TEAM DETAILS

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Current Limitations in Carbon Emission Tracking

- Industrial factories are significant contributors to carbon emissions, which have a profound impact on air quality and climate change. With increasing regulatory pressure and public awareness, factories are expected to monitor and reduce their carbon footprint. However, many existing emission monitoring solutions are either outdated, lack transparency, or fail to provide real-time data, limiting the ability of factory operators to take immediate corrective action.

- Current systems often do not offer a comprehensive and transparent view of emissions data, and discrepancies in reporting can lead to regulatory non-compliance and public distrust. Additionally, traditional methods of collecting emissions data are typically not designed for dynamic, large-scale monitoring around multiple factory sites, leading to inefficiencies and potential inaccuracies in reporting.

- There is a growing need for an advanced solution that not only tracks emissions in real-time but also ensures transparency in reporting through tamper-proof mechanisms, enabling factories to take proactive measures. Furthermore, factories require a way to receive instant notifications when emission levels exceed safe limits, and a system that provides actionable insights for long-term improvements.

- The lack of real-time monitoring, transparent data reporting, and advanced analytics tools makes it difficult for factories to optimize their operations and reduce emissions effectively. Addressing this issue is critical for environmental sustainability, regulatory compliance, and building public trust.

- Thus, a reliable and scalable system is required to continuously monitor emissions, ensure data integrity, and provide immediate feedback, helping factories take timely actions and contribute to a cleaner, more sustainable environment.

KODIKON -4.0

SOLUTION

- Our project tackles the pressing challenges in carbon emission tracking by introducing a blockchain-based solution designed to ensure data integrity, real-time monitoring, and transparent auditing.
- Creating tamper- proof system by recording each sensor reading directly onto the blockchain fostering a level of transparency that builds trust among all stakeholders, including regulatory bodies, environmental agencies, and the public.
- Unlike traditional self-reporting systems, which often submit emissions data long after the fact, our platform offers real-time monitoring.
- Smart contracts that automatically trigger alerts when emissions exceed set thresholds , ensuring faster responses to environmental risks.
- We aim to aggregate data from various factories and monitoring stations onto a single blockchain, eliminating the inefficiencies that come with fragmented data systems and allowing transparent auditing of emissions data thereby Improving consistency and enhancing collaboration across different sectors.
- The immutable nature of blockchain records means that regulatory authorities and third-party organizations can easily verify the data without worrying about tampering or bias.
- By bridging these gaps, our solution enhances trust and accountability in carbon emissions reporting, paving the way for a more sustainable future for our environment.

SOLUTION

DEFINING THE PROBLEM:

- Existing emission monitoring systems rely on centralized databases and manual reporting
- This causes potential for data manipulation and slower systems
- The absence of a real-time systems for monitoring and verifying emissions limits the effectiveness of environmental regulations.

MEASURING THE PROBLEM:

- Industrial activities are responsible for over 25% of global carbon emissions.
- High levels of CO2, NOx, and particulate matter (PM2.5, PM10) in industrial zones contribute to poor air quality,
- Annual non-compliance fines for industries are estimated to be in billions of dollars globally.
- Studies show that some industries underreport their emissions by as much as 20%, which delays mitigation efforts.

ANALYSING THE PROBLEM:

- Centralized emissions databases are vulnerable to manipulation and are difficult to audit in real time.
- Self reporting by companies introduces human errors and a potential for fraudulent reporting.
- Data from various monitoring sources is often stored in disconnected systems, leading to inefficiencies in data aggregation and analysis.

TARGET AUDIENCE → **Environmental Consultants and Analysts** → **Factory Operators and Managers** → **Regulatory Authorities and Government Agencies:**

Expectations :

Accurate, real-time monitoring of carbon emissions. Immediate detection of harmful emission levels.

Transparent and tamper-proof data reporting using blockchain.&- Real-time alerts for exceeding safe emission thresholds.

Timely corrective actions enabled by alerts.& Optimized operations and reduced emissions through detailed reports.
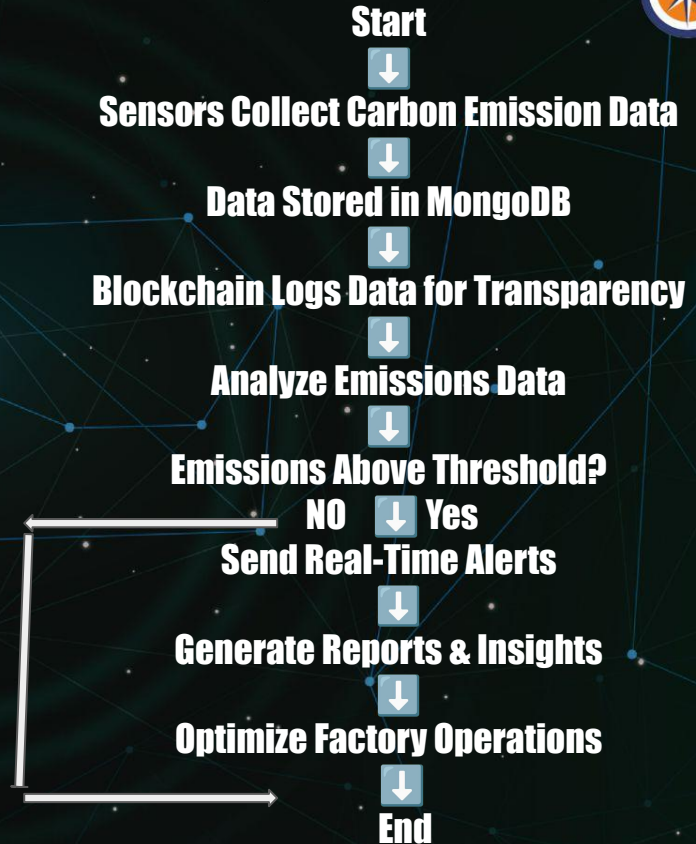
Enhanced compliance with environmental regulations.Practices, making factories more eco-friendly and efficient.

Effectiveness of solution :

- real-time carbon emissions monitoring with sensors for immediate action.
- Utilizes MongoDB to efficiently handle large and dynamic datasets.
- Incorporates blockchain for transparency and tamper-proof data logging.
- Builds trust among factories, regulators, and public
- Generates real-time alerts and detailed reports to aid compliance with environmental regulations.
- Generates real-time alerts and detailed reports to aid compliance with environmental regulations.

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Real - time alerts Tamper proof data integrity

real-time monitoring

SOLUTION

Sensors

Blockchain based solution

Consistency

Comprehensive reports and analysis

Trustworthy & accountable data

Start
⬇
Sensors Collect Carbon Emission Data
⬇
Data Stored in MongoDB
⬇
Blockchain Logs Data for Transparency
⬇
Analyze Emissions Data
⬇
Emissions Above Threshold?
NO ⬇ Yes
Send Real-Time Alerts
⬇
Generate Reports & Insights
⬇
Optimize Factory Operations
⬇
End

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TECH STACK

- FRONTEND: HTML, CSS, React

- BACKEND: Node.js

- DATABASE: MongoDB

- API's/SERVICES: Ethereum, Hyperledger,OpenAQ .

- **What is/are the domains covered in the solution?**

- The domains covered in the solution are SMART CITIES, ENVIRONMENTAL MONITORING , DATA MANAGEMENT AND ANALYTIC, and BLOCKCHAIN TECHNOLOGY for transparency and real time emissions tracking.

BUSINESS SCOPE

- Collaboration with environmental conservationists and government agencies enhances credibility and access to funding.
- Increasing regulatory pressure and corporate sustainability initiatives drive the demand for emission tracking solutions.
- Applicable across sectors like manufacturing, energy, transportation, and logistics, where emissions are significant.
- Opportunities to enter international markets with similar regulatory frameworks.
- Potential to offer additional analytics services for benchmarking and energy efficiency insights.

- Revenue Generation Potential:
  - Subscription based model
  - Licensing to government and corporations
  - By selling aggregated and anonymized data to third parties
  - Partnerships and sponsorships
  - Offering tailored consulting to optimize sustainability strategies.