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Building Equitable Air Quality Networks: Low-Cost Sensors and Community-Led Monitoring in Dublin

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Air quality monitoring remains a significant challenge in urban areas, particularly where high-cost infrastructure is unavailable or difficult to maintain. Traditional monitoring systems are often limited in scope due to expense and logistical constraints, leading to data gaps, especially in resource-constrained environments. Low-cost air quality sensors have the potential to transform environmental monitoring by providing accessible, affordable tools for collecting air quality data, especially in urban settings. As part of the SCORE project, a low-cost sensor system was developed to support real-time air quality monitoring across European cities. These sensors provide a more granular understanding of air pollution trends, making air quality data collection both scalable and accessible to a wider range of stakeholders, including local communities. This presentation will highlight the deployment of these sensors in Dublin, Ireland, where they have been successfully integrated into citizen science initiatives, enabling communities to actively participate in environmental data collection and contribute to air quality management.

Ensuring data accuracy and reliability is a key challenge in the use of low-cost sensors. We will examine the technical challenges of deploying low-cost sensors, such as calibration, accuracy, and long-term reliability in small-scale urban environments. The presentation will also discuss strategies for integrating sensor data into authoritative air quality monitoring networks to enhance overall data quality and spatial coverage.

In Dublin, the citizen science air quality initiative has built strong connections between local communities, researchers and policymakers. This collaboration exemplifies how co-created initiatives, backed by accessible technology, can empower citizens and bridge the gap between public engagement and formal policy processes. The outcomes of the Dublin case study suggest broader applicability for the SCORE model in other cities facing similar air quality challenges. By offering a replicable and scalable solution, low-cost sensors provide an affordable alternative to high-end monitoring stations, enabling resource-limited municipalities to expand their air quality infrastructure. The project demonstrates how engaging local communities in the data collection process can foster long-term, sustainable environmental stewardship. These insights underscore the importance of equitable partnerships between citizens, researchers, and governments in tackling air pollution, particularly in cities where financial or technical constraints have traditionally limited comprehensive air quality monitoring.