



# Goru<sup>®</sup>: AI Agent for Real-Time Operational Awareness in Industrial Environments

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# Team

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Technical Lead

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MS, BS in Electrical and Electronics Engineering

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**Enes Yaman**

AI R&D Engineer

BS in AI Engineering

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Robotics R&D Engineer

BS in Mechanical Engineer

# Problem

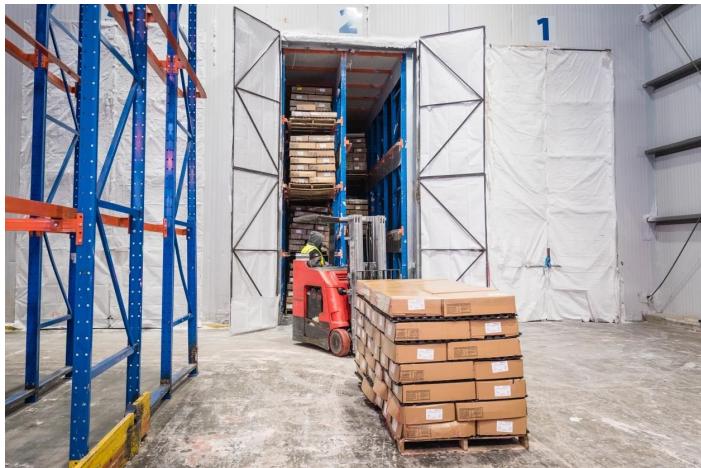
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Industrial workspaces lack effective real-time solutions for **operational awareness** which leads to inefficiencies.

An **AI-powered vision based operational awareness system** integrated into workspace can enhance efficiency in industrial workspaces.

To be scalable and effectively deployed across the entire workspace, the system must remain **low-cost, lightweight, and computationally efficient**.

# Goru® - Approach



- **Object/asset/event detection using AI**

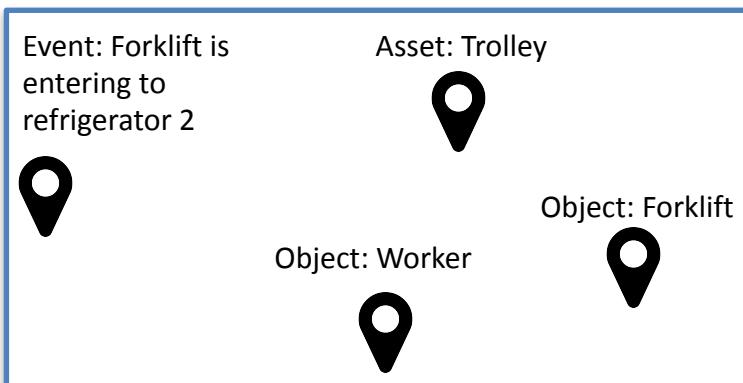
“Forklift is entering to refrigerator 2”

Input: Real Time Camera Stream

# Goru® - Approach



Input: Real Time Camera Stream



Output: Real Time Map

- **Object/asset/event detection using AI**

“Forklift is entering to refrigerator 2”

- **Real time location estimation of detected objects/assets/events**

- **Real time map generation of objects/assets/events**

- **Real time ego localization of the camera holder using visual inertial odometry (no GPS or RF module needed)**

# Goru® - Approach

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Goru® on a pole

**Assets Goru® can be integrated into:**

- **Poles**
- Unmanned systems,
- Forklifts,
- Human (wearable as vest),
- Heavy machinery,
- Mining vehicles,
- EV charging stations,
- Other (please contact for your specific asset types)

# Goru® - Approach

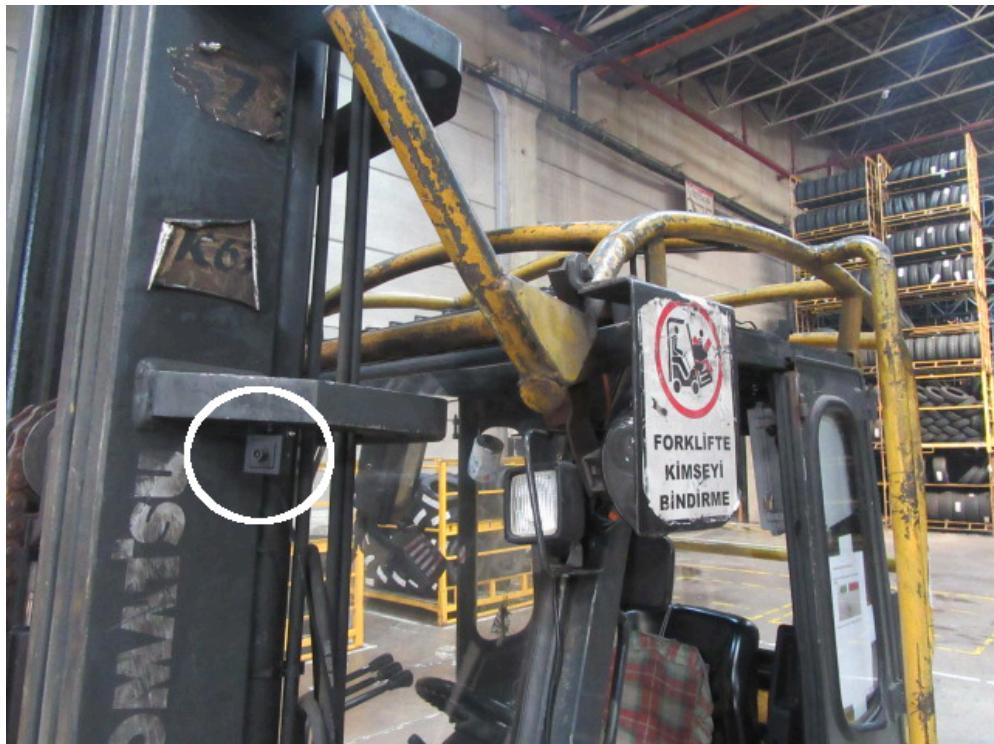


Goru® on a unmanned ground vehicle

**Assets Goru® can be integrated into:**

- Poles
- **Unmanned systems,**
- Forklifts,
- Human (wearable as vest),
- Heavy machinery,
- Mining vehicles,
- EV charging stations,
- Other (please contact for your specific asset types)

# Goru® - Approach



Goru® on a forklift

**Assets Goru® can be integrated into:**

- Poles
- Unmanned systems,
- **Forklifts,**
- Human (wearable as vest),
- Heavy machinery,
- Mining vehicles,
- EV charging stations,
- Other (please contact for your specific asset types)

# Goru® - Approach



Goru® on a human

**Assets Goru® can be integrated into:**

- Poles
- Unmanned systems,
- Forklifts,
- **Human (wearable as vest),**
- Heavy machinery,
- Mining vehicles,
- EV charging stations,
- Other (please contact for your specific asset types)

# Goru® - Approach

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Please contact us about to which asset type you want to integrate Goru®!

**Assets Goru® can be integrated into:**

- Poles
- Unmanned systems,
- Forklifts,
- Human (wearable as vest),
- Heavy machinery,
- Mining vehicles,
- EV charging stations,
- **Other**

# Goru® - Application Areas

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## Workspaces where Goru can be deployed:

- Power plants
- Biomass facilities
- Carbon Capture & Storage sites
- Oil & gas exploration and production sites
- Mining sites (underground and surface)
- Refineries and chemical plants
- Cement and metallurgical industries
- Manufacturing facilities and industrial processes
- Green and zero-emission buildings
- District heating and cooling networks (urban energy systems)
- Logistics centers and warehouses
- Ports, airports, and transport hubs
- Waterways and rivers

# Goru® - Use Case 1

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## The Patrolling Artificial Intelligence (Surveillance and Reconnaissance)

**Problem:** Monitoring what happens in a work environment through static cameras is often insufficient. Blind spots are inevitable — especially in dynamic settings with moving equipment, temporary obstacles, or changing lighting conditions. Static surveillance simply cannot provide continuous, full-coverage awareness.

### Solution with Goru®:

- **Transforms moving assets into patrolling AI units** — workers, forklifts, or robots equipped with Goru® become mobile vision nodes eliminating blind spots.
- **Understands the environment from the moving object's perspective** — perceives what each entity “sees,” enabling contextual awareness and safer collaboration.
- **Delivers continuous, intelligent monitoring without extra infrastructure** — one system serves both operational and analytical purposes.

**Impact:** Increased efficiency, reduced delays, and optimized resource usage in daily operations.

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## Asset Localization and Tracking in Industrial Workshops (Spatial Awareness)

**Problem:** Tools, trolleys, and other mobile equipment are frequently misplaced or hard to locate in busy workshop environments, causing time loss and reduced productivity.

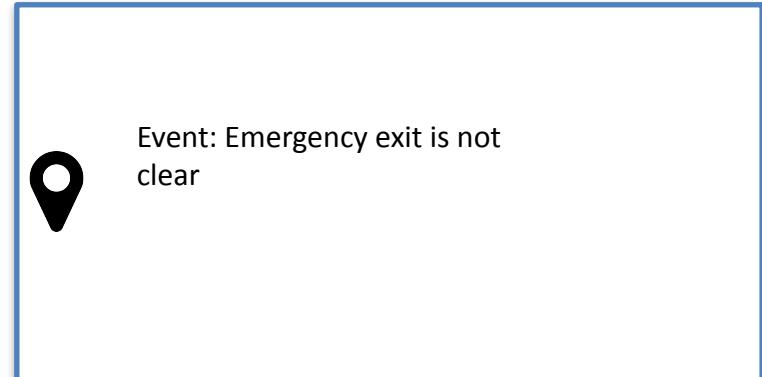
### Solution with Goru®:

- Continuous tracking of assets such as trolleys, specialized tools, and mobile units within the workshop.
- Visualization of their real-time positions on the system's digital map.
- Quick search functionality for locating needed assets.

**Impact:** Increased efficiency, reduced delays, and optimized resource usage in daily operations.

# Goru® - Use Case 2

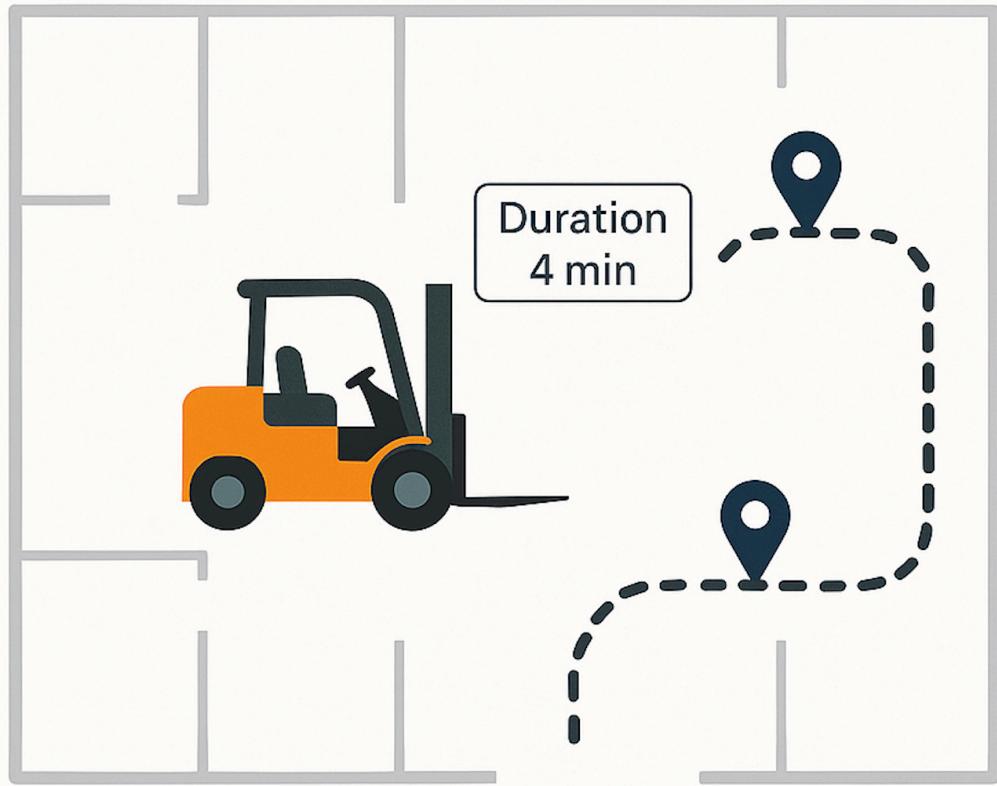
## Asset Localization and Tracking in Industrial Workshops (Spatial Awareness)



Real Time Map

# Goru® - Use Case 2

## Asset Localization and Tracking in Industrial Workshops (Spatial Awareness)



Work duration estimation

## Workspace Layout Optimization through Real-Time Mapping (Optimization)

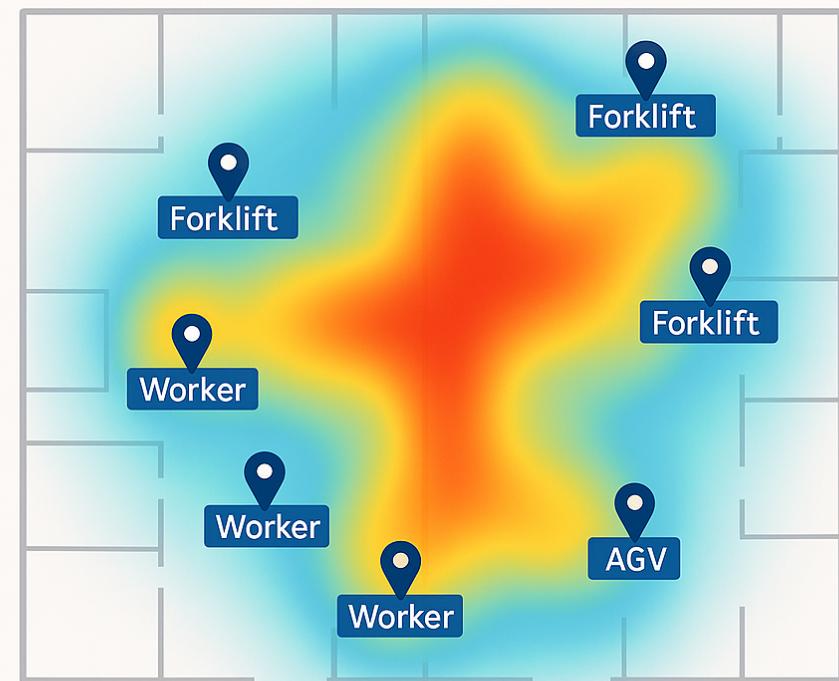
**Problem:** In facilities, workshops, and factories, workspace layouts are often designed without continuous feedback from actual usage patterns, leading to congested areas, inefficient routes, and underutilized zones.

### Solution with Goru®:

- **Real-time mapping** of worker and asset **movements** across the workspace.
- Generation of **heatmaps** to identify areas of high and low activity.
- Collection of data that enables **route optimization** for workers and equipment.
- Insights for **rearranging storage areas, pathways, and workstations** to maximize safety and efficiency.

**Impact:** Improved workflow efficiency, reduced congestion and accident risk, and data-driven decisions for future workspace design and layout adjustments.

## Workspace Layout Optimization through Real-Time Mapping



# Goru® - Use Case 4

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## Human–Robot Co-Work Awareness (Industry 5.0)

**Problem:** In shared industrial or logistics workspaces, autonomous robots currently operate without real awareness of nearby humans or mobile assets (e.g., forklifts, trolleys). They lack contextual understanding of where people are and what activities are happening around them, increasing the risk of inefficiencies and safety incidents.

### Solution with Goru®:

- By equipping human workers and mobile assets with Goru® wearable or embedded modules, each entity becomes a **real-time spatial node**.
- Goru's **shared real-time map** allows robots to access dynamic awareness of all moving actors — humans, machines, and vehicles.
- This enables predictive path planning, collision avoidance, and **adaptive task coordination** for safer and more efficient **human-robot collaboration**.

**Impact:** Enhanced safety, improved workflow coordination, and accelerated Industry 5.0 readiness through seamless human-robot coexistence and mutual situational awareness.

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# Goru® - Use Case 5

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## Energy Consumption Optimization (EU Green Deal)

**Problem:** In many industrial facilities, a significant portion of energy consumption is driven not by machinery inefficiency, but by small operational oversights—systems left open or temperature-controlled zones exposed. These human-driven inefficiencies cause unnecessary energy loss, reduce process stability, and increase both operational costs and environmental impact. Traditional automation systems rarely detect such contextual issues in real time.

### Solution with Goru®:

- Using its visual understanding and contextual reasoning, Goru automatically detects:
- The presence and behaviour of workers around the area,
- Patterns that lead to avoidable spikes in energy consumption.

**Impact:** Reduced energy waste, stabilized environmental conditions, and measurable savings across high-consumption industrial systems.

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# Goru® - Unique Features

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It offers **not only** a localization and mapping solution **but also** semantic inference like a patrol service.

It is integrable for **not only** static assets **but also** dynamic assets.

In battery mode, life span is 8 hours. So, it works throughout one shift.

It is low-cost, lightweight, and computationally efficient in order to ensure scalability and wide deployment across the entire workspace.

It works not only in workspaces but also in closed environments such as **tunnels**, **caves** and **mines**.

Looking for a Partner:

- The ideal partner should operate in industrial application domains such as manufacturing facilities, factories, industrial processes, refineries, mining sites, energy generation plants, or carbon capture and storage facilities, with a strong interest in real-time asset tracking, dynamic mapping, and AI-powered **operational awareness** solutions.
- Previous experience in "Industry 4.0/5.0" will be highly valued.
- The partner will actively contribute to defining use cases, providing facility access for piloting, and shaping validation.

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# Goru® - Customization

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Customization topics are:

- simulation of a digital twin of the facility,
- collection and labeling of training datasets,
- AI model training,
- integration of Goru® to infrastructure,
- UI/UX development of real time map
- and in-facility testing leading up to deployment.

We will collaborate closely with our partner across all work packages, ensuring the joint development of a practical and scalable solution.

# Questions?

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## **Selvi Technology**

*“Goru®: AI Agent for Real-Time Operational Awareness in Industrial Environments”*

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