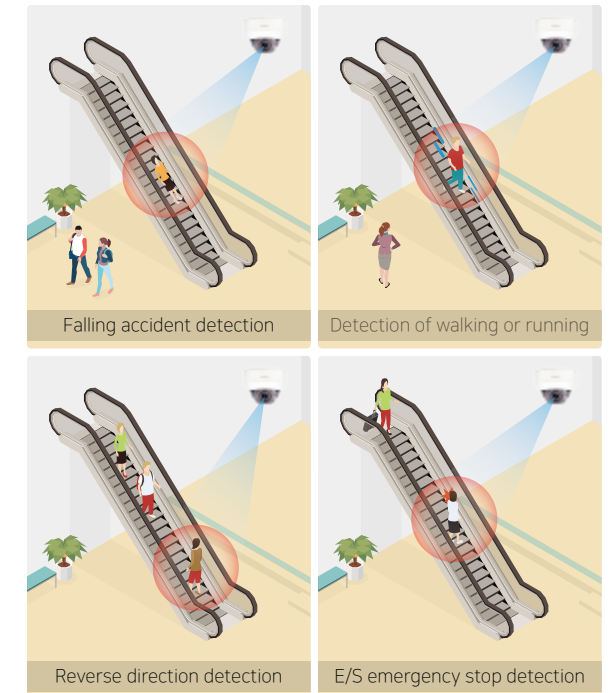
I Determination of forward, backward, left, right, and stopping movement
I Facial recognition and temperature check

Determination of forward, backward, left, right, and stopping movement
CCTV
KIOSK
Facial recognition and temperature check at entrance and exit

04 Escalator Abnormal Behavior Detection System

The Escalator Abnormal Behavior Detection System detects escalator accidents and signs in real time using deep learning technology. It is possible to detect falling accidents, walking/running, reverse direction, and sudden stoppage, and a wide angle of view is secured by using a fisheye lens camera, making it possible to monitor up to the center of the escalator with a single CCTV camera.
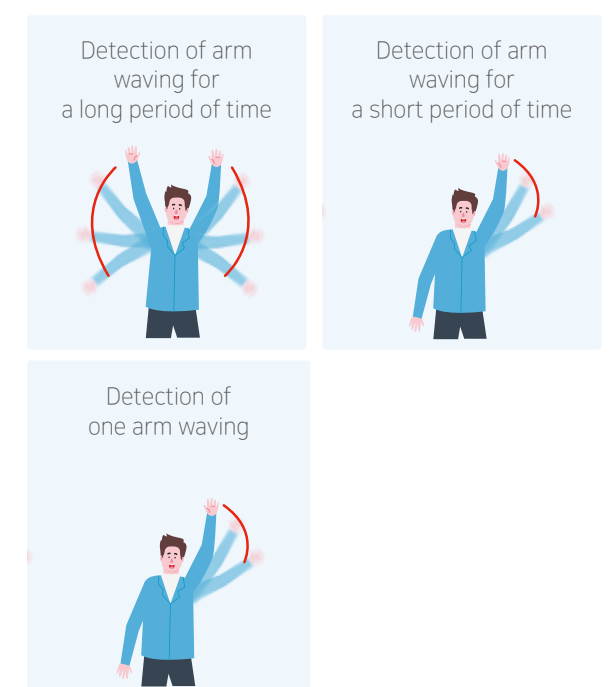
I Falling accident detection
I Detection of walking or running
I Reverse direction detection
I E/S emergency stop detection

Falling accident detection | Detection of walking or running
Reverse direction detection | E/S emergency stop detection

05 Arm Waving Detection System

The Arm Waving Detection System notifies CCTV monitoring personnel when a person waves one or both arms to request help in a dangerous situation. The motion history image (MHI) conversion technique is an effective method for checking large motions such as requesting help as it summarizes motions in one contrast frame and saves them.

I Detection of arm waving for a long period of time
I Detection of arm waving for a short period of time
I Detection of one arm waving

Detection of arm waving for a long period of time | Detection of arm waving for a short period of time
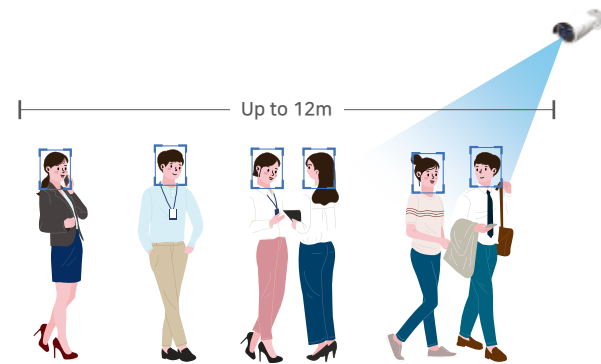Detection of one arm waving

FACE RECOGNITION

01 Walk-through Facial Recognition Number of Meals Count/Identification System

The Non-Contact Facial Recognition Number of Meals Counting/Identification System counts the number of meals employees are having. This facial recognition technology has maximum face recognition distance up to 12 meters and high accuracy up to 99.9%.
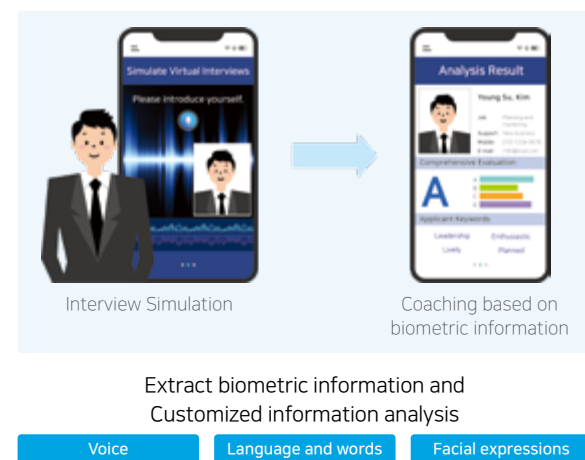
I Real-time face recognition
I Event inquiry
I Employee list inquiry

Up to 12m

02 Contact Free Video Interview System

The Non-Contact Video Interview System is an AI-based interview preparation platform that extracts biometric information (voice, language, words, and facial expressions), etc. using a mobile phone equipped with voice/image recognition sensors (microphone, camera), visualizes analysis results, and provides the results to users. Users can practice interviews without time and space constraints using familiar smart devices, and they can receive quantitative and numerical analysis results analyzed by artificial intelligence specialized for analyzing interviews.
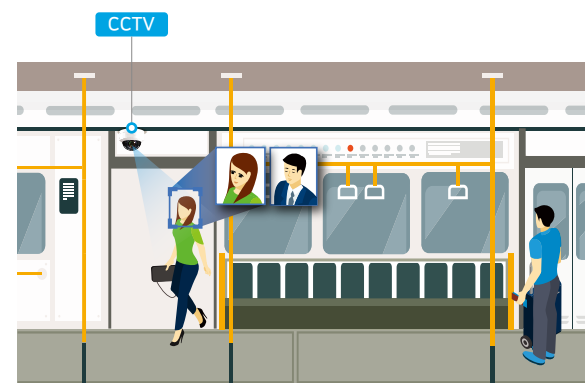
I Image analysis (Expression, gaze, motions, gestures)
I Voice analysis (Tone of voice, volume, talking speed, voice emotion)
I Language analysis

Interview Simulation | Coaching based on biometric information

Extract biometric information and
Customized information analysis

Voice | Language and words | Facial expressions

03 Free Rider Detection System

The Free Rider Detection System analyzes whether passengers are tagged by counting the number of passengers on board and passengers getting on and off using CCTV, acquiring passenger information, and tracking movement through skeleton detection. This face recognition-based free-ride prevention technology is a higher level than existing technology with low accuracy, and the processing speed is also fast since the deep learning image analysis algorithm is applied.

I Counting the number of passengers getting on and off
I Tagging detection

CCTV

CUSTOMIZING

01 Road Weather Information System

The road weather information system establishes safer highways through a live-stream of weather information generated using a deep-learning-based image analysis algorithm. The generated weather information is optimized for driving environments concerning weather elements that pose a risk to road safety such as fog, snow, or rain.

I Classification of fog, rainfall, and snowfall based on deep learning

02 Intelligent Security System Optimized for Unmanned Stores

The Intelligent Security System Optimized for Unmanned Stores is an intelligent video security system that recognizes abnormal behavior by analyzing 2D/3D images based on an integrated neural network in unmanned store environments where situations such as obscuration, congestion, and overlapping frequently occur.
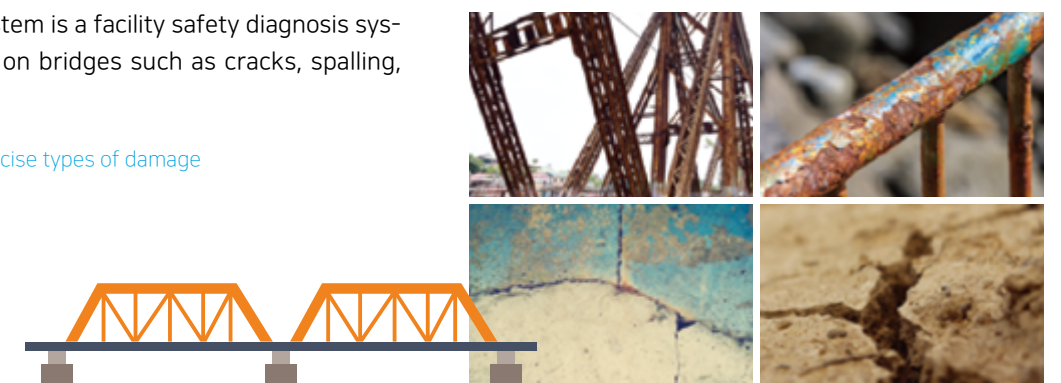
I Facial recognition upon entry
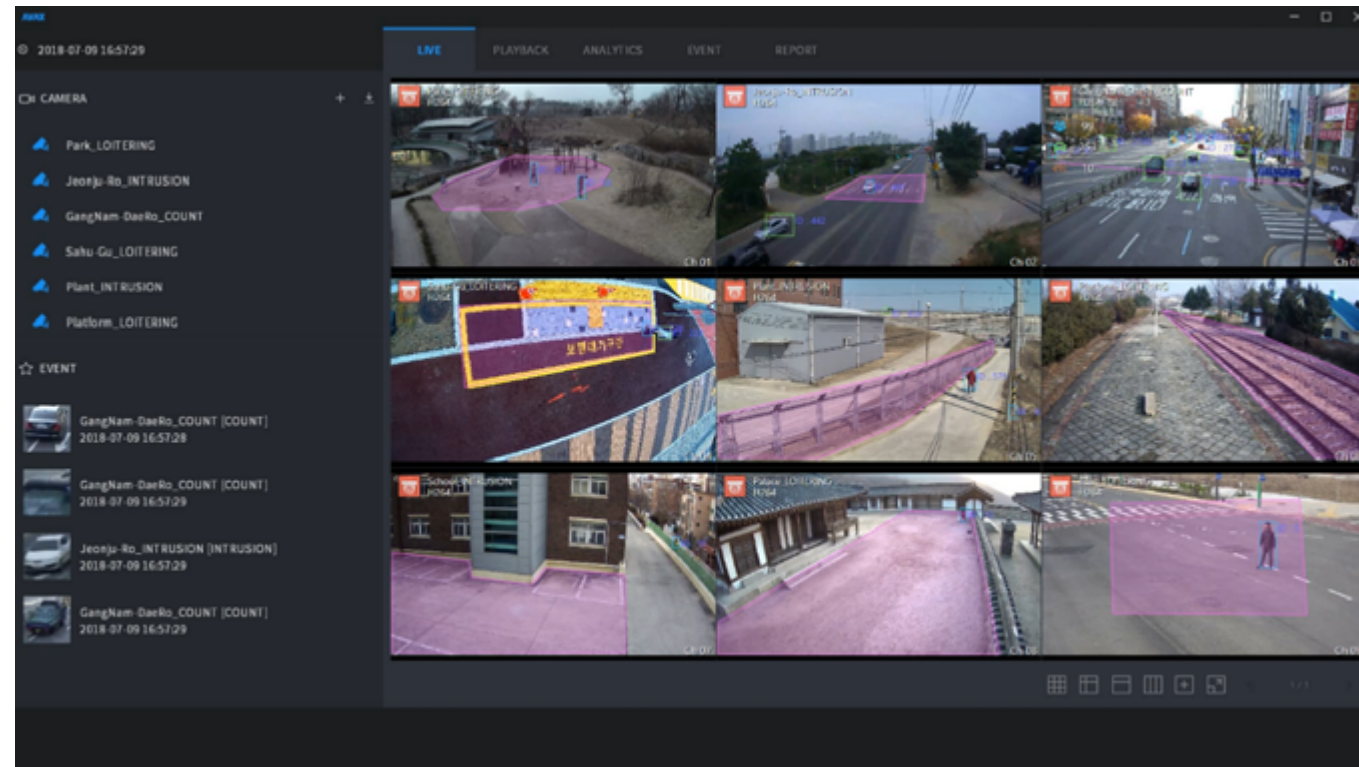I Recognition of abnormal behavior
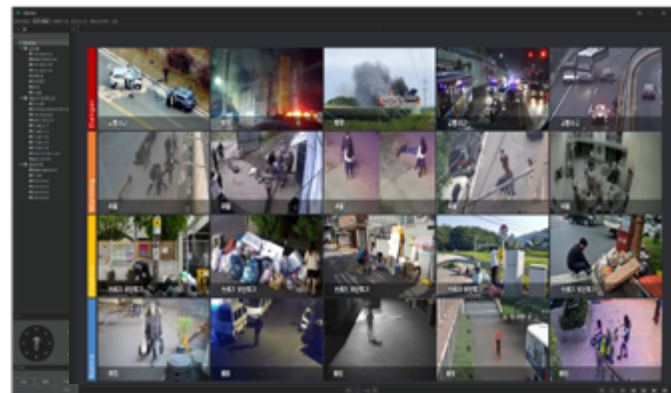

03 Facility Management System

The Facility Management System is a facility safety diagnosis system that detects anomalies on bridges such as cracks, spalling, and scaling.

I Mask-RCNN used to identify precise types of damage

AVAX
Advanced Video Analytic eXperience

Security CCTV System

· Providing alarms for living safety such as loitering and intrusion events
· Sales to local government office and public institutions by acquiring Excellent Product by Public Procurement Service - Thermoelectric Power Plants, Flood Management System, Public Rental House, etc. (Ref. 337 AVAX Intelligent Video Surveillance systems)

Smart Pedestrian Signal System

· Improving traffic efficiency and Pedestrian safety by recognizing pedestrians in waiting spaces and linking pedestrian signals
· Construction in Busan City, Paju City, Jinju City, and 5 other sites

Projects

Safety· Security Solution	[2019] Korea South-East Power CO. Yeong-Heung. Thermoelectric Power Station | Intelligent Video Surveillance system for operating industrial materials, resource conversion facilities and 20 other cases [2020] Jeju Free International City Development Center | Information and communication construction of 23 block of Jeju high-tech public rental housing and 49 other cases [2021] Korea Land & Housing Co. | Information and communication construction of Hanam Gamil B1BL Apartment and 41 other cases [in progress] Paju City, Gyeonggi-do | Paju City flood management system for national river and 30 other cases
Traffic Solution	[2020] Paju City, Gyeonggi-do | Smart Pedestrian Signal System and 2 other cases [2021] Jinju City, Gyeongsangnam-do | Smart Pedestrian Signal System and 1other case

PREVAX

Smart Intersection System

· Real-time and sensitive signal control optimization according to the intersection service level

· Recognition of queue(length/vehicle count), traffic volume, speed, traffic occupancy rate, vehicle type, etc.

Projects

Testbed Seoul	[2021] AI Video Information-Based Smart Intersection Technology for Cross walkers and Traffic Flows (2021) – Collaborate with Seoul Business Agency and Seoul City and Seoul Metropolitan Police / 4 consecutive intersection in Sangam-dong

PREVAX

Automated Incident Detection System

· Securing golden time and preventing secondary accidents by detection of unexpected incident
· Automated Incident Detection System Test : Highest Level
· Ref. Incident Detection System in West Expressway Tunnel(2021)

Traffic information Collecting System

· Recognition of traffic volume, speed, traffic occupancy rate, vehicle type, etc.
· Vehicle Detection System Test : Highest Level
· Ref. Intelligent VDS System in WonJu City (2021)

Identifying Moving Object & Rule Based Event Detection System

· Multi-channel artificial intelligence monitoring improves control efficiency and operational economy
· 84% less manpower compared to visual monitoring and obtaining New Excellent Technology(NET) certification (2021)
· Ref. Intelligent Video Surveillance system for integrated control center in Uiseong-gun, Gyeongsangbuk-do, Seongdong-gu, Seoul City (2020)
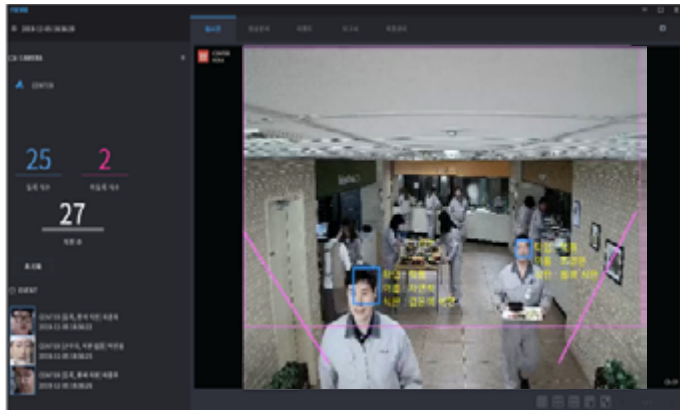
Non-Contact Facial Recognition Number of Meals Counting/Identification System

· Accurate meals counting by high-resolution technology and face recognition algorithms
· Face recognition certificate from KISA(2018)
· 12meters Recognition distance, 99.7% Recognition rate
· Ref. Samsung Welstory Inc. (2019)

Projects

Safety·Security Solution	[2020] Uiseong-gun, Gyeongsangbuk-do | Intelligent Video Surveillance system for integrated control center
	[2020] The Second Fleet of R.O.K Navy | Object recognition for Full HD security CCTV system and 2 other cases
Traffic Solution	[2020] UiWang City, Gyeonggi-do | Smart Intersection System of ITS construction projects and 2 other cases
	[2021] Hyundai E&C (Seoul City) | Incident Detection System in West Expressway Tunnel
	[2021] WonJu City National Territory Management Office | Traffic Information Collection System for ITS Construction
	[2021] Gangseo-gu, Seoul | Crosswalk pedestrian safety system(Hwagok Elementary School, Sinjeong Elementary School) and 1 other case
Customizing	[2019] Molex Korea Branch(Samsung Welstory Inc.) | Installing Automatic Pay Solution (Non-Contact facial recognition)

Reference

Project Name	Product	Client
Object Recognition for Full HD Security CCTV System	AVAX	Kun Dong Co.,Ltd.
AVAX Software License Agreement	AVAX	ICAD (Saudi Arabia)
AVAX System	Video Surveillance System Infra	National Evidence-based Healthcare Collaborating Agency
AVAX System	AVAX	SGA
AVAX System	AVAX	Gaytex Idustrial (Hong Kong)
AVAX System	AVAX	Thang Long Technology (Vietnam)
License Plate Recognition System	PREVAX-Smart Transportation	Dong Bu ICT Co.,Ltd.
Smartphone image preprocessing system	PREVAX-Smart Transportation	Namu Co.,Ltd.
Security CCTV System	CCTV	Yongin City
Smart intersection traffic collection system using deep running System	PREVAX-Smart Transportation	Electronics and Telecommunications Research Institute (ETRI)
Evaluation of bridge condition using deep running System	PREVAX	Korea Infrastructure Safety Corporation
Road weather information System	PREVAX	Korea Expressway Corporation
Security CCTV System	CCTV	Sejong Hightech Co.,Ltd.
License Plate Recognition System	AVAX	Dong Bu ICT Co.,Ltd.
Security CCTV System	CCTV	Hanmaum Networks Co.,Ltd.
Smart Pedestrian Signal System	AVAX	Busan City (Saha-Gu)
Smart Pedestrian Signal System	AVAX	Busan City (Jin-Gu)
Smart Pedestrian Signal System	AVAX	Busan City
Escalator control system	PREVAX	Busan Transportation Corporation

Category	Project Name	Client
Security and Safety	Intelligenct Video Surveillance system for integrated control center	Uiseong-gun, Gyeongsangbuk-do
	Security CCTV system	Yongin City
	Object recognition for Full HD security CCTV system	Jeju Free International City Development Center
	Object recognition for Full HD security CCTV system	Korea Land & Housing Co.
	Evaluation of bridge condition using deep running system	Korea Infrastructure Safety Corporation
Traffic	Road weather information system	Korea Expressway Corporation
	Inccident Detection System in tunnel	Hyundai E&C (Seoul City)
	Smart intersection traffic collection system using deep running system	ETRI
	Crosswalk pedestrial safety system	Gangseo-gu, Seoul
	Smart intersection system	Busan City
	Pedestrain Detection System	Jinju City
Retail	Walk-through meal counting system using facial recognition	Molex Korea (Samsungswlstory)
	F recognition, Focusing, Behavioral analytics system	WithMind Co.,Ltd

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Perception Intelligence

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