ORAL PRESENTATIONS

Optimal design of an urban air-pollution monitoring network

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This study investigates the optimal design of a traffic-based air-pollution monitoring network in urban areas. The main novelty of the proposed approach lies in the utilization of a hybrid mode of sensors. While typical applications focus on the placement of stationary sensors or the utilization of mobile sensors, such as vehicular sensors, we consider the usage of sensor-based drones that can alternate between these two main conditions. To address this novel approach, we propose a generalization of the Minimum Dominating Set Problem. This is achieved by incorporating binary variables for sensors allocation, sensor types suitability constraints, and either budget-related constraints or a cost-based objective function. We formulate the proposed problem variant as a Mixed Integer Linear Programming model and generate new sets of benchmark instances randomly. Furthermore, we conduct computational analyses using the Gurobi solver. The proposed approach provides an effective means of monitoring air pollution in urban areas by optimizing the placement of sensors and the utilization of sensor-based drones.