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An IoT-Based Dynamic pollution hotspots areas detection System using ESP8266 NodeMCU and Arduino

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The issue of air quality in Africa has emerged as a critical public health concern. Initial assessments conducted in major African urban centers reveal that fine particulate concentrations exceed the thresholds recommended by the World Health Organization (WHO). We developed two (2) mobile and fixed devices utilizing the Internet of Things (IoT) to detect areas with high PM2.5 particle pollution, along with other indicators. The primary innovation of this study lies in the utilization of a microcontroller (ESP8266 NodeMCU) enabling not only data collection from sensors but also transmission to a server utilizing its Wi-Fi connectivity and the HTTP protocol. The device was mounted on a vehicle for one month as part of an intensive measurement campaign across the Dakar region. The outcomes facilitated the identification of hotspots in Dakar, pinpointing the city's major anthropogenic sources of particle pollution. This mobile device will play a pivotal role in the future identification of suitable areas for the installation of fixed pollution sensors.

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