AUSTRIA VIENNA 2024

IRSC
INTERNATIONAL
Railway Safety Council

MTR

17-21
Sept. 2024

Vienna, Austria
Aula der Wissenschaften

Autonomous Detection and Alert with Cutting-edge Computer Vision Enhancing Platform Safety

Dr Billy Wai Pan Tam
Senior Technology Development Manager – Operations Systems
MTR Corporation Limited

Hong Kong

#1

City for Public Transport

Source: Urban Mobility Readiness Index 2022 and 2023

MTR Network in Hong Kong

99 Stations   ~5M Pax/day

Project Background

13 Stations

Automatic Platform Gate
Installation in Progress

High Traffic Density

Uniqueness in East Rail Line

Platform Yellow Line

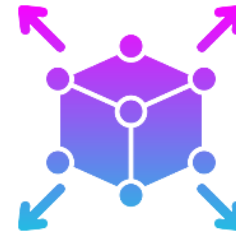Track Area

Operations Area

Pain Point to Station Staff

There are a total of around 400 platform cameras monitored by station staff in these 13 stations.

Project Objective

Artificial Intelligence & Autonomous

Easy To Implement & Scalable
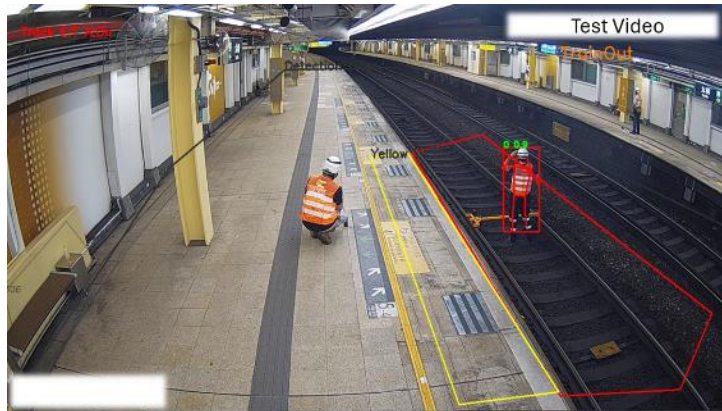
Enhance Safety & Operational Efficiency

Detect Intrusion / Object & Analyze Passenger Behavior with Safety Concern
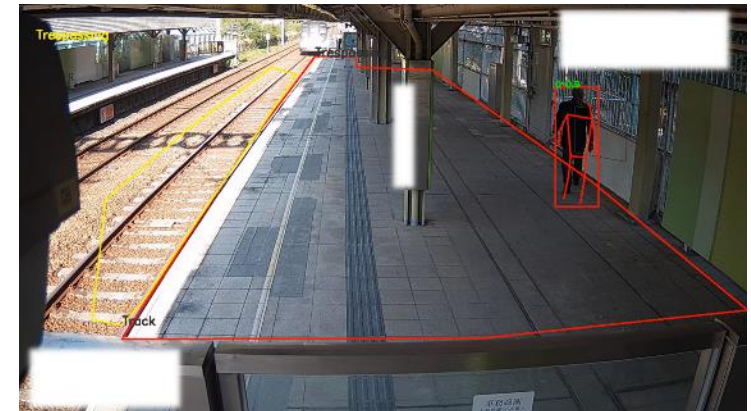
Key Functions – Intrusion

Person / Object on Track   **Beyond Yellow Line**   **Trespassing**

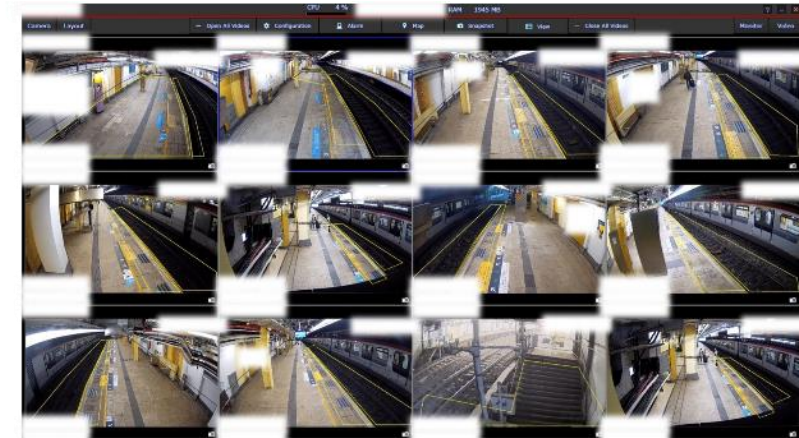# Key Functions – Behavior & Object

Person Collapse

Wandering

Presence of Dogs / Cats

Monitoring Facilities for Station Staff

Alarms can be monitored by station staff in station control room, platform supervisor booth and platform supervisor stand.

Actions by Station Staff

Critical Level Alarm

- **The train is tripped immediately by pushing the emergency train stop on the platform.**
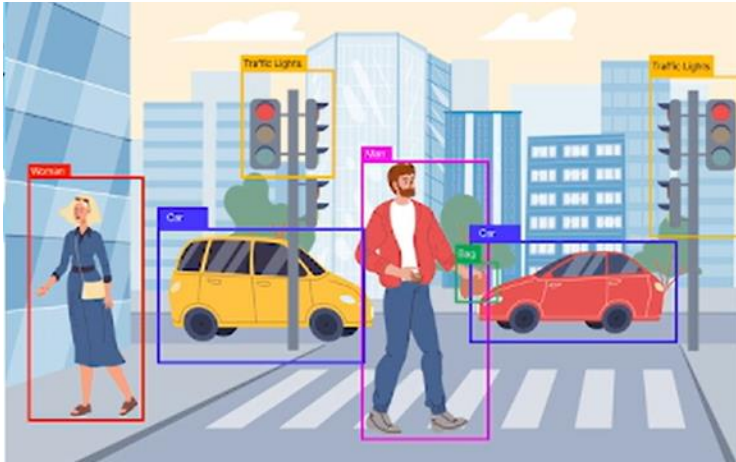
Actions by Station Staff

Alert Level Alarm

- **Platform supervisor informs other station staff to follow up the case.**

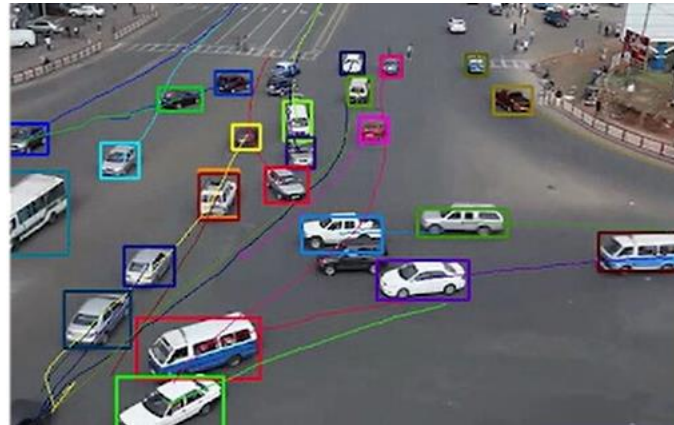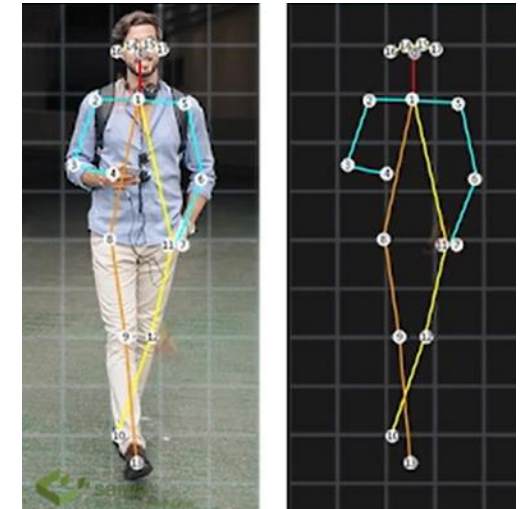- **Automatic public address is triggered for beyond yellow line alarm.**

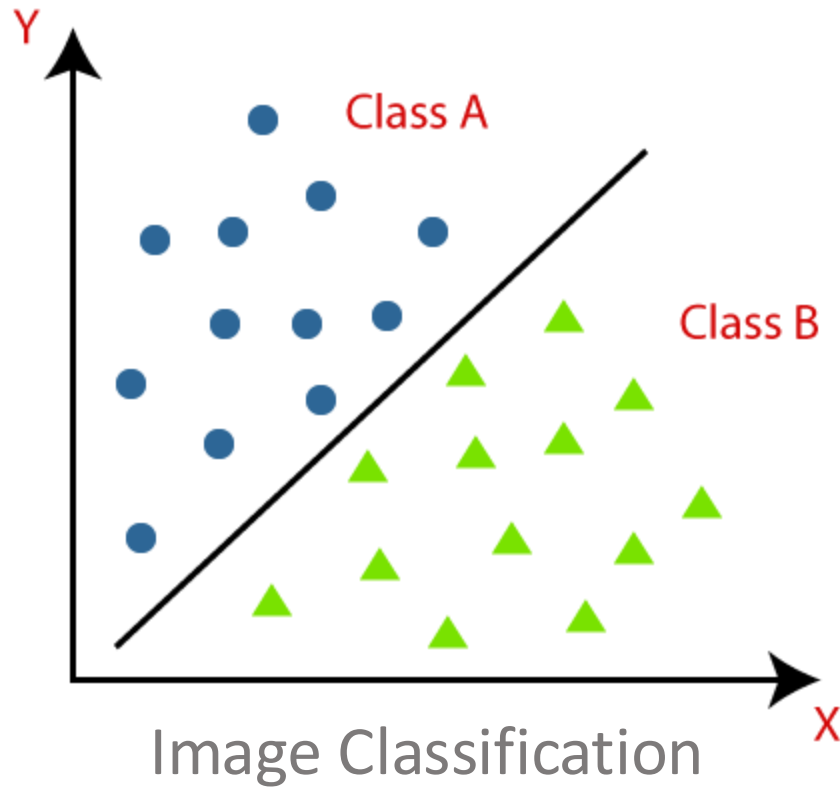# Customized AI Algorithm Design

Object Detection

Object Tracking

Skeleton Detection

Customized AI Algorithm Design

Image Classification

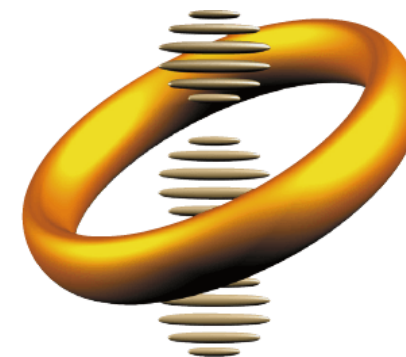No Train / Train Door Open / Train Door Close

Our Innovation

The first video analytics solution in Hong Kong developed specifically for railway applications:

- **Utilizing cutting-edge video analytics on top of CCTV monitoring**

- **Training AI models through extensive real and generated image dataset**

- **Recognizing objects and passenger behaviors for the railway contexts**

- **Integrating with other systems such as PA to facilitate operations**

Hong Kong Short-term Patent granted relevant to this application:

- **Monitoring Railway Nodes (HK30032938)**

Example of Successful Case

The system has prevented accidents in the past months.

Home page > Hong Kong news > sudden

Two visually impaired people accidentally crossed the tracks at MTR Fo Tan Station in one day, one of whom was injured

Sing Tao Headline, 30 March 2024

sudden Update time: 20:39 2024-03-30

- **Successfully detected fallen passengers**
- **Triggered alarm to inform staff**
- **Station staff timely stopped the approaching train**
- **Prompt actions to assist the passengers at the same time**

Safety

Innovation

Social
Responsibility

SAFETY FIRST 安全第一 QUALITY ALWAYS 品質至上

End of Presentation