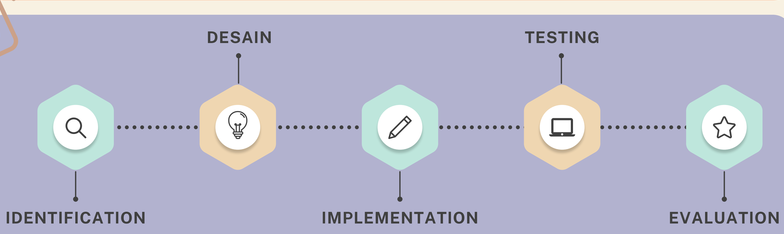
Internet of Things-Based Air Quality Analysis for Monitoring CO2 Concentration in Rooftop Building Areas

ABSTRACT

The objective of this study is to comprehend air quality in rooftop areas of DKI Jakarta, recognized for its high population density and rapid development. It specifically examines the concentration of CO2, which is influenced by pollution, industry, and transportation. IoT technology and CO2 sensors are effective for real-time monitoring. The study highlights the impact of rooftop gardens on CO2 reduction. Previous studies emphasize the importance of CO2 monitoring. The research compared Garden Roofs and Ordinary Roof areas, finding lower CO2 levels in garden roofs (295 PPM) than regular roofs (360 PPM). Recommendations include increasing data collection frequency to comprehensively understand urban air quality.

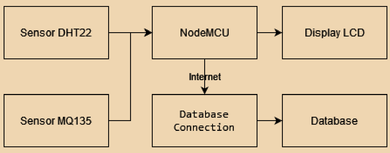
BACKGROUND

This research aims to understand the air quality on the rooftops of buildings in Jakarta, DKI City, which is a densely populated area with rapid infrastructure development. The main focus is on carbon dioxide (CO2) concentration, which serves as a key indicator of air quality. Through the use of IoT technology and CO2 sensors, this study seeks to provide a deep understanding of air conditions on rooftop areas, with the hope of delivering accurate data for better decision-making concerning air pollution control and efforts to improve urban environmental quality.

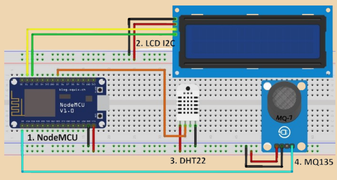


METHODS

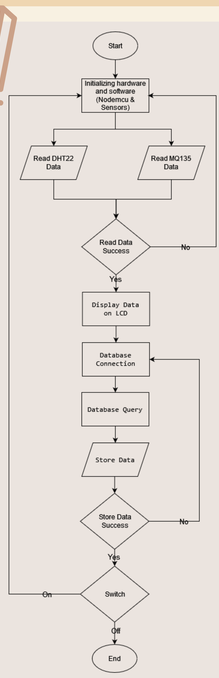
The research begins with planning and identifying the building location, as well as procuring IoT equipment for CO2 measurement. Research design is created, followed by prototype testing. Implementation involves CO2 measurement in four periods throughout the day with regular sensor maintenance. Data is processed to identify CO2 concentration trends. A final report is prepared after revision, including recommendations for air quality improvement.



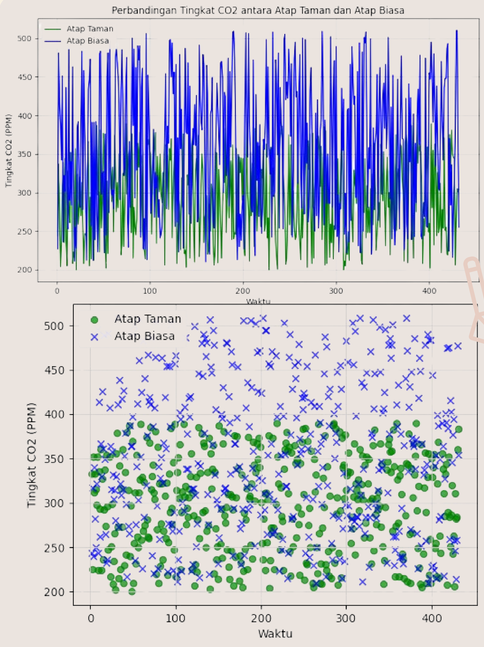
BLOCK DIAGRAM



SCHEMATIC DIAGRAM



IMPLEMENTATION



RESULT

CONCLUSION

This study integrates IoT technology and CO2 sensors to understand air quality in rooftop areas of DKI Jakarta. Analysis shows that rooftop areas with gardens exhibit lower average CO2 levels (295 PPM) compared to regular rooftops (360 PPM), indicating the potential of garden roof designs in reducing CO2 concentrations. However, the research has limitations in data collection intervals and focus on two types of roofs. Recommendations for future research include increasing data collection frequency and considering additional factors for a more comprehensive understanding of urban air quality.

Thank You

Yayasan Bina Sarana Informatika
Universitas Bina Sarana Informatika
LPPM UBSI
Electrical Engineering Department UBSI

Your contribution is very meaningful in efforts to understand and improve air quality in the rooftop area of the building.
Thank you for all your assistance and cooperation.

CONTACT US

Ir. Andi Rosano, M.T.
Email: andi.aox@bsi.ac.id
Electrical Engineering
+62 878-1490-2242

R. Deasy Mandasari, M.T.
Email: deasy.rde@bsi.ac.id
Electrical Engineering
+62-8780-8878-698

Ir. Djadjat Sudaradjat, M.T.
Email: djadjat.dsj@bsi.ac.id
Electrical Engineering
+62 856-1000-797

https://quakewarn.cloud/co2/grafik/
Hibah Penelitian Dosen Yayasan Tahun 2023