



## Use Case: Elevating Safety and Efficiency in Construction with Optimized AI Model Deployment

### Client

A forward-thinking deep tech startup based in Singapore, specializing in innovative solutions for the Construction Industry. Their expertise lies in Computer Vision and Deep Learning technologies.

### Business Challenge

Our client, dedicated to ensuring the safety and security of construction workers, faced significant hurdles while translating their cutting-edge models into real-time applications. The challenge was to achieve seamless real-time alerts for Worker Safety & Security using AI models for Person Detection, Mask Detection, Intrusion Detection, and PPE compliance check.

### Solution: Streamlining Real-Time Deployment for Enhanced Performance

In collaboration with the client, we devised a comprehensive solution strategy that encompassed both video streaming optimization and AI model refinement:

- **Video Streaming Pipeline Enhancement:** We addressed the pipeline's performance bottlenecks, ensuring it could handle the influx of live camera data. This optimization laid the foundation for efficient real-time data processing.
- **AI Model Optimization:** Recognizing the underutilization of GPU memory and the need for correct model deployment, we advised the client to configure the AI models accurately for production. This step alleviated the immediate GPU memory filling issue.
- **Containerization for Scalability:** The AI models were containerized and deployed, allowing the solution to seamlessly scale as new camera devices were introduced for data capture.
- **Performance Baseline Benchmarking:** A performance benchmark baseline was established to assess AI model performance accurately, pinpointing areas for improvement.
- **TensorRT Integration for Speed:** To enhance speed and efficiency, we migrated the models to TensorRT for quantization. This step significantly improved model speed, boosting performance by 3x-5x times post deployment.



## Outcome

Our collaborative efforts brought about transformative outcomes for our client and the Construction Industry:

- **Real-Time Insights:** The platform achieved real-time alerts for Worker Safety & Security, providing actionable insights for enhanced construction site monitoring.
- **Optimized Scalability:** Containerization allowed the solution to grow seamlessly as new camera devices were added, maintaining consistency in performance.
- **Speed and Performance:** Integration with TensorRT led to a remarkable 3x-5x improvement in model speed, elevating real-time data processing efficiency.
- **Data-Driven Decision-Making:** The deployment of AI models empowered construction professionals to make informed decisions swiftly, proactively addressing safety and compliance concerns.

## Technology Landscape

Our solution harnessed a range of advanced technologies, including Python, Deep Learning, Kafka, Spark, Redis, TensorFlow, and Keras.

By synergizing our expertise with the client's vision, we transformed their AI models into a robust and performant tool that safeguards the safety and security of construction workers in real time. This innovation not only elevates construction site management but also showcases the profound impact that technology-driven solutions can have on enhancing industry practices.