GORIA

Case Study

Smart City Solution

Taiwan Train Station

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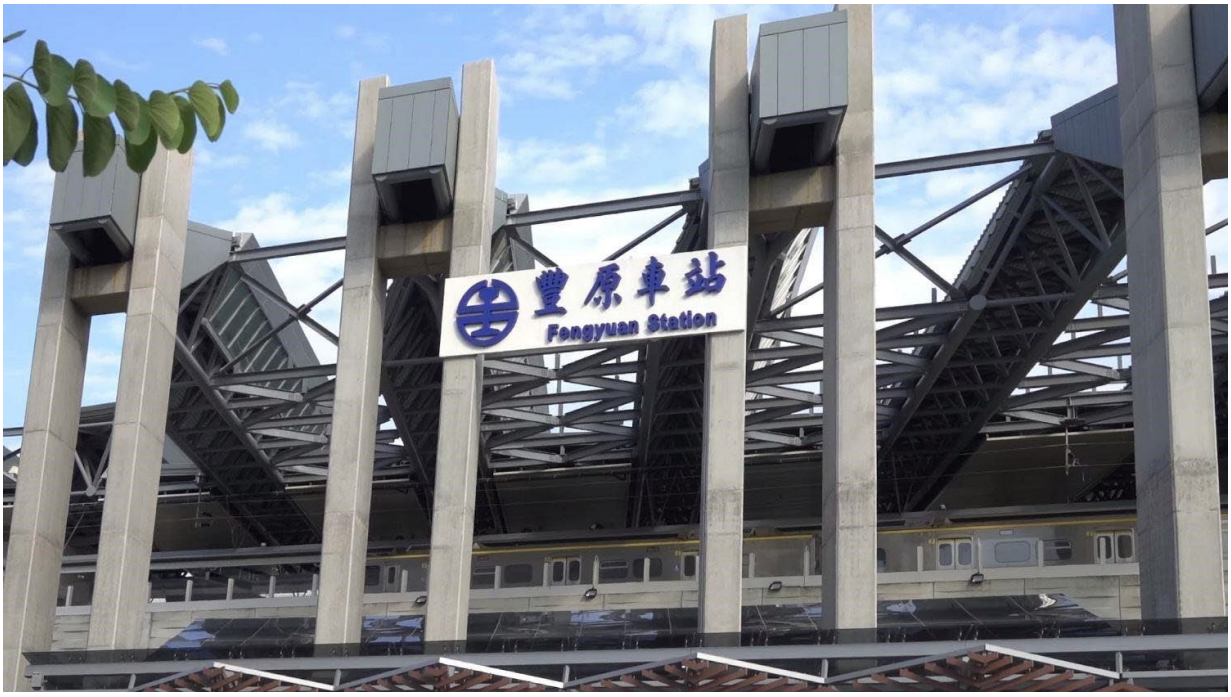
Overview

Gorilla Technology worked with the Taiwan Railway Bureau to build the country's first smart train station. This is a more in-depth review of the project that uses edge AI and video analytics and how it became a successful framework for making stations safer and more traveler-friendly.



Fengyuan Train Station

With over 1.1 billion railway rides per year[1], train travel in Taiwan is full of crowded platforms and a daily stream of passengers and their baggage—difficult to monitor at all hours of the day.

[1] Taiwan Rail Association. "Passenger Traffic of Railway in Taiwan Area", 2019.

Recently, there was an explosion at major train station in Taipei[2], which prompted the need to have a comprehensive safety plan in place. Fengyuan Train station was chosen as the place to initiate this safety project.

The Railway Bureau and Fengyuan station relied on passive CCTV surveillance systems in the event of an emergency or unexpected situation. These systems were rapidly becoming obsolete and in need of an upgrade. The station had a difficult time getting notified about problems and needed a way to receive alerts right away.

[2] https://www.straitstimes.com/asia/east-asia/breaking-three-explosions-in-taipei-mrt-train-car-21-injured

Project Goals

The Railway Bureau wanted to incorporate edge AI to see if it could help with its safety issues. Administrators identified three priorities for completing the upgrades to the station:

1. **Shorten response times for emergencies and dangerous incidents:**
   - Fire or emergency alert notifications
   - People going the wrong way down an escalator
   - People entering into restricted zone or onto the train tracks
   - Unattended packages

2. **Monitor dangerous behavior:**
   - People loitering too long on the platform
   - Unusual crowd movements on the platform (such as groups running)
   - Passengers crossing the Yellow Safety Line on the platform

3. **Make the station user-friendly for travelers:**
   - Counting the amount of people to prevent bottlenecks and ease foot traffic
   - Identify elderly or disabled passengers who require assistance
   - Persons requiring toilet assistance

Technical Obstacles

One of the main challenges of the Fengyuan train station is that it is a wide open space which makes it hard to keep track of all activities all the time. In addition, the Security team includes a minimal amount of staff and they rely on the human eye to detect incidents—which is not always reliable.

Any new system would need to be capable of:

- ➔ keeping track of people and incidents in every corner of the station
- ➔ working with existing staffing requirements
- ➔ leveraging existing technologies in the station
- ☐ be able to detect crowd movements as well as individual behaviors

Solution

Gorilla designed a smart surveillance solution using its award-winning system IVAR™ (Intelligent Video Analytics Recorder) to perform complete monitoring and video analytics all throughout the station. The solution integrates IoT devices, sensors, and surveillance cameras in a proactive edge AI system in order to deliver comprehensive surveillance.

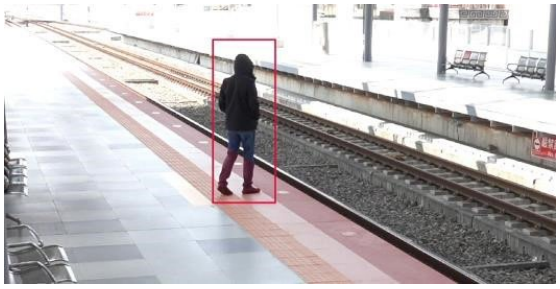
The surveillance system at Fengyuan operates from a centralized Control Center and can issue immediate alerts when potential risks are detected (like when people would cross the yellow line on platforms).

The video analytics system's key capabilities are to:

- ➔ Analyze people's behavior
- ➔ Identify dangerous/risky behavior patterns

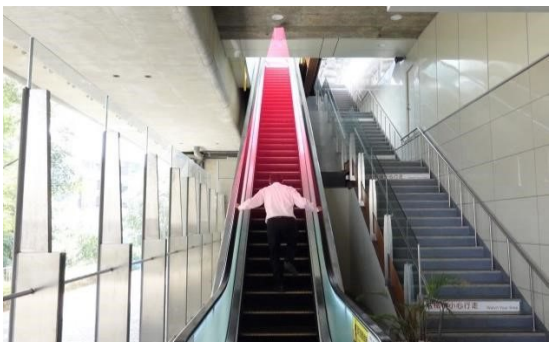
Eleven different Edge AI detection modes were deployed to improve safety and accelerate staff response to events:

- **Intrusion Detection for Restricted Areas**
  Issues alerts whenever someone enters a restricted zone.



- **Yellow Safety Line Detections**
  When passengers go past the yellow line, an alert is sent in real-time for staff to react promptly

- **Fire or Emergency Notifications**
  The system was integrated with the existing fire alarms and intercoms to issue alerts once a fire was detected or an emergency alarm was triggered



- **Direction Detection for Escalators**
  IoT devices were deployed to detect if a person is moving in the wrong direction on an escalator and produce an immediate alert to staff

- **Loitering Detection on the Train Platform**
  Detects when a passenger spends too long on the platform and sends an alert to staff

- **Station Flow Statistics**
  Counts the people in the station and on the platform and sends alerts when at capacity

- **Loitering Detection for Station, Washrooms**
  When passengers stay too long in the washroom or press emergency button, an alert is sent out

- **Unattended Baggage Detection**
  Identifies a package left past a certain time limit and sends an alert

- **Abnormal Crowd Behavior Detection**
  Detects when large amounts of people moving quickly in the event of violence or some dangerous occurance

Results

The comprehensive video surveillance system efficiently monitored all areas and activities and has cut security response times in half. In all, the IVA detection methods used at the station has helped station staff to meet their core objectives of keeping the station safe and reducing response times.

50% Reduction in Response Times

After the solution was launched, the number of passengers crossing platform warning lines decreased by 70%, greatly improving the safety of the station and its travelers.

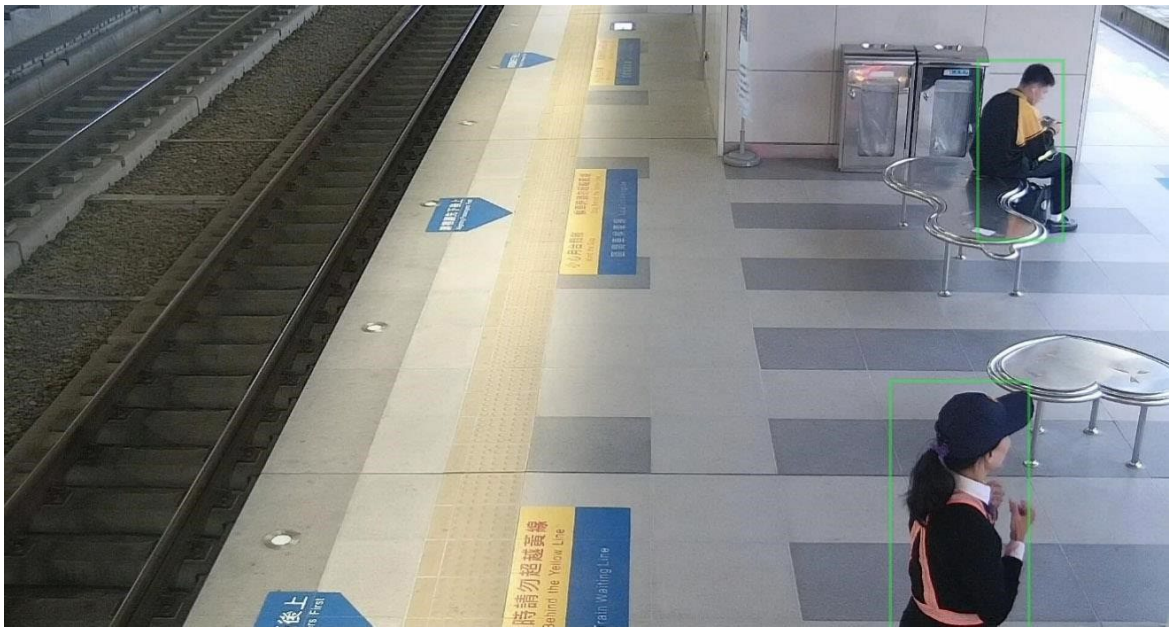
70% Decrease in Yellow Line Crossings

Future Deployment

This is the first time the Railway Bureau has implemented a smart surveillance solution. Due to the overwhelmingly positive results of decreased incidents and improved response times, the Railway Bureau plans on creating more smart stations with Gorilla in the near future to ensure friendly station spaces, assist people in need and prevent accidents.

Conclusions

The Fengyuan test project shows the ability for edge AI, video analytics and IoT to improve the handling of incidents, enhance rail safety, and create a safe and comfortable passenger environment.



About Gorilla

Gorilla Technology, a privately held company established in 2001, is a global leader in video intelligence, network intelligence and IoT technology. It develops a wide range of video-centric and content management solutions including Smart Cities, Smart Retail, and Enterprise Security. In addition, Gorilla provides a complete Security Convergence Platform to government institutions, telecom companies and private enterprises with network surveillance and cybersecurity.

Being in the forefront of edge AI real-time video analytics and computer vision advancements, demand for ready-to-market solutions such as Gorilla IVAR keeps us going and by featuring our solutions together with industry leading partners, we are showing our intent to stay on the edge and in the lead.

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