SIYTE for Criminal Activity in Rail

Cable theft costs the UK Rail Industry over £3.3m annually, causing over 69,000 minutes train delays in 2024. A single incident in 2024 caused 13,485 minutes of delay, costing £725,000.

Network Rail spend more than £3.5m per year removing graffiti. Additionally, graffiti and vandalism of carriages mean cause them to be taken out of service, sometimes at short notice impacting services.

Technology solutions for the detection of trespass are often challenged by false detections, with responders losing confidence in these systems and ignoring alerts.

All Criminal Activity starts with Trespass

Although there are thousands of cameras on the railway, the vast majority are not actively monitoring, being for evidence collection only.

SIYTE leverages advanced AI technology to analyse real-time CCTV from existing cameras, identifying potential trespassers and alerting appropriate responders. This system has been proven to work on the railway, with firm evidence of both detecting and reducing trespass.

- **Deterrent:** Trespass detection can be linked to automated announcements from speakers embedded in cameras or external speakers to deter trespassers.
- **Real-time Alerting:** SIYTE alerts stakeholders to events via SMS, Email or Mobile App), with redacted snapshots/videos, and can add context (e.g. wearing PPE).
- **Data Insights:** Logging and reporting of trespass events for analysis for better decision making (e.g. informing a business case for improved fencing).

Beyond Trespass: Utilising sensors and sound analytics to complement machine vision to detect criminal activity.

- **Vandalism & Theft:** SIYTE use sound and vision analytics, as well as sensors, to detect when assets are being vandalised and compromised.
- **Graffiti:** SIYTE can use air quality sensors to detect graffiti events as they happen and vision analytics to identify incidents after the event.
- **Removing False Alerts:** SIYTE re-analyses each detection using advanced models, removing misdetections so that staff can trust the system.

Under the Hood: SIYTE for Criminal Activity

Sensor Integration

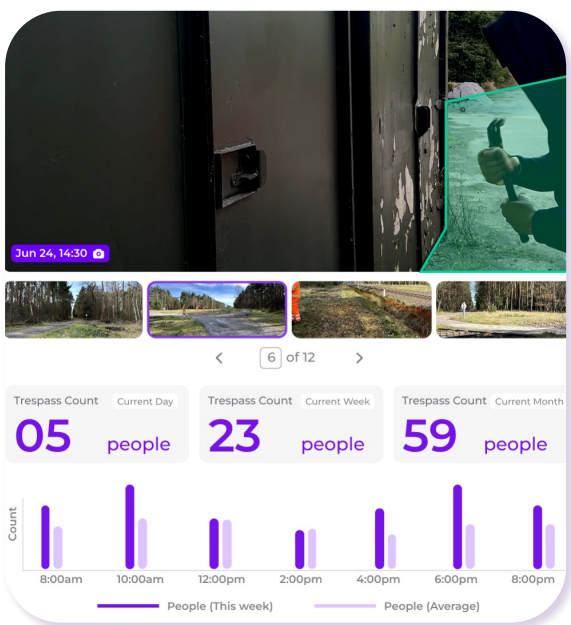
Vandalism, Theft & Graffiti:

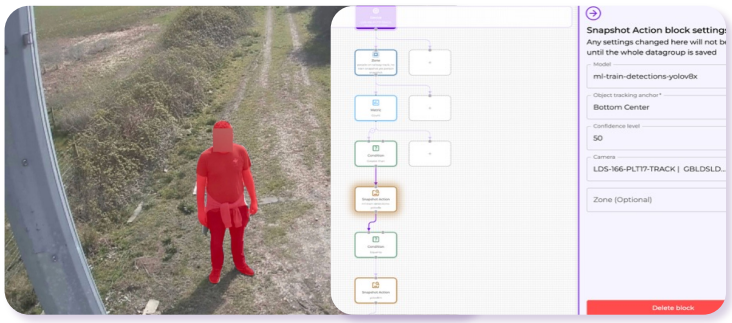
SIYTE can use sensors to detect if assets are being compromised:

- **Tilt and vibration** sensors detect if equipment or structures are being vandalized
- **Open/Close** sensors detect if cabinets have been opened.
- **Heat and Humidity** sensors detect arson or if holes are made in structures.
- **Air Quality** sensors detect volatile organic compounds from aerosols
- **Sound** sensors with analytics detect breaking glass

These sensors can be used in combination with trespass detection to provide greater confidence for alerts.

For instance, a vibration event combined with a person detected on site provides greater confidence to a vandalism event.





False Alert Prevention

Proven on the UK railway to reduce 98% of false alerts, SiYtE leverages a Cloud Inference Engine to analyse every detection and remove false alerts before recording events and alerting staff:

- **Misdetections:** SIYTE re-analyses every detection to check it really is a person.
- **Misplaced Detections:** SIYTE ensures people are not misplaced due to being partly hidden from the camera (for instance then incorrectly misplaced as being inside a perimeter)
- **Engineering Work:** SIYTE can check if the trespasser is wearing PPE, filtering out engineering workers (in the day and at night!).

Any Camera

- **Smart Cameras:** SIYTE can re-use the capabilities of smart CCTV cameras, where the camera provides the initial detection and SIYTE's cloud service removes false alerts and provides a reporting and alerting service
- **Basic "Email Alert" Cameras:** These cameras detect people using machine vision or motion are notoriously "noisy". SIYTE can receive the email alerts, and its Cloud Inference engine will check the image and remove false alerts.
- **"Dumb" Cameras:** Where cameras have no smart capability (e.g. analogue cameras running through encoders), SIYTE's on premise compute can analyse camera streams, detecting people, effectively making them smart.