Core Team

Strategy and Direction

Harris SUN – CEO and Founder
Business and Investment
Serial entrepreneur. Passionate in innovation and exploration. Award winners of multiple startup competitions.

Board of Advisors

Prof. Louis LOCK
Honorary Technical advisor
Ex-chairman of HKIE. Adjunct Professor of SEE, was conferred Honorary Fellowship of the Institute of Measurement and Control (InstMC) in 2018 and awarded the Certificate of Honorary Fellowship

Douglas SUM
Technical advisor,
Façade Engineering
With over 13 years of global engineering consultancy and contractor experience, he has undertaken various world-class projects, including Hong Kong Disneyland, Macau City of Dreams, and Dubai Metro. Worked as the facade-consultant team-leader on one of the tallest buildings in the world - the Burj Khalifa in Dubai and responsible for its architectural design, engineering consultation and site supervision.

Dr. Dennis LEE
Technical Advisor,
Structural Engineering
An experienced chartered engineer and entrepreneur with 10 years industrial work experience, 7 of which in major multinational consultancies for building designs. He graduated in PhD in Concrete Structures from Imperial College London, Concrete Durability Group, with expert knowledge in concrete chemistry, deterioration mechanism, measurement and testing.

Dr. Toa CHARM
Principal Business Advisor
30+ years of experience in innovation and technology industry in Asia. Specialized in AI/Big Data, FinTech, Innovation and Entrepreneurship, Digital Strategy and Transformation. Associate Professor of CUHK Business School. Former Chief Public Mission Officer of Cyberport where Dr. Charm cultivated a world-leading digital tech ecosystem with 1,200+ digital companies from 40+ countries. Served HSBC, IBM etc. in senior management positions. Received the 2019 College of Business Distinguished Alumni Award of CityU.

Research

Prof. Hao SUN -
Cofounder and Advisory Chief Scientist
Forbes 30 Under 30: Science, Forbes Magazine, 2018, Assistant Professor, Northeastern University (Boston)

Dr. Gary HO –
Technical Director, Research and Principal Engineer
He graduated with Ph.D. in Engineering from Yale University, USA in the area of medical image analysis. In 2011, he joined Intel Corporation in California, USA as a research engineer, working on computer vision research and product development. He published several international conference and journal papers and authored 3 U.S. patents. .

Dr. Michele DE FILIPPO - Data Scientist,
Civil Engineering
PhD in Civil Engineering from the Hong Kong University of Science and Technology with a major in Applied Mathematics as well as international academic experiences in six universities worldwide with engineering work experience.

Sasan ASADIABAD (PhD Candidate) -
Senior AI Engineer
Ph.D. candidate in Artificial Intelligence, KoC University, Turkey. Responsible for computer vision and AI research and development.

AI Computer Vision / Software

Dr. Ao CHEN - Consulting Technical Director,
Computer Vision
He graduated with Ph.D. degree in Computer Science from the University of Geneva, Switzerland, dedicated in computer vision research and development. In 2007, he joined Canadian FT, mainly engaged in big data matching systems. In 2013, he joined Pix4D in Switzerland and served as technical director of Pix4D China.

Andy YEUNG - Technical Director,
Software Engineering
Profoundly impactful IT intellectual. Extremely Passionate in software development. He holds the bachelor degree of information engineering in the Chinese University of Hong Kong and the Master degree of computer science in the University of Hong Kong.

Tak HO - Senior System Architect
Graduated from the Hong Kong University of Science and Technology. Engaged in robust system development for more than ten years. Responsible for cloud computing, AI research and development.

Grace WOO - UX Designer
Graduated from the Hong Kong Polytechnic University. Strong knowledge of brand aesthetics and delivers the right product strategy for the end-user to enjoy the best possible user experience.

Zhehui TAI- Robotics Engineer
Graduated with a bachelor degree of computer engineering in the University of Hong Kong. Strong interest in IOT and robotics. Specialize in software and web development.

Operation

Dr. Edward CHAN –
Consulting Technical Director , Operation
He received his PhD from the Hong Kong University of Science & Technology in Mechanical & Aerospace Engineering in 2013. He has published several journal papers and holding 1 Chinese patent and 1 US patent. He is experienced in engineering project management and operations, from academia research projects to private sector projects.

Tony IP – Assistant Project Manager ,
Mechanical Engineering
Tony is a professional UAS pilot with the background of mechanical engineering, specialized in application of UAS for infrastructure inspection and conditional survey.

Jeff GU – Operational Engineer
Master's degree holder in mechanical engineering from Hong Kong University of Science and Technology, with a focus on Mechatronics. Experienced in hardware and firmware design as well as mechanical system analysis.

Business

Yolanda AU –
Senior Business Development Manager
Significant experience managing employee relations, benefits, compensation and training issues. She obtained her Bachelor degree in Human Resource Management with honors and scholarship in the University of Northumbria at Newcastle. Previously, she formed a team of 4 to provide innovative technology in stock taking for warehouse which earned her 3rd place in the Kerry Logistics Hackathon.

Angela MUI – Financial Controller
Financial expertise with solid experience in both the Professional field and Commercial field. Enjoy working in E-commerce and Start-ups Company to build up a new business in Team.

Boon HO –
Business Development Associate
A highly motivated and dynamic individual who can combine her enthusiasm and knowledge with strong work ethic to work and learn in a collaborative work environment.

Awards or Certifications

International Awards

- Winner of World Summit Awards 2019 in Smart Settlements & Urbanization
- Winner of Red Herring 2019 Asia Top 100
- Finalist of Harvard Startup Competition 2018
- Runner-up of Techsauce Global Summit 2018
- 25 Hottest AI Companies 2018 (CIO Bulletin)
- 30 Fastest Growing Companies to Watch 2018 (CIO Bulletin)

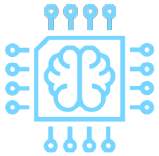
Regional and Hong Kong Awards

- Gold Medal Award Winner of 2nd Asia Exhibition of Inventions Hong Kong 2019
- Winner of 2019 Hong Kong Rising Star by Deloitte China Rising Star Program
- Winner of HKTDC Entrepreneur Day Start-up Express
- Winner of TechCrunch China Greater Bay Area Conference Cum Regional Final (HK) 2018
- Global Entrepreneurship Week (Hong Kong) Champion 2017
- HKU Dreamcatcher Award Winner 2017 (100K funds)

Highlights

01 >50% more cost-effective

02 Saving up >50% engineer time than traditional method



03 AI-powered analytics

04 Deliverable endorsed by chartered engineers or surveyors

05 Big Data predictive inspection

Why is this important?




High Risk

Long period of human eye inspection work at high altitude poses high risk of work injury.

Regulatory Difficulties

Limited by the amount of staff, it is difficult for the government to supervise a large number of inspection projects, and the method of spot checks is often used, which cannot be fully covered.

High Cost

Traditional inspection requires manual selection of detection points, manual operation of instruments to measure the degree of tilt, excessive labor, high operating costs, and low efficiency.

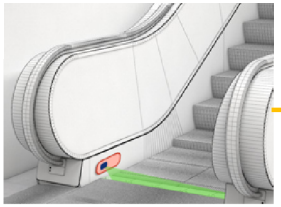
Inspector Inconsistency

The technical level of the inspectors is uneven and directly affects the test results.

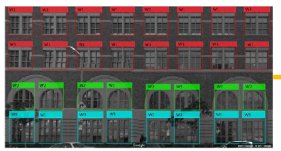
Smart Building

IoT sensing inspection

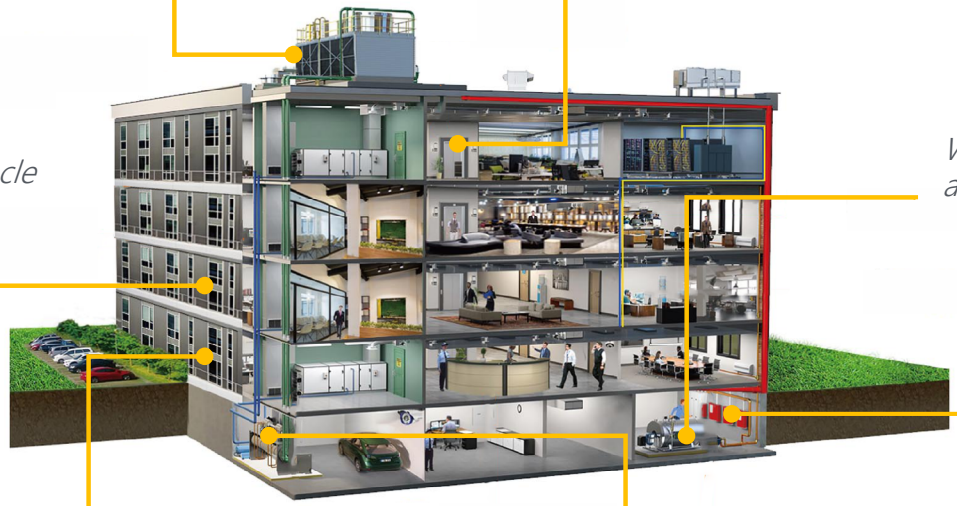
Air Conditioning Ventilation Monitoring System

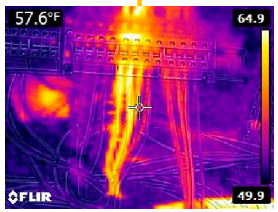


Real-time Obstacle Detection



Façade Integrity Monitoring System





Switch Board IR Monitoring System

Elevator Rope Inspection

Water Supply and Drainage Monitoring System

Fire Service Monitoring System

Our Products

RaSpect-ACE

Building Inspection and Monitoring System on **Cloud Platform**

Façade Inspection

F01 Reinforced Concrete (RC) Building

F02 Curtain Wall Building

F03 Heritage and Historic Building

Elevator Monitoring

L01 Bearing Monitoring

L02 Rope Monitoring

Escalator Monitoring

E01 Comb Section Monitoring

Chiller Monitoring

Ongoing.

Infrastructure Monitoring / Inspection

I01 Structural Monitoring

I02 Pylon Tower Inspection

Indoor Water Leakage Detection

Coming Soon.


RASPECT
AI-powered Predictive Inspection for Architecture.
RaSpect-ACE
Building Inspection
and Monitoring System
Cloud Platform

RaSpect-ACE Cloud Platform

How does it work?

Premium **White Label**

- **Tailor-made** user interface and features based on customers' own configuration
- Our **ready-to-use** system saves the development cost for customers
- Customers can set up **private cloud** for secured data storage and access

API Integration

Enable to manage data from separate system beyond the inspection

Flexible **Subscription Plan**

With inspection service:

Standard cost on surface area / m^2

Data usage only:

Standard cost on data volume

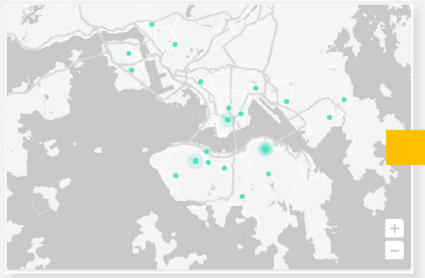
RaSpect-ACE Cloud Platform

Product Features

RaSpect-ACE
Cloud Platform

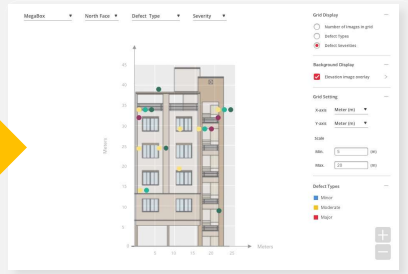
Dashboard

- Visual tracking, analysis and display of data
- 24 x 7 Real-time monitoring
- Predictive analytics

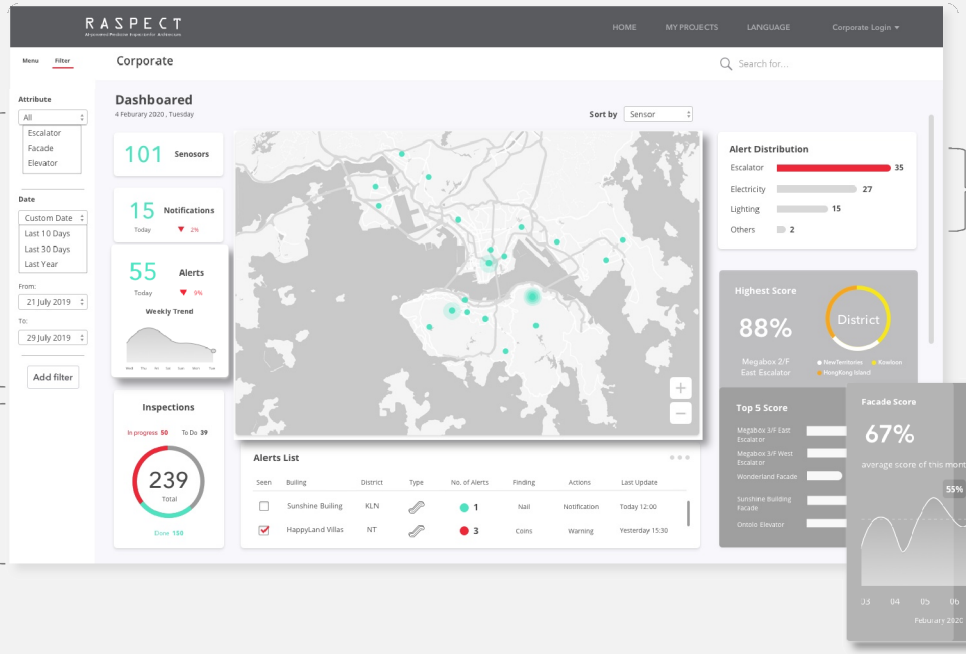


Regional

Building



Façade



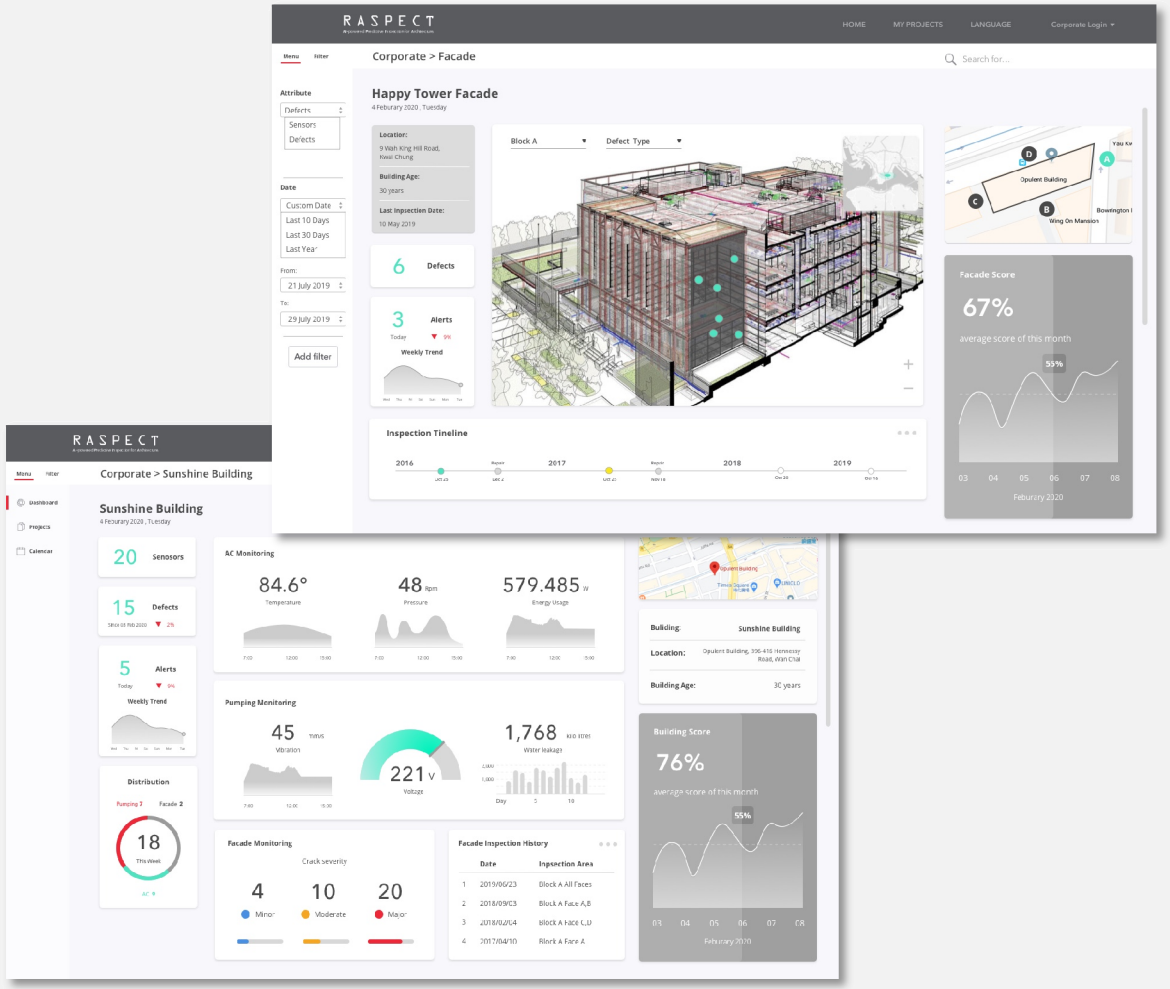
RaSpect-ACE Cloud Platform

Product Features

RaSpect-ACE
Cloud Platform

BIM

- Compatible with industry BIM software
- Structural analysis

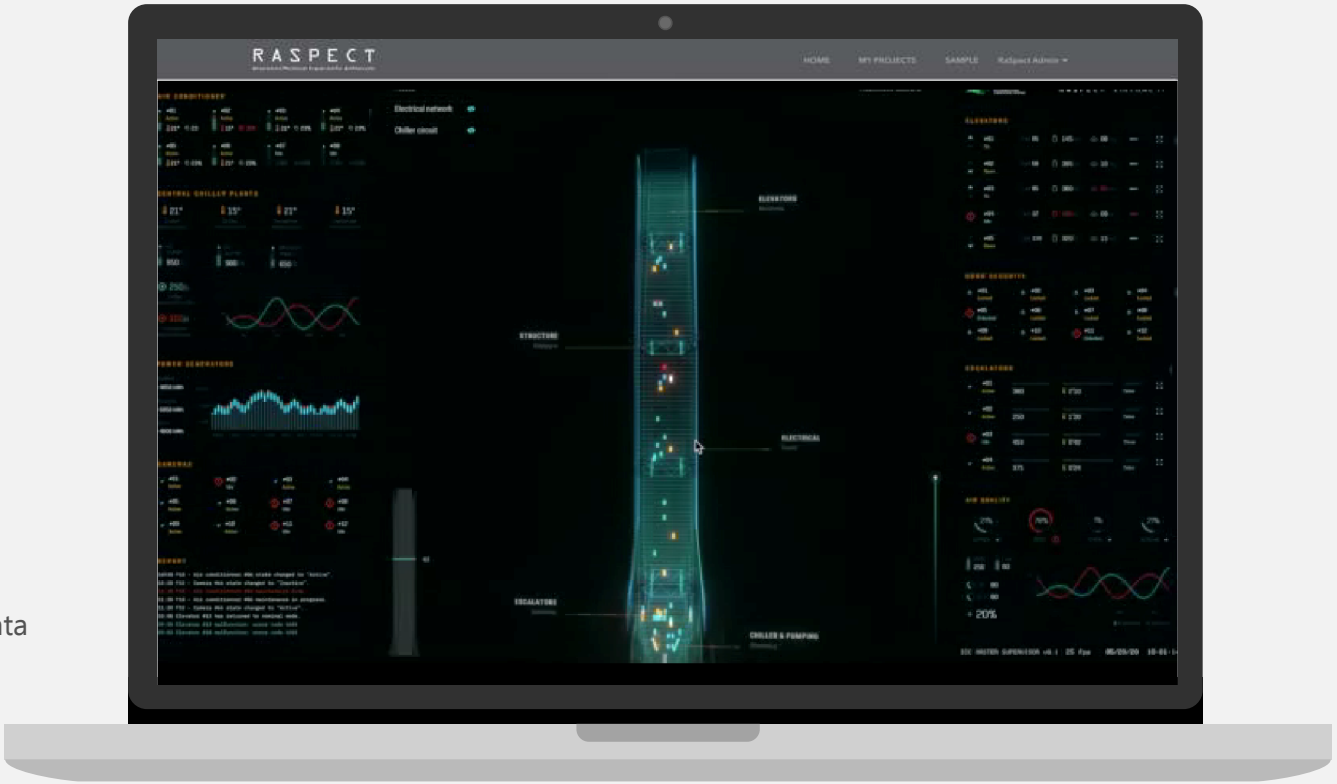


Product Features

RaSpect-ACE
Cloud Platform

Digital Twin

- Simulation and prediction of real-time data from the building facilities
- Integrated with IoT and AI analytics




RASPECT
AI-powered Predictive Inspection for Architecture
AI-powered
Façade
Inspection
CONFIDENTIAL

Problem Statement

Skyscraper Inspection (484m)

Case Study

Traditional Inspection

Frequency :	Every year
Duration:	1 year
Approach:	Fully manual inspection
Pros:	Industry standard, No liability risk
Cons:	Lack of transparent, error prone, High safety risk for worker, non-repeatable

RaSpect Inspection

Frequency :	Every half year
Duration:	3 months
Approach:	Automated AI inspection
Pros:	Transparent, Low error, Low risk, Repeatable
Cons:	Lack of standard, Need to educate the market for penetration

Facade Analysis

50% Cost Saving

than traditional inspection

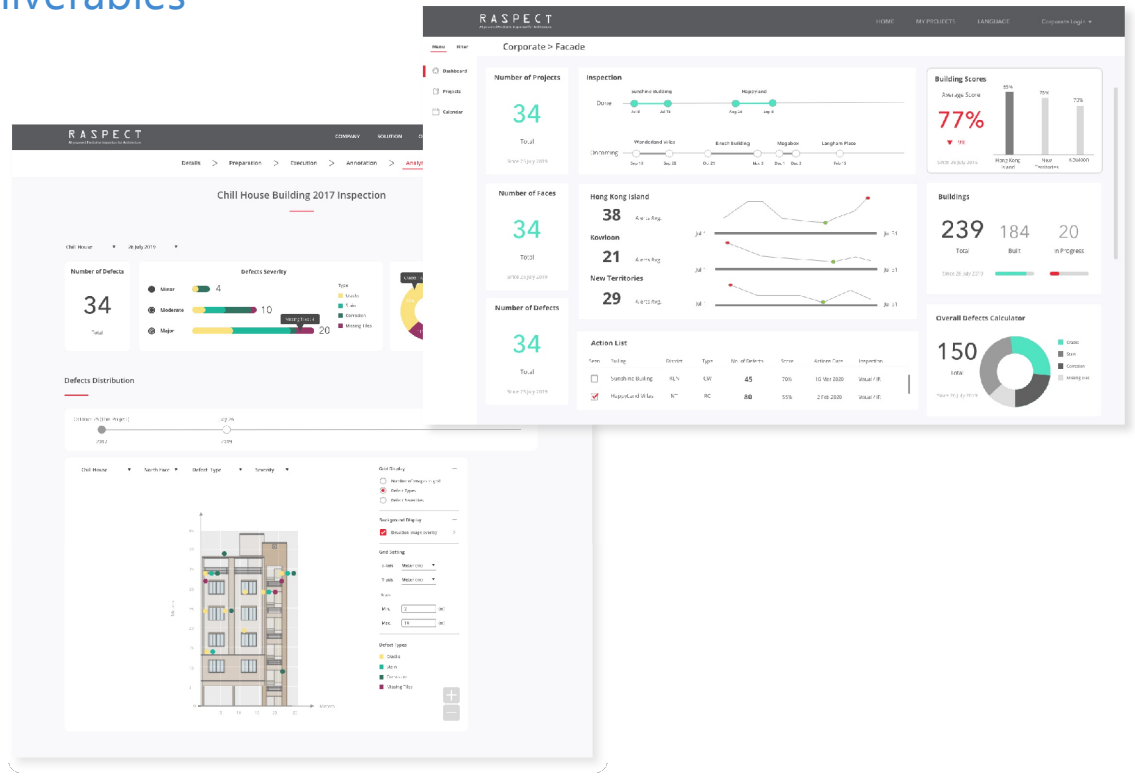
50% Faster

inspection time spent than traditional inspection

Big Data

Analytics

Deliverables



Deliverables:

- Big data analytics and data visualization on RaSpect-ACE cloud platform
- Detailed inspection report with all annotated images and post-analysis recommendations
- Result recognised by chartered professionals

AI-powered Façade Inspection Workflow

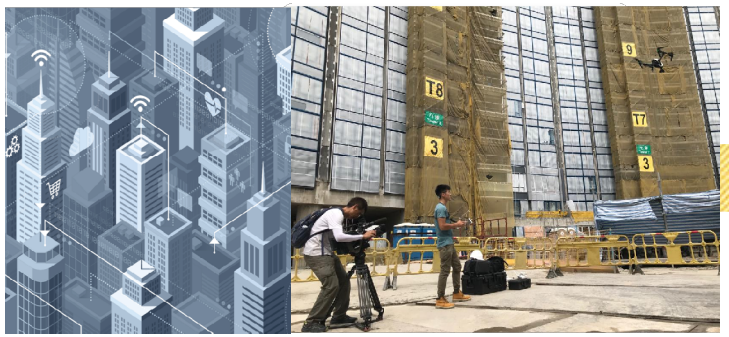
Automated Data Collection → Automated Data Post Processing → Automated Data Analysis → Big Data Prediction

24x7 IOT Inspection

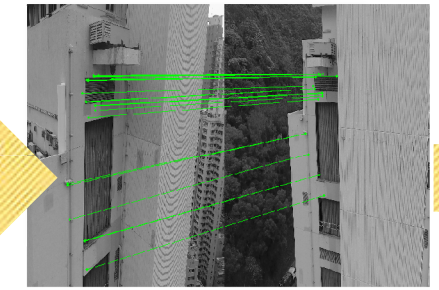
Robotics Inspection

AI-Powered Inspection

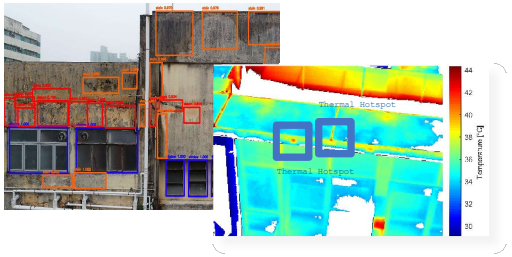
Predictive Inspection



Patented Data Acquisition Mechanism



Automatic positioning



Defects Recognitions, Visual & Thermal Analysis, Vibration & Ultrasonic Analysis and Structural Analysis

AI Analysis & Big Data Analytics

Defect Analysis

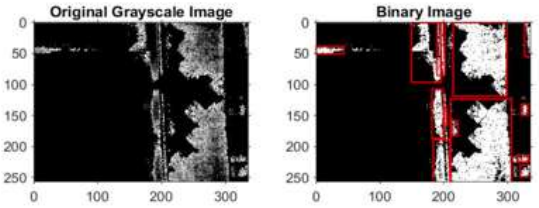
AI-powered Visual Recognition and Analysis

Our defect classification is based on the Code of Practice for Mandatory Building Inspection Scheme 2012 and Code of Practice for Structural Use of Concrete 2013 from Buildings Department.

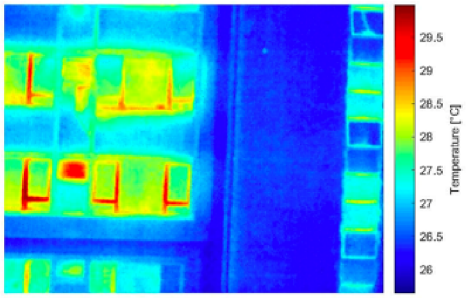
AI determines the severity of damage and provides rating automatically. Rapid image recognition is able to label potentially dangerous building defects, document their location and range and analyses their severity.

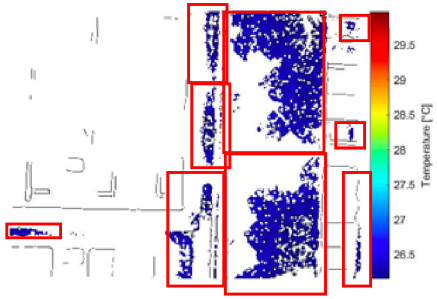
Thermal Analysis

AI-powered Thermal Recognition and Analysis



Detect thermal anomalies that are related to water leakage, moisture trapping and debonding in an intelligent and automated manner.





Detection of thermal anomalies is based on Computer Vision algorithms that can be tested applied on different thermal scenarios, including beam elements, roofs and the entire façade of reinforced concrete buildings.

AI-powered Façade Inspection

Reference Cases

Curtain Wall Inspection and Conditional Survey

ICC

Client Name:	Kai Shing Management Services Limited
Address:	1 Austin Rd W, West Kowloon
Completion Period:	May 2020

New Building Inspection

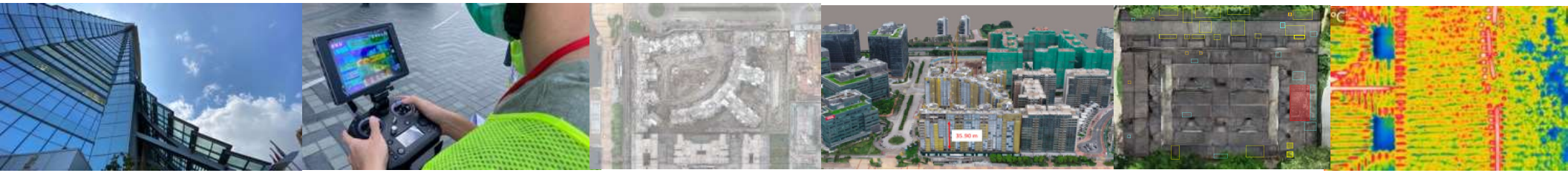
Ontolo

Client Name:	The Great Eagle Company Ltd.
Address:	7 Fo Yin Road Pak Shek Kok
Completion Period:	Jul 2019

Roof Tiles Inspection

Sam Tung Uk Museum

Client Name:	Architectural Services Department
Address:	2 Kwu Uk Lane, Tsuen Wan, New Territories
Completion Period:	Jul 2019



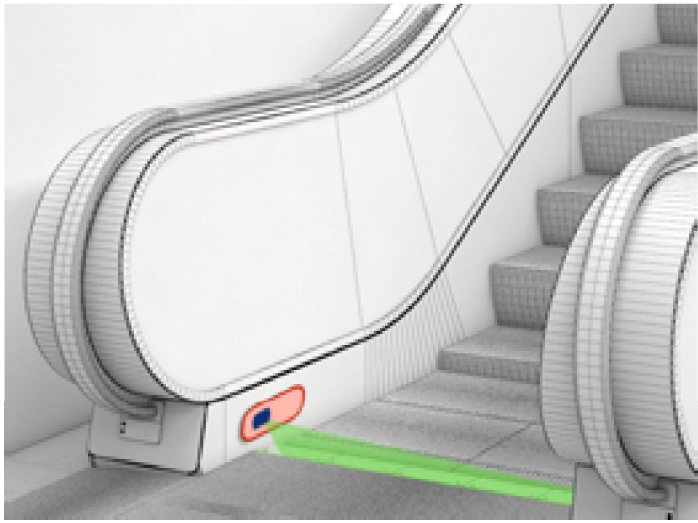

RASPECT
AI-powered Predictive Inspection for Architecture
AI-powered
Escalator
Monitoring
CONFIDENTIAL

Problem Statement

Real-time Comb Section Monitoring System

There are thousands of escalators operating in Hong Kong everyday. Objects may be jammed at escalator comb section, posing high risks and may have serious consequences.

Real-time Comb Section Monitoring System



90% Labour Cost Saving

than traditional inspection

Real-time Alert

24x7

inspection time spent than traditional inspection

95% Detection Accuracy

or above in less than 3 seconds

Deliverables

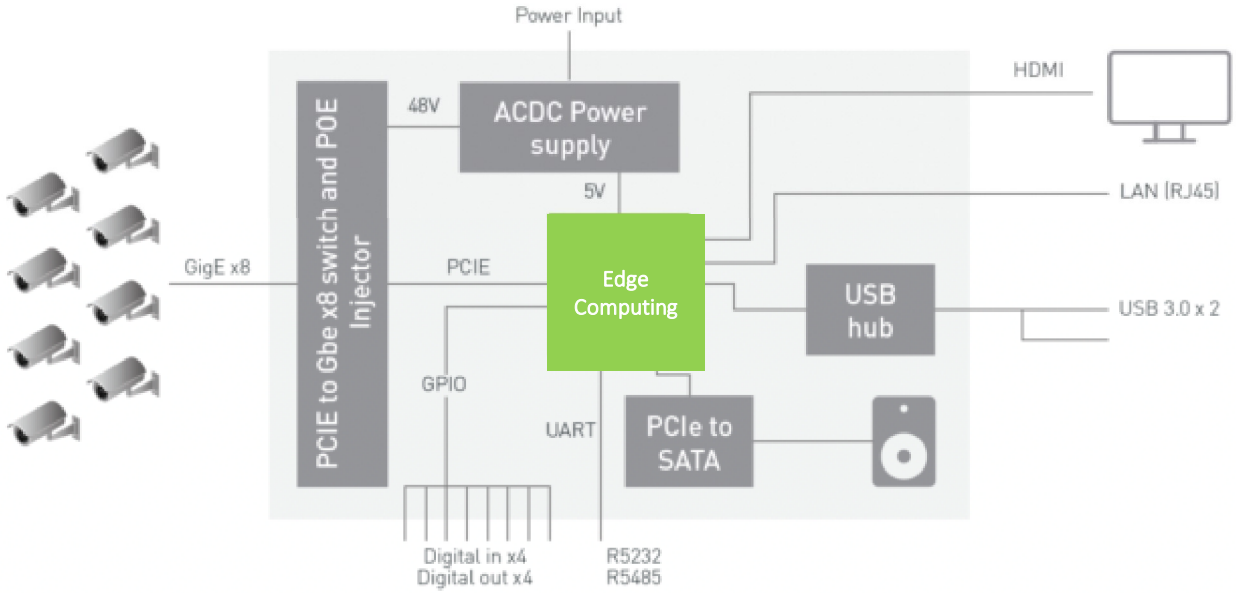
- Detect obstacles that reach the escalator comb section in less than 3 seconds with a detection accuracy of 95% or above
- Detect specified obstacles
- Real-time alert system will alert with images or videos to staff in office

Real-time Alert System

Integration of an AI-embedded System

Stationary visual cameras and data streaming and networking system are installed. AI technology (e.g. machine learning) improves the reliability and accuracy of object detection and be able to alert with images and videos to appropriate staff in office.

Embed the trained AI model into the local processor. Design and build communication gateway for software updates and feedback signals.



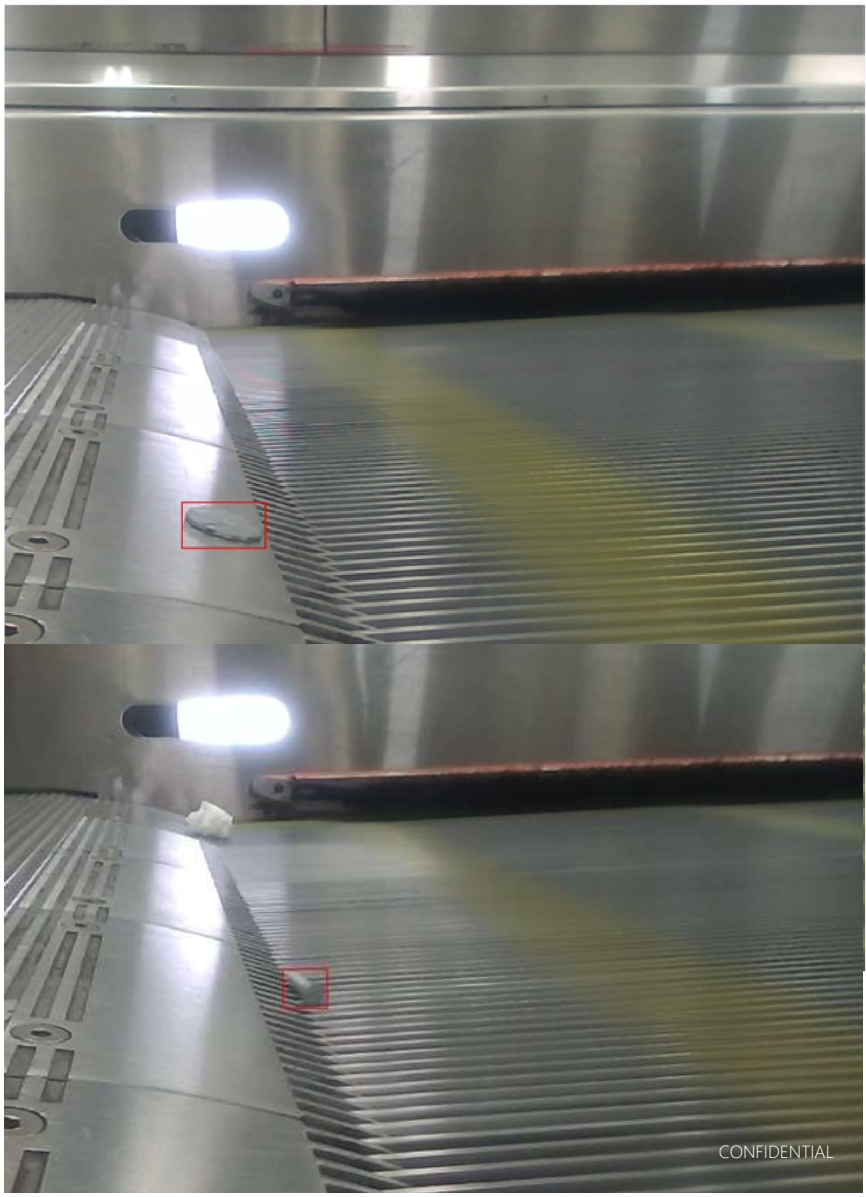
AI-powered Escalator Monitoring

Reference Case

Obstacle Detection
Escalator Comb Section

MTR

Client Name:	The Jardine Engineering Corporation Limited
Address:	HKU station
Completion Period:	October 2019




RASPECT
AI-powered Predictive Inspection for Architecture.
AI-powered
Elevator
Monitoring
CONFIDENTIAL

Problem Statement

Rope and Bearing Monitoring System

The traction wire ropes are important suspension equipment for an elevator. It bears the full weight of the elevator and the counterweight during operation. It also drives the elevator to move between the wire rope and the traction wheel groove.

The wire ropes are subjected to:

01 Repeated stretching and bending

02 Breaking of wires

03 Abrasion

04 Rusting

05 Loss of friction




Rope and Bearing Monitoring System

Deliverables

- Detailed analysis report
- Real-time alert system for staff in office
- Real-time dashboard monitors all the machinery components on RaSpect-ACE cloud platform

80% Saving Cost

In maintenance and repairing

Real-time Alert

24x7

Less inspection time spent than traditional inspection

Non-Intrusive

monitoring

Elevator Rope Monitoring

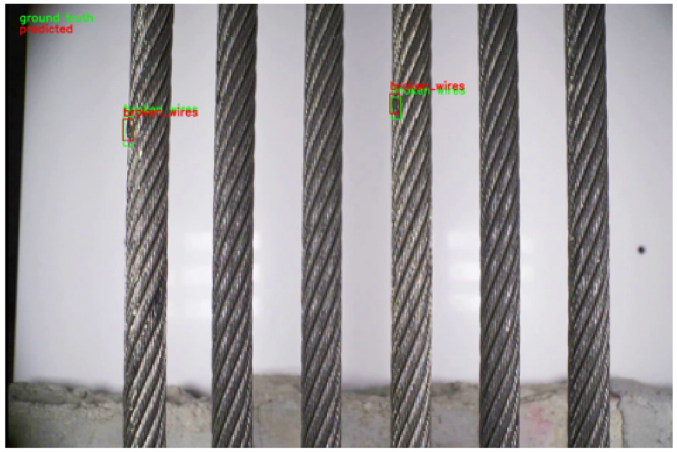
Visual Monitoring System

Installation of Cameras

A set of high-speed cameras are installed in the top floor machine room. The setup must cover entire rope profile. If multiple ropes are closely-packed, an array of cameras can be arranged.

Defects to be identified

- Broken wires
- Reduction in diameter
- Corrosion
- Rope deformation
- Heat damage

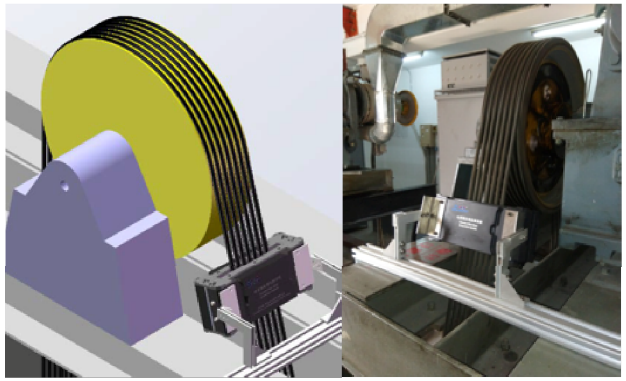


Data Livestream

Camera monitors the rope condition with real-time alert system. Data is streamed to the cloud server for data processing.

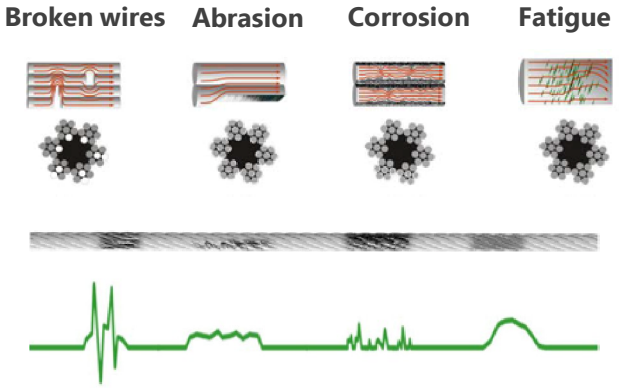
Elevator Rope Monitoring

Magnetic Inspection



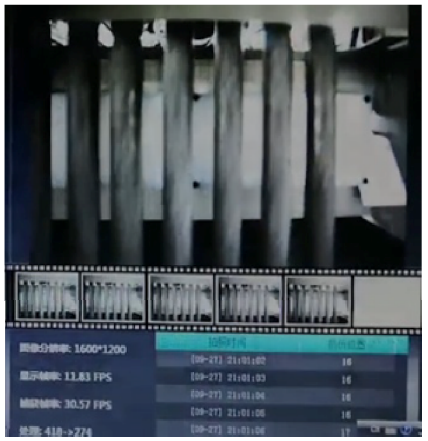
Installation of magnetic memory regulation device

Elevator magnetization device is installed near guiding wheel, where the wire rope runs steadily with minimum vibration such that uniform magnetic field is ensured.



Defects to be identified

- Broken wires
- Corrosion
- Abrasion
- Fatigue
- Others



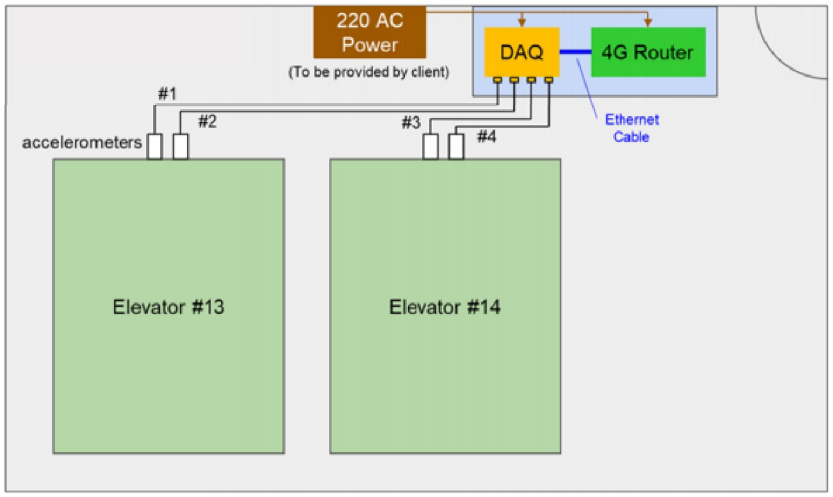
Online device monitoring

Once one or more steel cores inside the traction belt are detected broken, a warning will be prompted online and the elevator control system shall make corresponding protective measures.

Elevator Bearing Monitoring

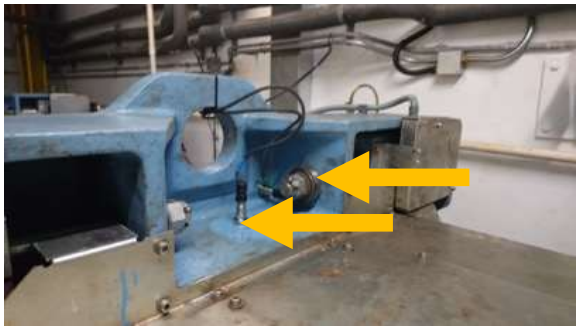
Vibration Sensor Monitoring

System Setup



Vibration Sensor Installation

DAQ unit and on-board computer mounted to the structural frame

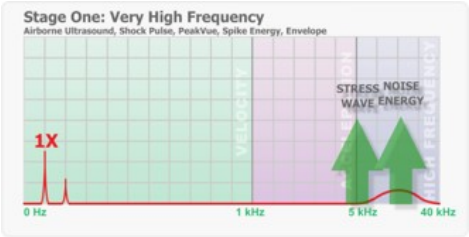


After sensor installation

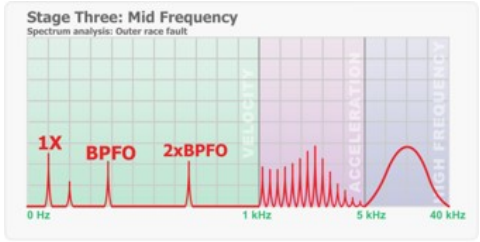
Measuring the vibration levels and frequencies of machinery
Analysing the healthiness of machines and their components

Elevator Bearing Monitoring

Vibration Sensor Monitoring

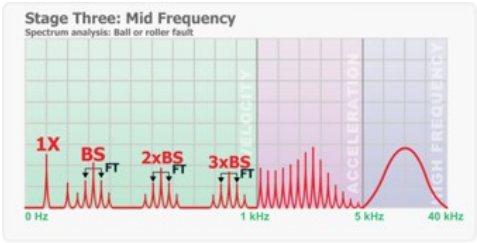


Lack of lubrication or minor bearing damage changes the vibration amplitude



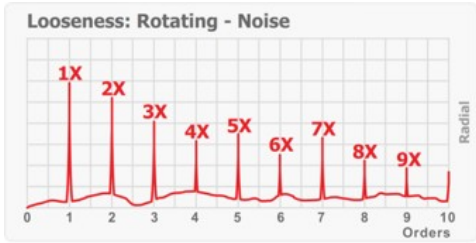
Outer race of bearing is suspected to have damage

Areas with noisy spectrum indicate potential small debris inside or other factors



One point on outer raceway is suspected to have damage

Areas with multiple sharp peaks on spectrum indicate potential loosening in rolling elements



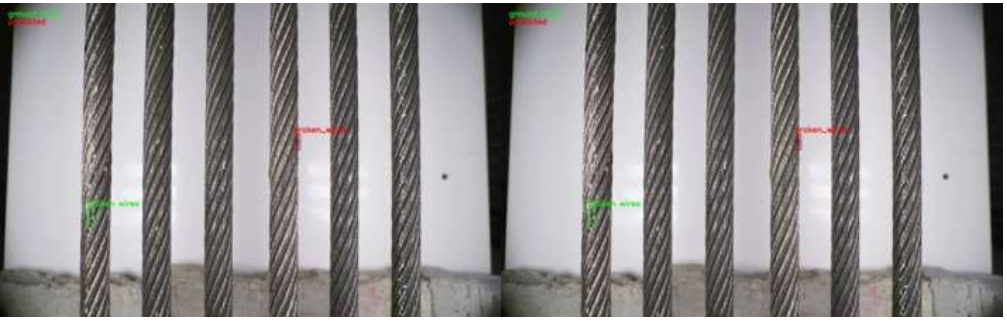
AI-powered Elevator Monitoring

Reference Case

Elevator Rope
Visual Monitoring System

Schindler

Client Name:	Schindler Lifts (Hong Kong) Ltd.
Address:	1 Austin Rd W, West Kowloon
Completion Period:	April 2020



Elevator Bearing
Vibration Monitoring System

Schindler

Client Name:	Schindler Lifts (Hong Kong) Ltd.
Address:	1 Austin Rd W, West Kowloon
Completion Period:	April 2020


RASPECT
AI-powered Predictive Inspection for Architecture.
AI-powered
Infrastructure
Monitoring/
Inspection
CONFIDENTIAL

Infrastructure Inspection and Monitoring

80% Cost-effective

solution

Safer Workplace

than traditional inspection

Predictive

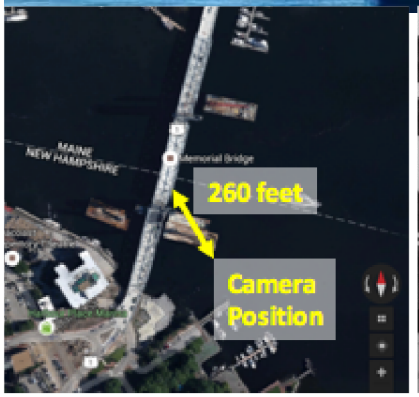
Maintenance

Deliverables

- Proactive failure prevention
- Real-time alert system will alert with images or videos to staff in office

Bridge Monitoring

A Spatiotemporal Video Analytics Approach



Phase-based Motion Magnification

$$d = \phi(x, y, t)\left(\frac{\partial \phi}{\partial x}\right)^{-1}$$

2.40 Hz – 2.60 Hz, x400

CNN + LSTM: Spatiotemporal Learning

Pylon Tower Inspection

Inspection by UAV

Any symptom that impacts the structural and electrical safety or affects the performance of power transmission, is considered as defect. Periodical inspections are carried out to spot defects in their early stage such that appropriate preventive maintenance can be arranged.

Common Defects

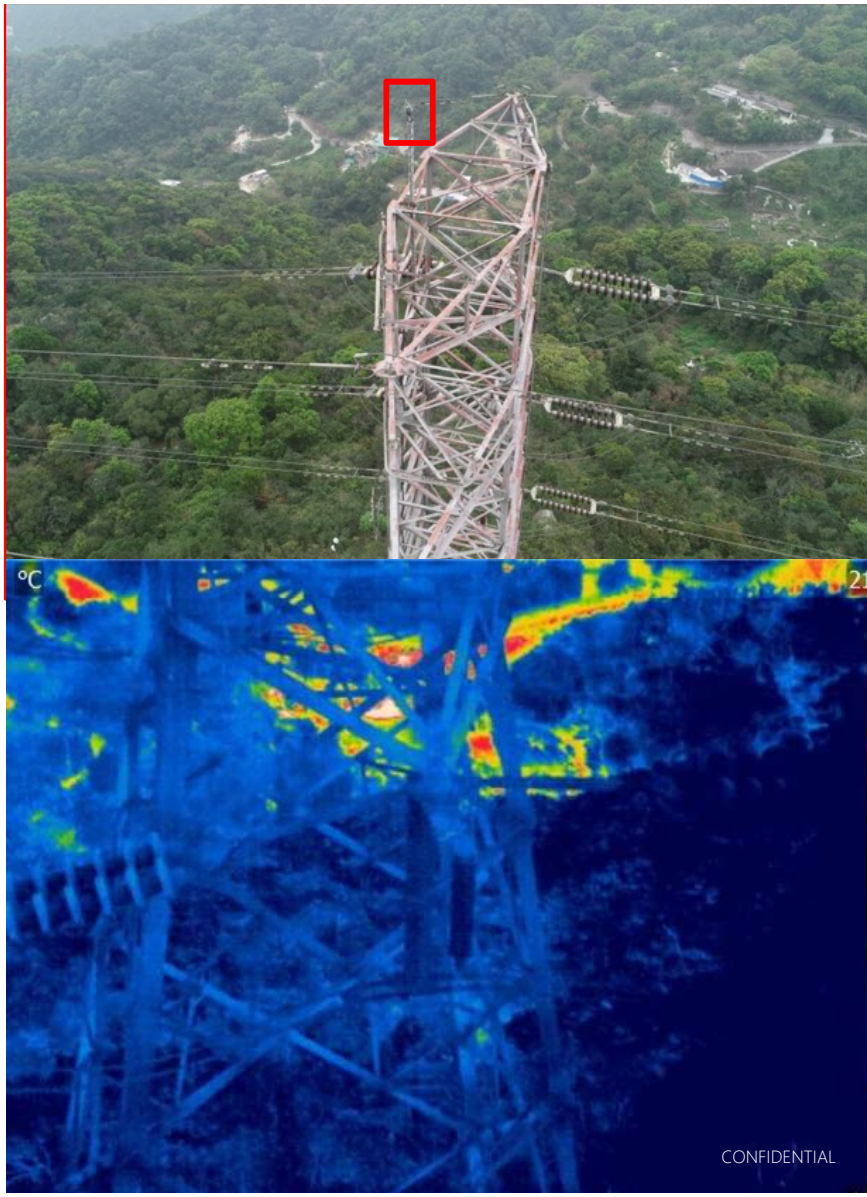
01 Insulator defects

02 Degradation of coatings

03 Rusting / Oxidation

Pylon Tower Inspection

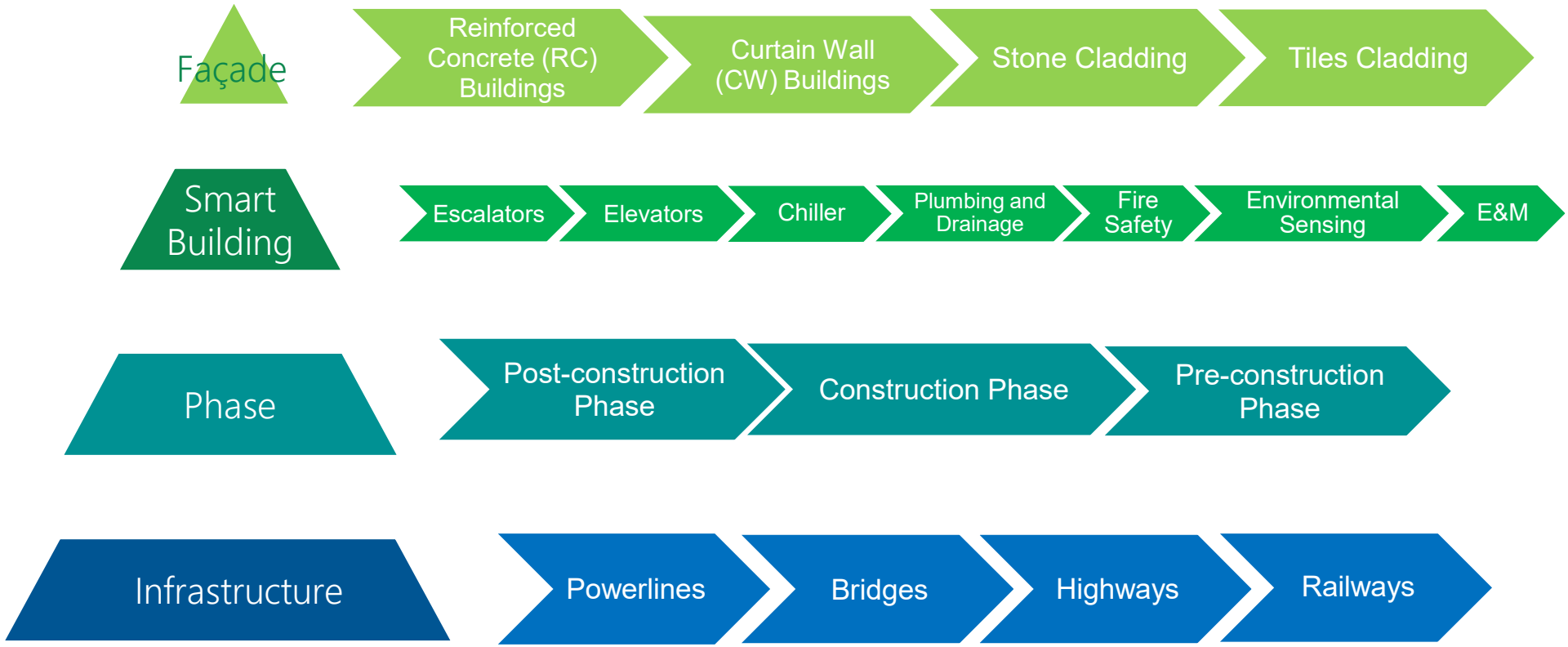
Client Name:	Kum Shing Engineering Co. Ltd.
Address:	HMH-YWS 3HMC5 22°21'01.8"N 114°11'40.7"E HMH-OSS 3HMA5 22°21'29.8"N 114°12'25.0"E HMH-YWS 3HMC18 22°21'34.7"N 114°09'35.3"E
Completion Period:	Mar 2020



Competitive Analysis

	RaSpect	Dronesurvey Asia	H3Zoom	Sky-Future
Based	Hong Kong	Hong Kong (Local)	Singapore (Regional)	UK (Global)
Defect Analysis	✓		✓	✓
Thermal Analysis	✓		✓	✓
Automated Defect Positioning	✓			
3D Model Deliverable	✓	✓	✓	✓
Deep Learning	✓		✓	✓
AI Cloud Based Platform	✓		✓	✓
Façade Inspection	✓		✓	
Predictive Inspection	✓			
BIM-enabled	✓			✓
Digital Twin	✓			✓

Product Roadmap



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