

GateWatch

Computer Vision System for Barrier and
Parking Control

We design, deploy, and support IT products

About GateWatch

GateWatch is a ready-made software solution based on computer vision technology. It connects to your RTSP cameras and automatically detects 3 types of violations:

1. Little Train

Two vehicles passing through under a single barrier opening

2. See-Saw

Fraudulent entry/exit maneuvers (back-and-forth)

3. Unauthorized Access

People in restricted areas near barriers



GateWatch

Key Features

✓✓ Automatic real-time violation detection

✓✓ No expensive camera replacement required

✓✓ Telegram integration



Multi-Camera Support

Simultaneous processing of multiple RTSP streams



Vehicle Detection: YOLOv11

Support for various model formats



Accurate Tracking

OC-SORT + real motion parameter estimation



3 Violation Types

With customizable parameters to fit your conditions



Calibration

Distortion and tomography correction (PyQt5-based tool)



Performance

GPU acceleration via TensorRT (NVIDIA)

What GateWatch Detects

01 Little Train

Following another vehicle through the barrier

How it works:

- Tracks vehicle pairs
- Analyzes movement direction
- Detects finish line crossing
- Calculates time difference between crossings

Result:

Alert with video and license plate (when integrated)

02 See-Saw

Back-and-forth fraudulent maneuvers

How it works:

- Tracks start and finish line crossings
- Detects vehicle position
- Checks for backward movement toward the start line

Result:

Fraud detection even without license plate recognition

03 Unauthorized Access

People near the barrier

How it works:

- Detects people and vehicles
- Checks presence in barrier zone (using a mask)
- Checks distance between person and vehicle
- Sends crop to ZShot – final decision

Result:

The system does not trigger on "someone just walking by"

Video Stream Processing Workflow



System Components

Video Streaming

FFmpeg, RTSP

Object Detection

YOLOv11, PyTorch, TensorRT,
ONNX Runtime

Object Tracking

OC-SORT

Violation Detection

OpenCV + custom logic

Message Queue

RabbitMQ, aio-pika

Calibration

PyQt5

Containerization

Docker, Docker Compose

Detector Masks

mask_all

full zone for vehicles and
people

lane_mask

lane markings

mask_barrier

barrier zone

zone_mask

small barrier zone

start_mask

start line

finish_mask

finish line

Hardware Requirements

Minimum

**4 CPU
cores**

8 GB RAM

**10 GB SSD
For one camera at HalfHD**

Recommended

8+ CPU cores

16 GB RAM

50 GB SSD

NVIDIA GPU with 8+ GB VRAM

CUDA 11.8+ (RTX 3080 or higher)

GPU: NVIDIA with CUDA 11.8+ support – RTX 3080 or higher recommended for optimal performance