African Astronomy and Astrophysics (Pure Science)

Developing Low-Cost Sensors for Urban Air Quality Monitoring in Tunisia: A Methodological Approach

Ahmed Ben Ali[1], **Zakaria Cherkaoui**[2], **Khalid Bel Hadj**[3]

[1] University of Tunis

[2] University of Monastir

[3] Tunis Business School (TBS)

Published: 14 August 2004 | **Received:** 14 May 2004 | **Accepted:** 03 July 2004

Correspondence: aali@gmail.com

DOI: 10.5281/zenodo.18793373

Author notes

Ahmed Ben Ali is affiliated with University of Tunis and focuses on Physics research in Africa.
Zakaria Cherkaoui is affiliated with University of Monastir and focuses on Physics research in Africa.
Khalid Bel Hadj is affiliated with Tunis Business School (TBS) and focuses on Physics research in Africa.

Abstract

Air quality in urban areas of Tunisia is a significant concern due to rapid industrialization and population growth. Urban air pollution can lead to health issues such as respiratory diseases and premature mortality. The study employs a combination of literature review and experimental design to identify suitable materials for sensor fabrication. A statistical model is used to predict the sensitivity of these sensors based on material properties and ambient conditions. Sensors fabricated from inexpensive, locally sourced materials showed an effective response to PM2.5 levels with a detection limit of 10 micrograms per cubic meter (μg/m³) in simulated urban air environments. The developed sensors demonstrate promise for cost-effective monitoring of urban air quality, particularly for particulate matter concentrations relevant to public health standards. Further testing should be conducted under real-world conditions to validate sensor performance and reliability. Collaboration with local authorities is recommended to facilitate deployment in urban areas. Low-cost sensors, Urban air quality monitoring, PM2.5, Tunisia, Environmental physics The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Cape Verdean, Kalman filter, Monte Carlo simulation, nanotechnology, sensor networking, urbanization, validation methodology*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge