SMART INDIA HACKATHON 2024

TITLE PAGE

- **Problem Statement ID –25038**
- **Problem Statement Title-Blockchain-Based Blue Carbon Registry and MRV System**
- **Theme-Clean & Green Technology**
- **PS Category- Software**
- **Team ID-**
- **Team Name-NEELKADAM**

NeelKadam

Nature to Credits: A Blue Carbon Journey

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Our Impact

- Promotes a transparent, fast, and fair process.
- Cuts approval times from 1-2 years to months.
- Eliminates middlemen, directly benefiting communities with enhanced revenue.
- Establishes a trustworthy source of credits.
- Introduces a decentralized MRV system for blue carbon.

What are we doing

NGOs / Communities / Panchayats
Upload project data
NCCR / Government Verifiers
Verify & Approve
Blockchain Registry
Store verified records
Smart Contracts
Generate carbon credits
Buyers / Corporates (Purchase)
Buy credits to offset emissions
Buyers / Corporates (Retire)
Retire credits to prevent reuse

Our Innovations

- **Secure Records:** Blockchain technology ensures transparent and unchangeable records.
- **Smart Contracts:** Government approvals initiate automatic credit distribution via smart contracts.
- **Direct Community Sales:** Local groups sell credits directly to companies, cutting out intermediaries.
- **Reliable system:** Official groups verify our system, ensuring credit authenticity.

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TECHNICAL APPROACH

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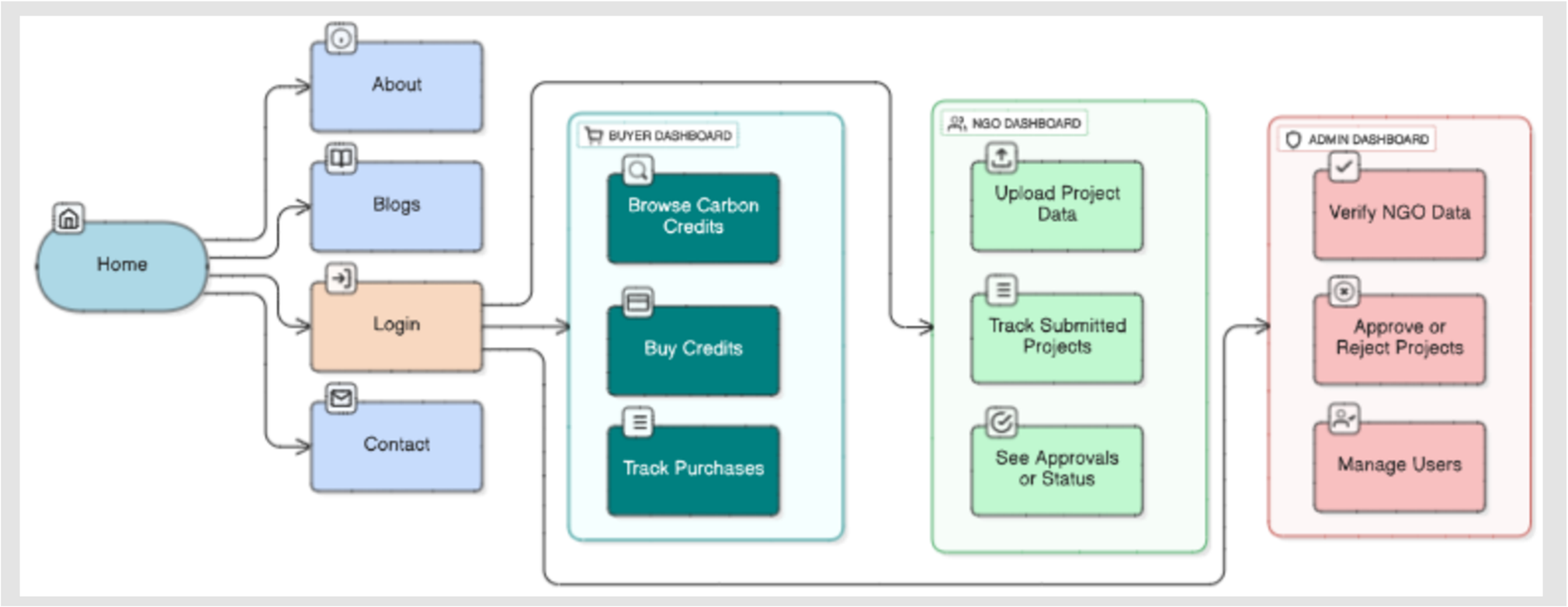

Frontend
React (Vite), TypeScript/JavaScript, HTML, CSS, styled with Tailwind CSS.

Backend
Node.js with Express.js (REST API), PostgreSQL (db).

Blockchain
Ethereum (Solidity smart contracts) with Hardhat for dev/testing.

Tools and DevOps
Git/GitHub , Thunder Client (API testing), pgAdmin & SQLTools (db management).

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FEASIBILITY AND VIABILITY

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Feasability

- Proposes a decentralized MRV system for efficient measurement, reporting, and verification
- Uses blockchain and smart contracts to ensure transparency and prevent fraud
- Provides a scalable platform for NGOs, communities, and coastal panchayats
- Leverages the growing global demand for carbon credits driven by ESG commitments

Potential Challenges and Risks

- Uncertainty in data accuracy and completeness, risking erroneous analysis.
- Difficulty in identifying and correcting data errors, leading to poor conclusions.
- Lack of clear data verification rules results in inconsistent quality.
- Manual data checks are costly and time-consuming, posing financial and operational risks.
- Safeguarding private data presents privacy and security challenges.

Strategies for overcoming these challenges

- **Multi-Layer Verification:** Accurate info via geo-tagged photos, Google Maps, and external reviews.
- **Government Partnership:** Early collaboration with NCCR/MoES to integrate into government support.
- **Credit security:** Smart contracts ensure secure, one-time credit issuance and automatic retirement.
- **Hybrid verification:** Precise verification using on-site surveys and digital proof.
- **Transparency:** Public dashboard tracks all credits for buyer trust.

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IMPACT AND BENEFITS

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NGOs & Communities
Easy upload, verify & monetize restoration
Government (NCCR/MoES)
Faster, tamper-proof verification, less admin work
Corporates/Buyers
Trusted carbon credits for sustainability goals
Public
Healthier coasts, restored ecosystems & climate resilience

IMPACT ON TARGET AUDIENCE

Social benefits

- Provides alternative livelihoods
- Boosts community participation
- Promotes conservation awareness

Economic benefits

- Revenue for NGOs & panchayats
- Cuts costs by removing middlemen
- Attracts corporate & global buyers

Environmental benefits

- Restores mangroves, marshes & seagrass
- Improves biodiversity & habitats
- Shields shores from erosion & storms

Governance benefits

- Smart contracts stop double counting
- Public dashboards build trust
- Eases NCCR/MoES compliance

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RESEARCH AND REFERENCES

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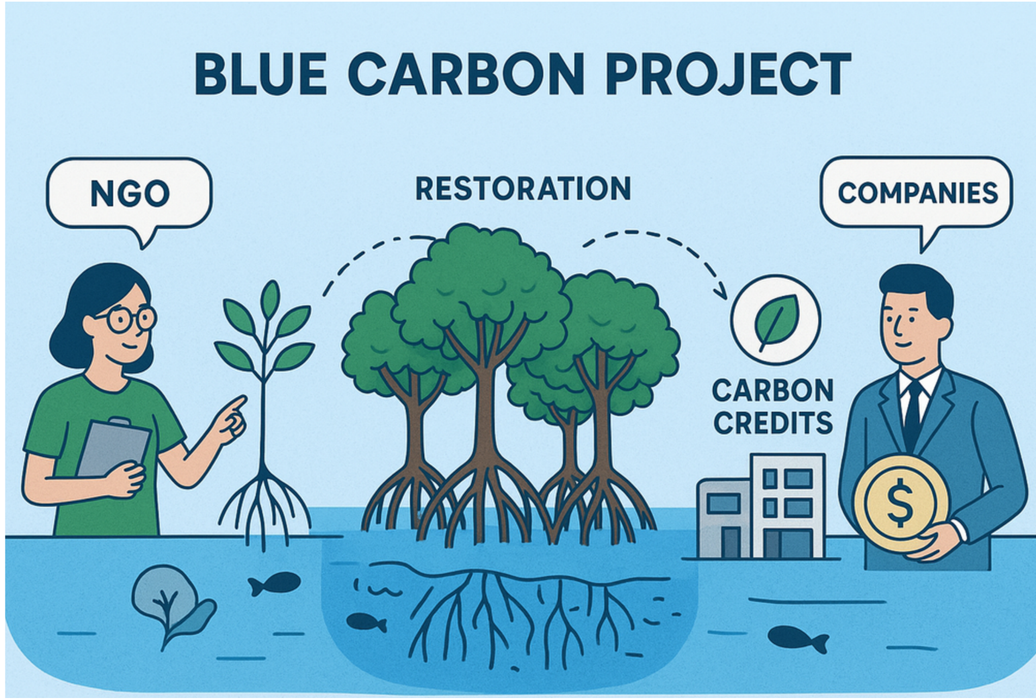
We consulted the following resources:

[The Future of Blue Carbon Science]
(https://www.nature.com/articles/s41467-019-11693-wt)

[Dimensions of Blue Carbon and Emerging Perspectives]
(https://pmc.ncbi.nlm.nih.gov/articles/PMC6451379/)

[Blue Carbon Handbook]
(https://oceanpanel.org/wp-content/uploads/2023/06/23_REP_HLP_Blue-Carbon-Handbook_low-res.pdf)

[TheBlueCarbonInitiative]
(https://www.thebluecarboninitiative.org/library)

Additionally, we explored numerous case studies and gathered insights from potential users, professionals in the field, and various NGOs. We also analyzed other digital platforms and successful global websites to enhance our understanding.