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Drone-Tech: a new AI approach for smart cities illegal waste contrast

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Illegal waste disposal, especially in southern Italy, has become one of the most critical violations of the waste management laws and contributes to the social alarm raised by waste and ecological crimes. Illegal waste disposal threatens public safety and health, the environment, and the economy, with scenarios that range from small dumps created by citizens to vast landfills of toxic materials collected and buried in dangerous places and also as a cause for wildfires. Specifically, illegal trafficking of human waste has recently become one of the most lucrative activities of organised crime. Often, criminal organisations set waste on fire to eliminate evidence of hazardous materials, releasing highly toxic fumes (e.g., dioxin) that put public health at risk or even reducing farming capabilities of the affected areas. Unauthorized landfills often lack the proper waste treatment leading to the release of leachate, which pollutes the ground water table, other water sources and causes long-term damage, e.g., by increasing cancer incidence. The early detection and continuous monitoring of illegal waste disposal is therefore crucial to prevent and alleviate their impact and the cost of the waste treatment. The goal of the DRONE-TECH project is to develop an innovative and ready-to-use tool for detecting and monitoring illegal waste dumping sites across large urban and peri-urban areas and in compliance with law enforcement and regulations. The project incorporates artificial intelligence (AI) techniques (i.e., deep learning, led by UNIBA) into an innovative module for automatic change detection (provided by Sightec) of imagery provided by drones (operated and managed by High-Lander) and based on an integral collaboration of end-users (Municipality of Bari, Local Police, fire brigades, other agencies and regulators operating in, or affected by, the field of waste management) to create an ultimate system for the detection and monitoring of illegal dumping sites and support the management of surveillance activities of waste accumulation over time across large urban and peri-urban areas.

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