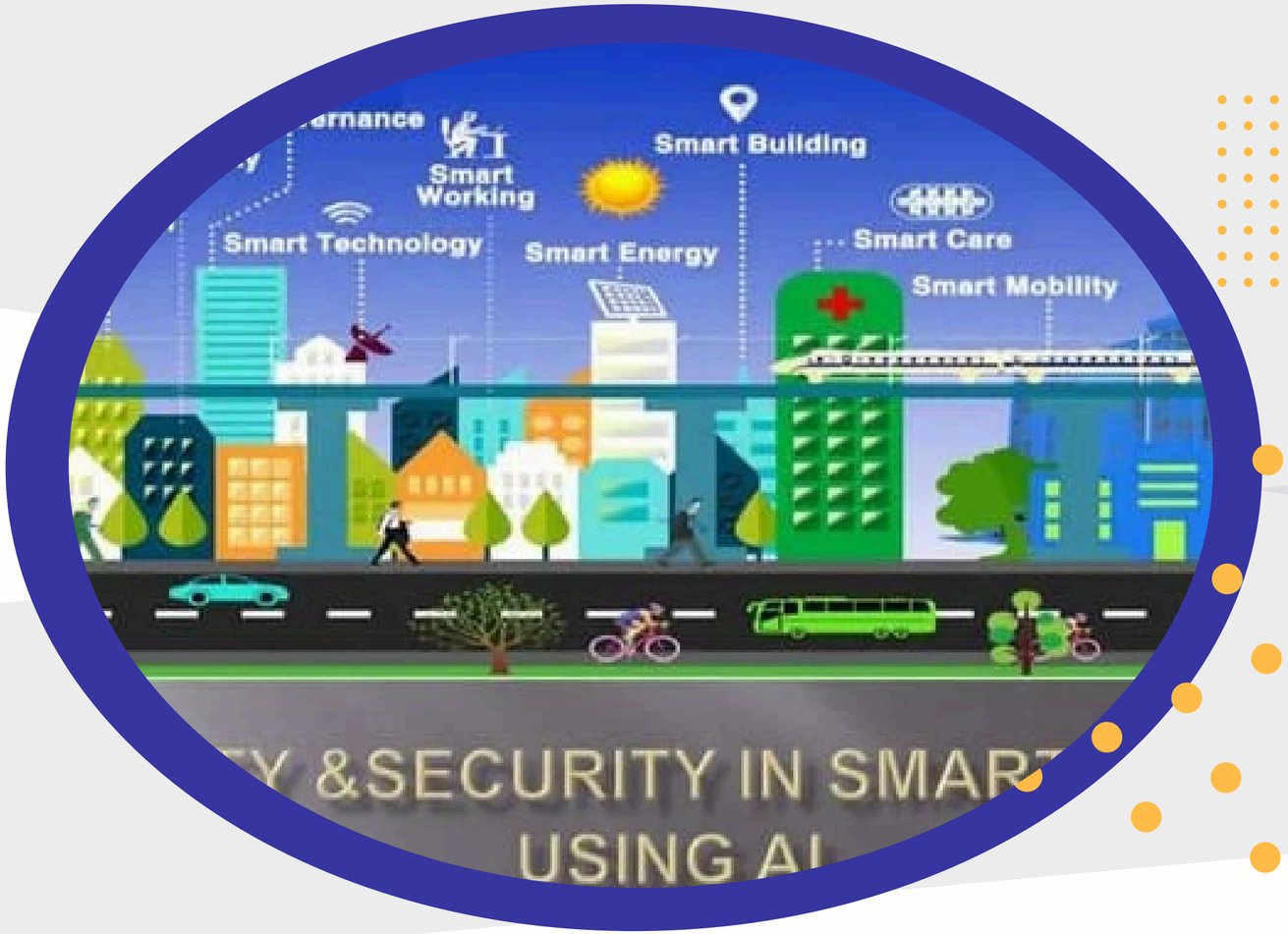
Interreg

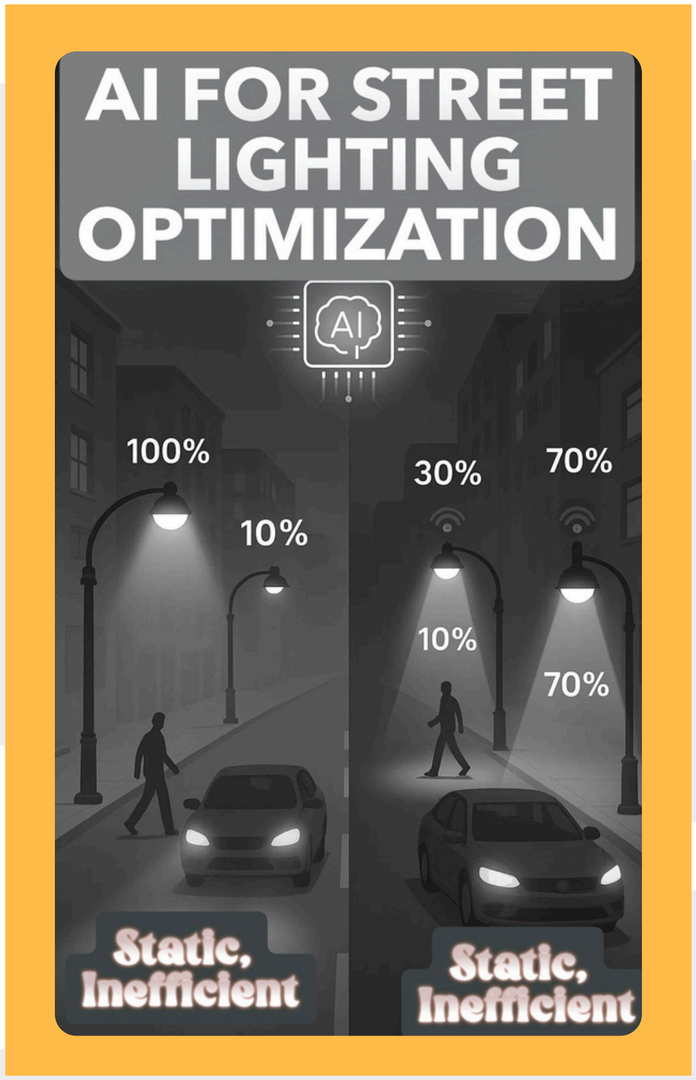
Co-funded by the European Union

IPA Bulgaria – Serbia



AI Applications Supporting Services of General Interest in Cross-Border Regions

Sample Ideas

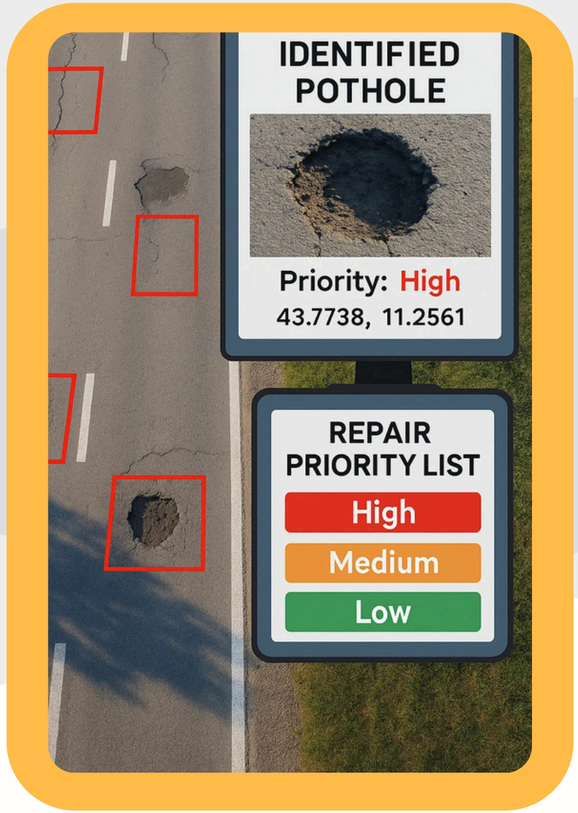


AI for street lighting optimization

A smart system that monitors the movement of people and cars and adjusts the strength of lighting (by neighborhood, street, time).

AI for road infrastructure monitoring and maintenance

Analysis of photos from drones or mobile phones to automatically detect cracks, potholes and other damage on streets and roads.
Generate prioritized lists of repair needs.



AI traffic and parking prediction system

An integrated service that analyses traffic congestion and parking availability in real time.
Recommendations to optimise routes and inform citizens through an app.
Applicable especially in border settlements with tourist influx.

AI for sustainable water supply and water monitoring

A system to predict leaks, overuse and contamination risk.
Sensors on the network controlled by AI algorithm.
Loss prevention and better network maintenance.

Sensors for filling of waste containers

Objective:

Measure in real time how full a container is and send that information to a central AI system that optimizes the schedule and route of garbage collection.

Sensor type:

- Ultrasonic sensor – sends sound waves down to the waste in the container and measures the distance to the surface
- Optical sensor – uses infrared or laser light to 'see' the level of waste

Both types do the same thing: they report what percentage of the container volume is occupied.

Problems:

Municipalities A (Bulgaria) and B (Serbia) have inefficient garbage collection: containers are often emptied either too late (full) or too early (unnecessary), leading to high costs, dissatisfaction and low motivation for separate collection.

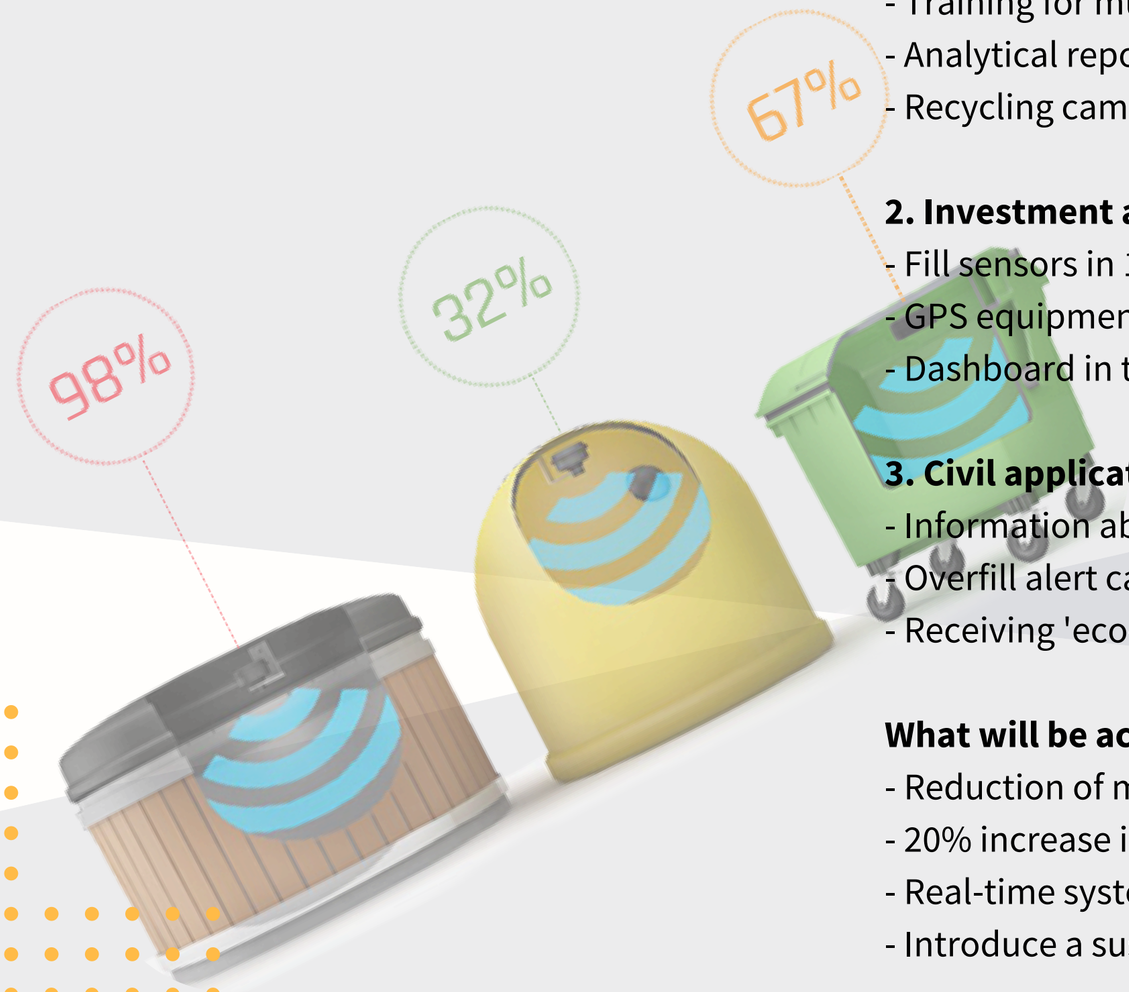
Solution:

- Collects data from sensors in the containers for real-time filling
- Uses an AI algorithm that:
- Calculates the optimum route of garbage collection machines on a daily basis
- Analyses which areas dispose of what waste and when

Based on the analysis:

- Municipalities run targeted recycling campaigns
- Citizens are notified via a mobile app about the location and status of the containers

Sensors for filling of waste containers



What exactly will be done:

1. Soft activity (mandatory):

- Software solution with AI algorithm for route optimization
- Training for municipal employees and operators
- Analytical reports on waste by area (e.g. in X district plastic is predominant)
- Recycling campaign – only in the areas with the weakest indicators

2. Investment activity (if possible):

- Fill sensors in 100 containers – in both cities
- GPS equipment for 4 garbage collection machines – synchronized with the AI system
- Dashboard in the municipality with a real-time map (possibility of public visualization)

3. Civil application:

- Information about the nearest empty container
- Overfill alert capability
- Receiving 'eco-points' when participating in separate collection

What will be achieved:

- Reduction of machine mileage by up to 15% → lower costs
- 20% increase in separate waste collection through targeted campaigns
- Real-time system status data → faster decisions
- Introduce a sustainable service of common interest, easy to replicate in other municipalities

AI for winter cleaning and snow removal management

What it does:

- Monitors weather data, warnings, snow accumulation and citizen alerts
- AI algorithm prioritizes which streets to clear first (schools, hospitals, steep sections)
- Tracks GPS on snowplows, analyzes performance and makes recommendations for optimization

What is achieved:

- Faster and adequate cleaning
- Transparency and control over the work of contractors
- Safety for residents

AI control system for street and decorative lighting in small settlements

What it does:

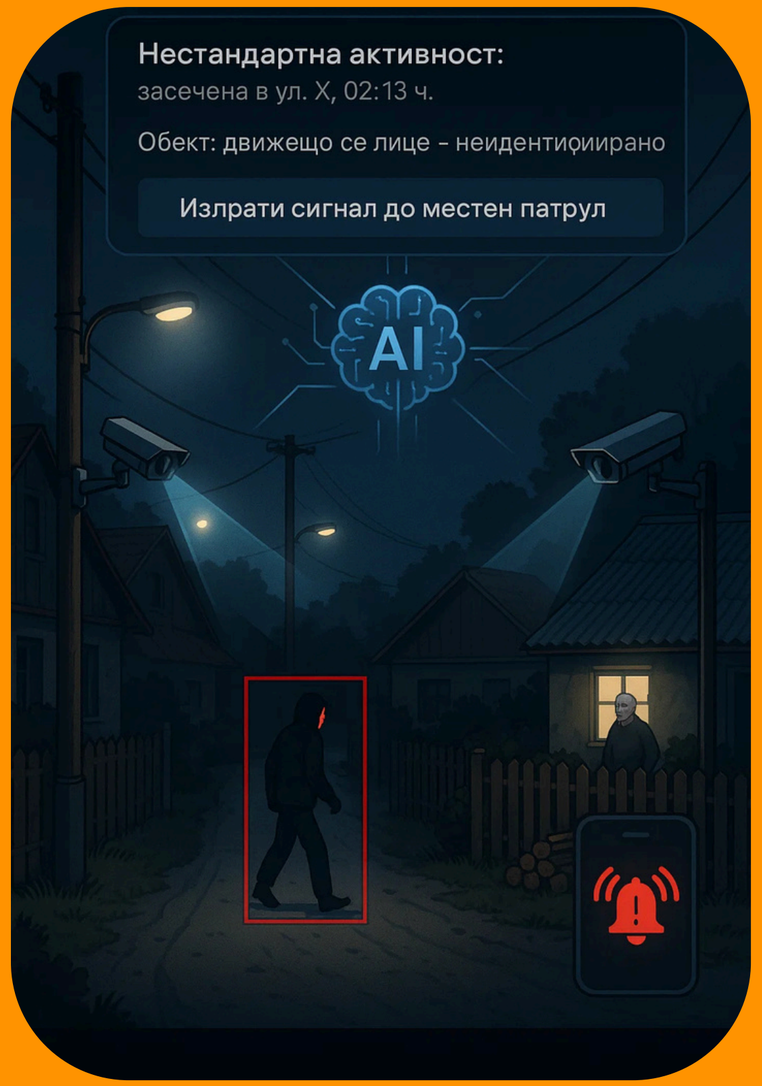
Lighting is dynamically controlled on a per base basis:

- Sunset/sunrise, movement of people/vehicles, presence of events (e.g., fair, market)
- Algorithm takes into account consumption, defects and the need to replace lamps

What is achieved:

- Reduced electricity costs
- Better illumination in risky hours/areas
- Timely servicing of damaged lamps

AI system to prevent domestic crime and assault in villages



What it does:

- Integrates video surveillance, street lighting and motion sensors
- AI analyses atypical patterns – e.g. driving at prohibited times, unusual behaviour, detection of faces around elderly people's properties
- Sends an alert to local security/mayor/patrol

Solar-powered smart cameras can be installed in strategic locations, enabling 24/7 surveillance even in remote areas with limited infrastructure. Alerts are sent to local authorities or municipal patrols .

Benefits

- Faster response to security threats
- Protection of vulnerable residents, including the elderly
- Increased safety in rural communities
- Energy-independent monitoring using solar-powered systems

What is achieved:

- Timely response to suspicious activity
- Protecting the elderly and single households
- Improved sense of security

AI to adapt public spaces to the needs of people with disabilities

What it does:

- By analyzing routes, survey data and camera/drone images, AI offers optimizations:
- Need ramps, signage, audio signals, tactile pathways
- Creates a map with accessible routes and buildings
- Citizens can report inaccessible objects

What is achieved:

- A more accessible environment for all
- Better investment planning
- Participation of people with disabilities in social processes