

# Urban Guardian: Clean Streets through Anomaly Detection in Video Stream

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In this paper we propose the method for detection of environmental deterioration with stress on urban places. Devaluation of the public property, vandalism or even criminality in large cities is partially solved by installing security systems in form of cameras etc. There has to be operator, however, who observes the city and coordinates resources to solve such problems (often afterwards only). We use existing camera systems to automatically detect variety forms of the public property devaluation. We use advanced approaches to analyse the video streams and detect actions such as deterioration, vandalism, public urination etc. Our solution provides real-time solution which assists operators to detect the problem and instantly take an action to solve it. Besides problem detection, we propose techniques to support tracking of the suspects using complex systems of cameras and face/person recognition. Via our approach we help to solve problems in almost every bigger city which spends too many resources on maintenance and is unable to detect little but consequently expensive to fix contraventions.

**Urban Guardian**  
Clean Streets through Anomaly Detection in Video Stream  
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**STU**  
**FIIT**

**Anomaly detection**

- Litter dropping
- Illegal waste deposits
- Property deterioration
- Vandalism
- Public urination
- Wrong parking

**Reference image**  
view in the default state

**Offset image**  
contains differences

**Problems**

- Polluted streets
- Non-disciplined citizens
- Existing surveillance used ineffectively

**Goals**

- Cleaner streets
- Effective repression against delinquents

**Person tracking**

- Neural network
- Real time

**Solution**

- Anomaly detection in video streams
- Person detection
- Multiple camera system
- Human operator as a supervisor
- Real time suspect tracking support

Known camera position and orientation  
Angle  
Height  
Inferred distance  
Typical person height  
Trajectory is computed

- Known camera position
- Inference of human real position
- Multiple camera system allows position correction, tracking fleeing suspects