

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**  
**“Jnana Sangama”, Belgaum -590014, Karnataka.**



**Full Stack Web Development Report  
On  
“ECOSHARE”**

*Submitted by*

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*Under the Guidance of*  
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**B.M.S College of Engineering**

*in partial fulfilment for the award of the degree of*  
**BACHELOR OF ENGINEERING**  
*in*  
**COMPUTER SCIENCE AND ENGINEERING**



**B.M.S. COLLEGE OF ENGINEERING**  
**(Autonomous Institution under VTU)**

**BENGALURU-560019 Sep 2025 – Jan 2026**  
**B. M. S. College of Engineering, Bull Temple Road, Bangalore 560019**  
(Affiliated to Visvesvaraya Technological University, Belgaum)  
**Department of Computer Science and Engineering**



**CERTIFICATE**

This is to certify that the project work entitled "**ECOSHARE**" carried out by **NIKHITHA S (1BM24CS189), NIKITHA M N (1BM24CS190), PANCHAMI P (1BM24CS196), HARSH BAFNA(1BM24CS357)** who are bonafide students of B. M. S. College of Engineering. It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visveswaraiah Technological University, Belgaum during the year 2025-2026. The project report has been approved as it satisfies the academic requirements in respect of **Full Stack Web Development(23CS3AEFWD)** work prescribed for the said degree.

Signature of the Guide  
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Name of the Examiner

1)

2)

Signature with date

**B.M.S. COLLEGE OF ENGINEERING DEPARTMENT OF COMPUTER  
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**DECALARATION**

We, **NIKHITHA S (1BM24CS189), NIKITHA M N (1BM24CS190), PANCHAMI P (1BM24CS196), HARSH BAFNA(1BM24CS357)** students of 3<sup>rd</sup> Semester, B.E, Department of Computer Science and Engineering, BMS College of Engineering, Bangalore, hereby declare that, this Full Stack Web Development entitled " **ECOSHARE** " has been carried out by us under the guidance of **Mohan M, Assistant Professor**, Department of CSE, BMS College of Engineering, Bangalore during the academic semester Sep 2025 - Dec 2026. We also declare that to the best of our knowledge and belief, the development reported here is not from part of any other report by any other students.

Signature

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# INTRODUCTION

## 1.1 Overview

EcoShare is a web-based application developed using the MERN stack (MongoDB, Express, React, and Node.js) that aims to simplify group travel planning while promoting environmentally responsible decisions. The platform allows users to create trips, add members, record shared expenses, and automatically calculate settlements so that everyone knows who owes whom.

What makes EcoShare unique is the integration of eco-intelligence into financial decision-making. Each expense is assigned an environmental impact score, and users are encouraged to choose eco-friendly alternatives. Based on these choices, users earn GreenPoints, which reflect their contribution to sustainable travel. The application also provides dashboards, leaderboards, and activity history to give users complete visibility into both their spending and their environmental impact.

By combining expense management with sustainability awareness, EcoShare serves as a collaborative, transparent, and socially responsible travel management platform.

## 1.2 Motivation

The motivation behind developing EcoShare comes from two major real-world problems faced by travellers:

1. Difficulty in managing shared expenses

During group trips, people often forget who paid, how much was spent, and who owes whom. This leads to confusion, disputes, and inaccurate settlements.

2. Lack of awareness about environmental impact

Most travel and expense-tracking applications focus only on money. They do not consider the environmental cost of transportation, accommodation, or food choices. As a result, users are not encouraged to make eco-friendly decisions.

EcoShare was created to bridge this gap by combining financial transparency with environmental responsibility. By rewarding eco-friendly choices with GreenPoints and showing CO<sub>2</sub> savings, the platform motivates users to travel more sustainably while still keeping their expenses organized and fair.

# **SOFTWARE REQUIREMENTS**

## **2.1 Hardware Requirements**

- Processor: Intel Core i3 or above
- RAM: Minimum 4 GB (8 GB recommended)
- Storage: Minimum 10 GB free disk space
- System Type: 64-bit system
- Input Devices: Keyboard and Mouse
- Output Devices: Monitor
- Internet Connection: Required for development, testing, and API usage

## **2.2 Software Requirements**

### Operating System

- Windows 10 / 11
- Linux (Ubuntu 20.04 or later)
- macOS (Monterey or later)

### Frontend Technologies

- React (Vite)
- Tailwind CSS
- HTML5
- CSS3
- JavaScript (ES6+)

### Backend Technologies

- Node.js
- Express.js

### Database

- MongoDB (Local or MongoDB Atlas)

### Authentication

- JSON Web Tokens (JWT)

### Development Tools

- Visual Studio Code
- Git & GitHub

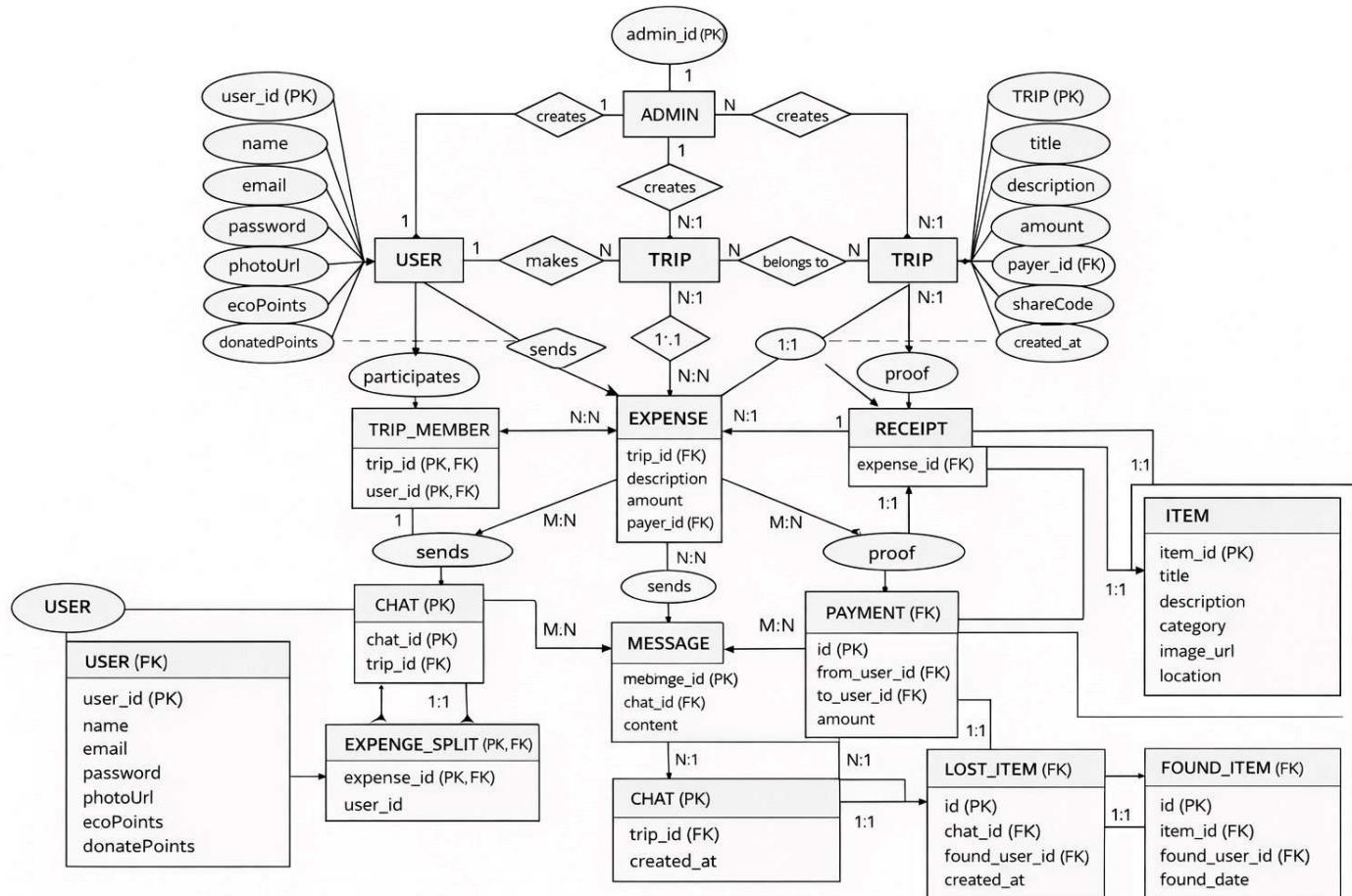
### Web Browser

- Google Chrome
- Mozilla Firefox

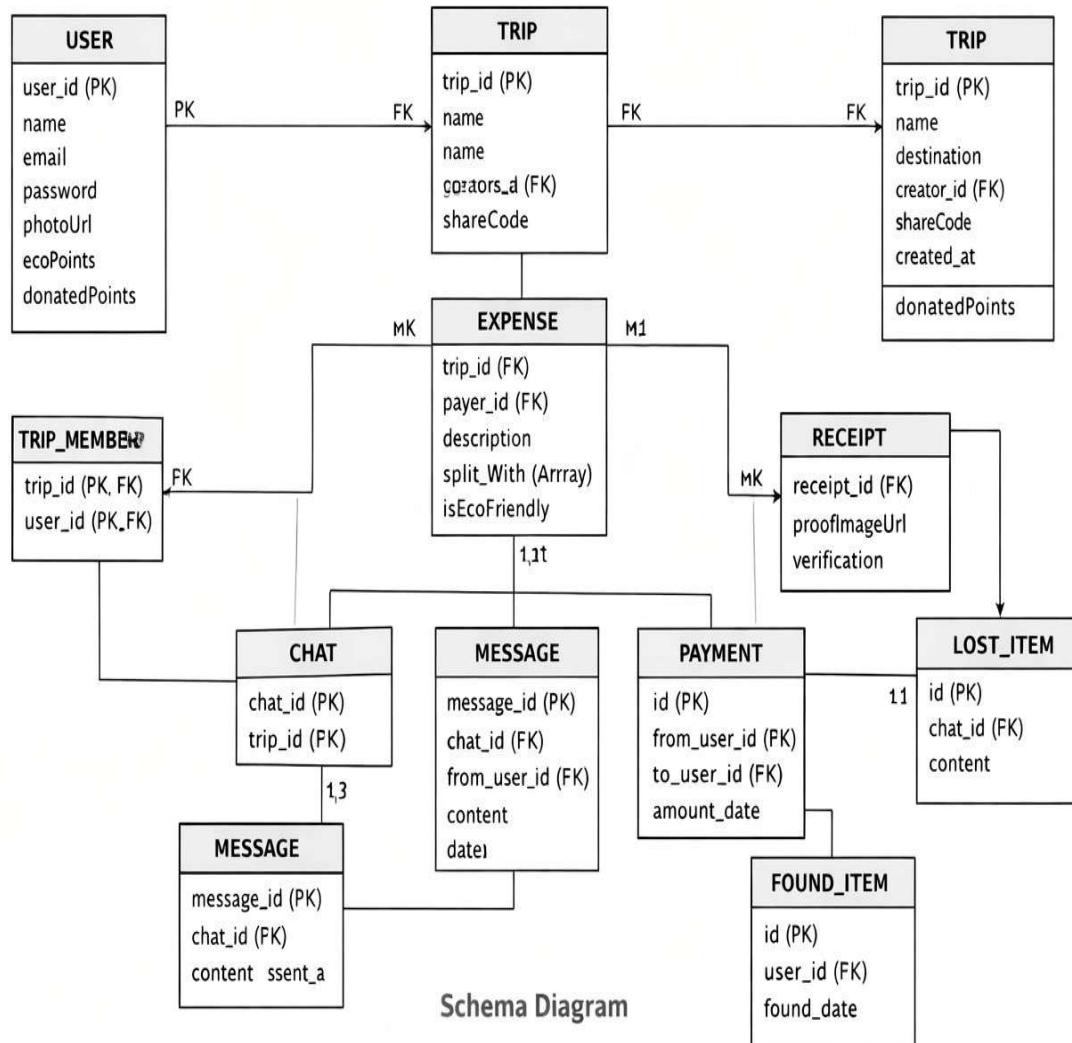
### Optional Libraries & Tools

- Recharts (for data visualization)
- Postman (for API testing)

### 3. ER DIAGRAM OF THE PROJECT

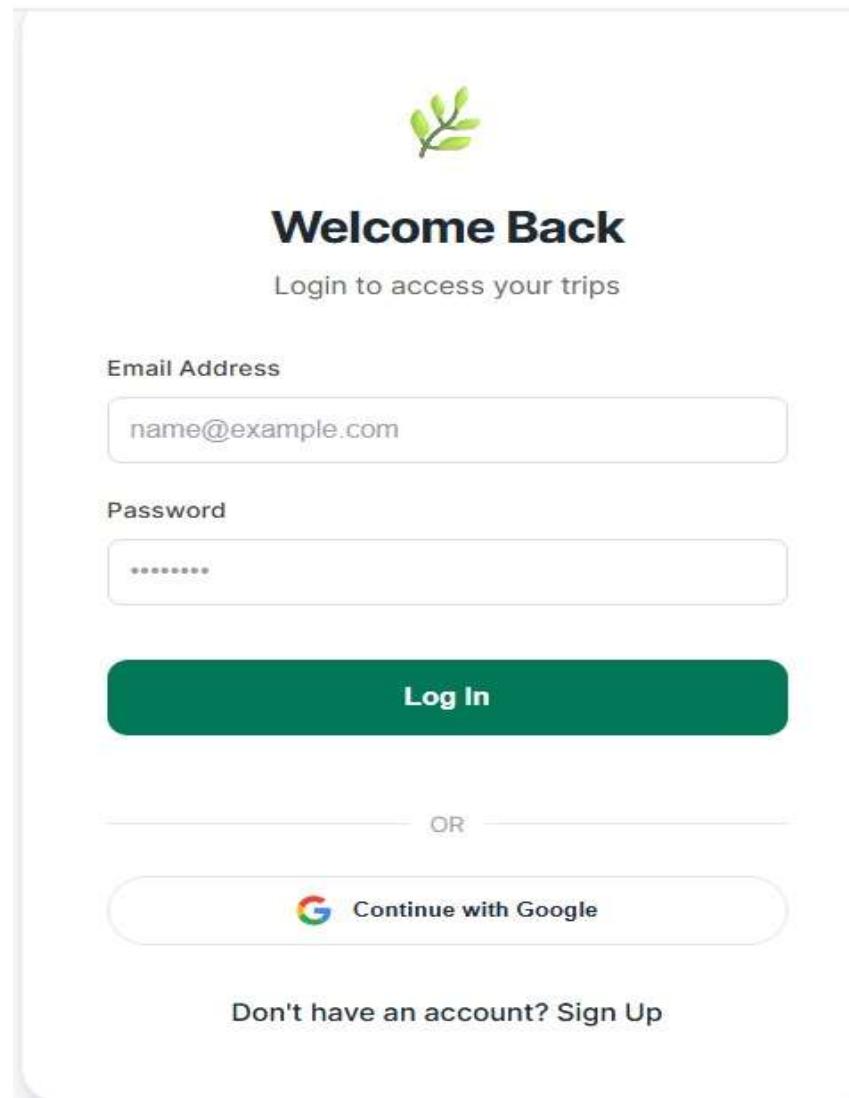


## 4. SCHEMA OF THE PROJECT

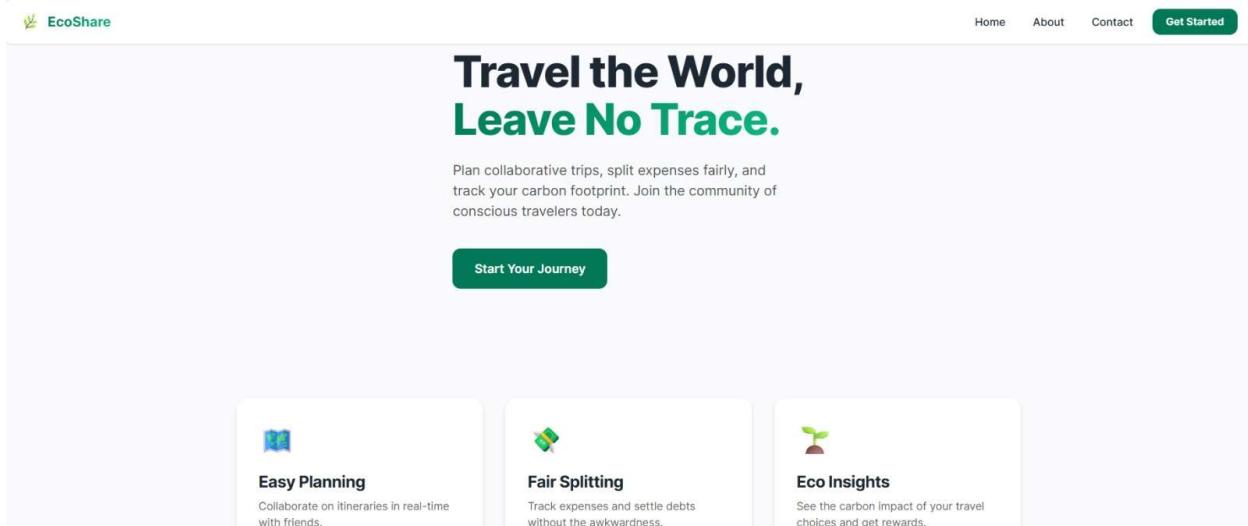


## 5. USER INTERFACE DESIGN

Login Page

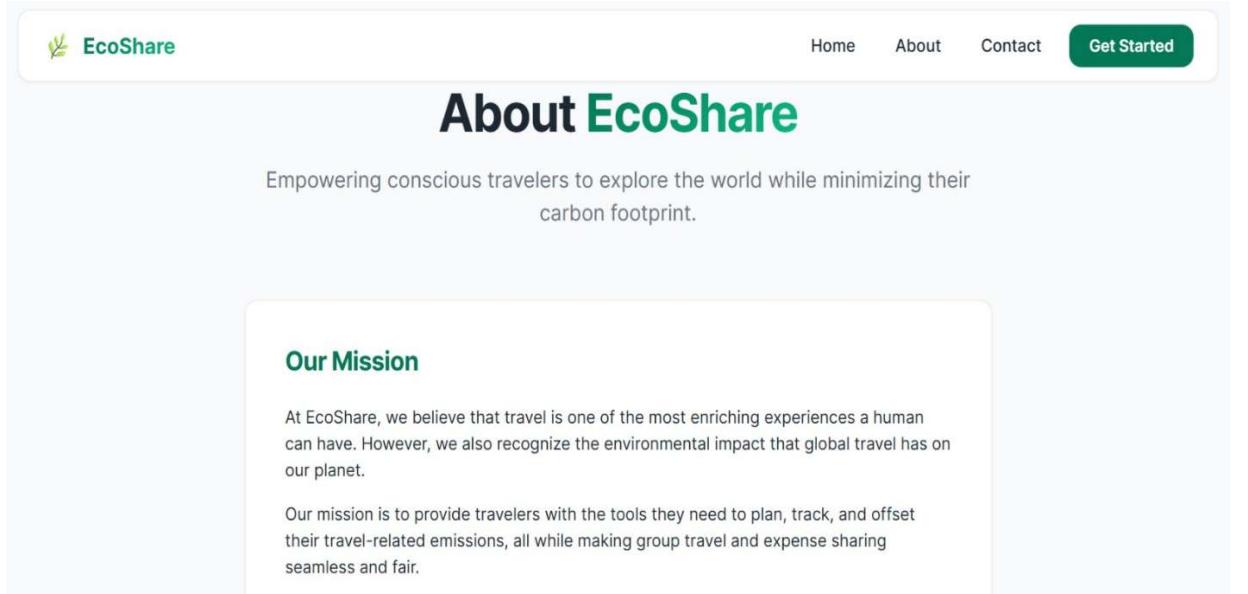


## Home Page



The screenshot shows the EcoShare homepage. At the top left is the logo "EcoShare" with a small leaf icon. At the top right are navigation links: "Home", "About", "Contact", and a green "Get Started" button. The main title "Travel the World, Leave No Trace." is centered in large, bold, teal font. Below it is a subtitle: "Plan collaborative trips, split expenses fairly, and track your carbon footprint. Join the community of conscious travelers today." A "Start Your Journey" button is located below the subtitle. At the bottom of the page are three cards: "Easy Planning" (with a book icon), "Fair Splitting" (with a money bag icon), and "Eco Insights" (with a plant icon).

## About Us Page



The screenshot shows the EcoShare "About Us" page. At the top left is the logo "EcoShare". At the top right are navigation links: "Home", "About", "Contact", and a green "Get Started" button. The main title "About EcoShare" is centered in large, bold, teal font. Below it is a subtitle: "Empowering conscious travelers to explore the world while minimizing their carbon footprint." A section titled "Our Mission" is highlighted with a light gray background. The text in this section reads: "At EcoShare, we believe that travel is one of the most enriching experiences a human can have. However, we also recognize the environmental impact that global travel has on our planet. Our mission is to provide travelers with the tools they need to plan, track, and offset their travel-related emissions, all while making group travel and expense sharing seamless and fair."

## Contact Us Page

The screenshot shows the 'Contact Us' section of the EcoShare website. At the top, there's a navigation bar with links for Home, About, Contact, and a green 'Get Started' button. Below the navigation, a large teal header says 'Get in Touch'. A sub-header below it reads 'Have questions or suggestions? We'd love to hear from you.' To the left, a 'Contact Information' sidebar lists 'Our Office' (B.M.S College Of Engineering), 'Email Us' (ecoshare@gmail.com), and 'Call Us' (+91 9606343561). To the right, there are input fields for 'First Name' (John), 'Last Name' (Doe), 'Email Address' (john@example.com), and 'Subject'.

## Profile Page

The screenshot shows the profile page for a user named Harsh Bafna. The top navigation bar includes links for Profile (which is active), My Trips, Impact, Leaderboard, and Logout. Harsh's profile card features a large circular icon with a 'H', his name 'Harsh Bafna', and his email 'harshbafna@gmail.in'. To the right, a green box displays '12 ECO POINTS' and '0 DONATED'. Below the profile card, three main sections are visible: 'Recent Adventures' (with a link to 'View All History'), 'My Earth Impact' (represented by a donut chart), and 'Next Goal' (which includes a 'Gold Supporter Badge' section and a 'WIN A FREE TRIP' callout about a collaboration with VolunteerYatra).

## My Trips Page

The screenshot shows the 'My Trips' section of the EcoShare app. At the top, there's a navigation bar with the 'EcoShare' logo, 'Profile', 'My Trips' (which is highlighted in green), 'Impact', 'Leaderboard', and 'Logout' buttons. Below the navigation bar are two large green cards representing trips:

- Coorg**: A trip organized by 'Friends'. It has an 'Active' status and 5 members.
- Goa**: A trip organized by 'Bday'. It has an 'Active' status and 1 member.

At the bottom left of the main area, there are two buttons: '+ New Trip' and 'Join with Code'.

## Friends In Trip Page

The screenshot shows the 'Friends' page for the 'Coorg' trip. At the top, there's a navigation bar with the 'EcoShare' logo, 'Profile', 'My Trips', 'Impact', 'Leaderboard', and 'Logout' buttons. Below the navigation bar is a back button labeled '← Back to Trips'.

### Friends

Code: bc734ec7

Actions: + Invite, Expenses, Settle Up

Participants: N H P P N (represented by colored circles)

All Expenses

+ Add Expense

A transaction listed under 'All Expenses':

- dinner** (represented by a bowl icon)
- Paid by **Nikhitha S** for everyone
- ₹1000.00
- trash can icon for deletion

## Sharing Invite Code

The screenshot shows the EcoShare app interface. On the left, there's a sidebar with a green leaf icon and the text "EcoShare". Below it, a "Friends" section shows a green button "+ Invite" and a code "bc734ec7". At the bottom of this sidebar, there are "Expenses" and "Settle Up" buttons. The main area has a heading "All Expenses" and a card for a "dinner" expense paid by "Nikhitha S" for everyone. On the right, a modal window titled "Share link" displays a URL "http://localhost:5173/join/bc734ec7" and two sharing options: "My Phone" and "(You)". Below this, a "Share using" section lists various platforms: Nearby Sharing, Microsoft Teams, Copilot, Microsoft 365 Copilot, Outlook, WhatsApp, Gmail, Facebook, Twitter, LinkedIn, and a blue square icon. A green button "+ Add Expense" is visible at the bottom right of the modal.

## Adding Expenses

The screenshot shows the "Add New Expense" form. It has fields for "Description" (travel) and "Amount" (1460). Below this, a "PAID BY" section shows five users: Nikhitha Shivakumar, Harsh Bafna, pavan, panchami, and Nikhitha S. Under "SPLIT WITH", it shows "Nikhitha Shivakumar", "Harsh Bafna", "pavan", "panchami", and "Nikhitha S". A green "NONE" button is next to the list. At the bottom, there's a checked checkbox with the text "This is an eco-friendly expense (+50 pts)".

## Verification Of Proof for Green Points

The screenshot shows the EcoShare app interface for verifying an expense. At the top, there are tabs for 'TRAVEL' and 'TURBO'. The main header 'EcoShare' has a green leaf icon. Navigation links include 'Profile', 'My Trips', 'Impact', 'Leaderboard', and 'Logout'. Below the header, under 'PAID BY', it lists 'Nikhitha Shivakumar' (red), 'Harsh Bafna' (green, checked), 'pavan' (blue), 'panchami' (teal), and 'Nikhitha S' (purple). Under 'SPLIT WITH', it lists 'Nikhitha Shivakumar', 'Harsh Bafna', 'pavan', 'panchami', and 'Nikhitha S'. A green button labeled 'NONE' is visible. A checked checkbox indicates 'This is an eco-friendly expense (+50 pts)'. A note says 'Verification Photo Required for Points' with a 'Choose File' button and a message 'No file chosen'. A warning says 'Proof is mandatory for green points'. A tip at the bottom says 'Tip: We also auto-detect keywords like "Cycle", "Bus", "Train", "Vegan".'. Buttons for 'Cancel' and 'Save Expense' are at the bottom right.

## Splitting Up Expenses and Settling Up the Split

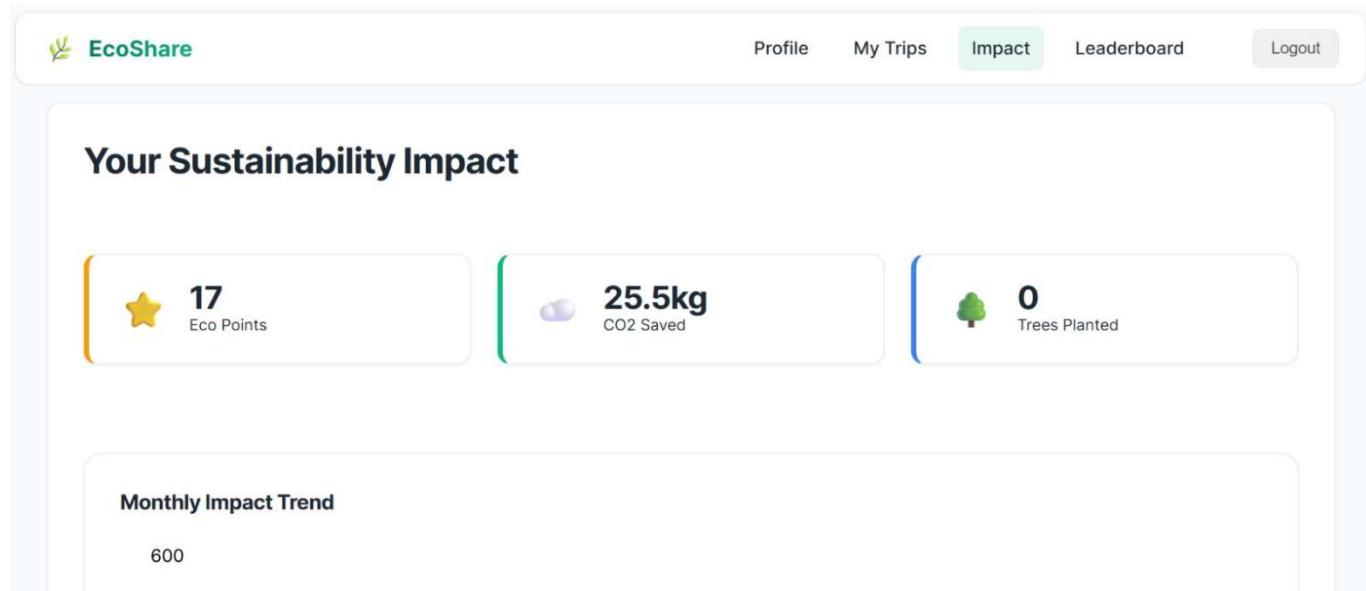
The screenshot shows the EcoShare app interface for splitting expenses. The top navigation is identical to the previous screen. Below, under 'Expenses', there are two tabs: 'Expenses' (selected) and 'Settle Up'. The 'Balances' section shows the following amounts:

User	Amount	Note
Nikhitha Shivakumar	-292.00	owes
Harsh Bafna	+1168.00	gets back
pavan	-542.00	owes
panchami	-542.00	owes
Nikhitha S	+208.00	gets back

The 'How to Settle Up' section contains two items:

- Nikhitha Shivakumar pays Harsh Bafna ₹292 ✓ Mark as Paid
- pavan pays Harsh Bafna ₹542 ✓ Mark as Paid

## Impact Page



## Impact Graph According To Green Points Acquired



## Recent Eco- Actions

The screenshot shows the 'Recent Eco-Actions' section of the EcoShare app. At the top, there's a navigation bar with 'EcoShare' logo, 'Profile', 'My Trips', 'Impact' (which is highlighted in green), 'Leaderboard', and 'Logout'. Below the navigation is a timeline from Jan to Jun. Under 'Jan', it says '0'. The main area lists recent actions:

Date	Action	Points
Today	Started trip to Goa	+5 pts
Today	Joined trip to Coorg	+2 pts

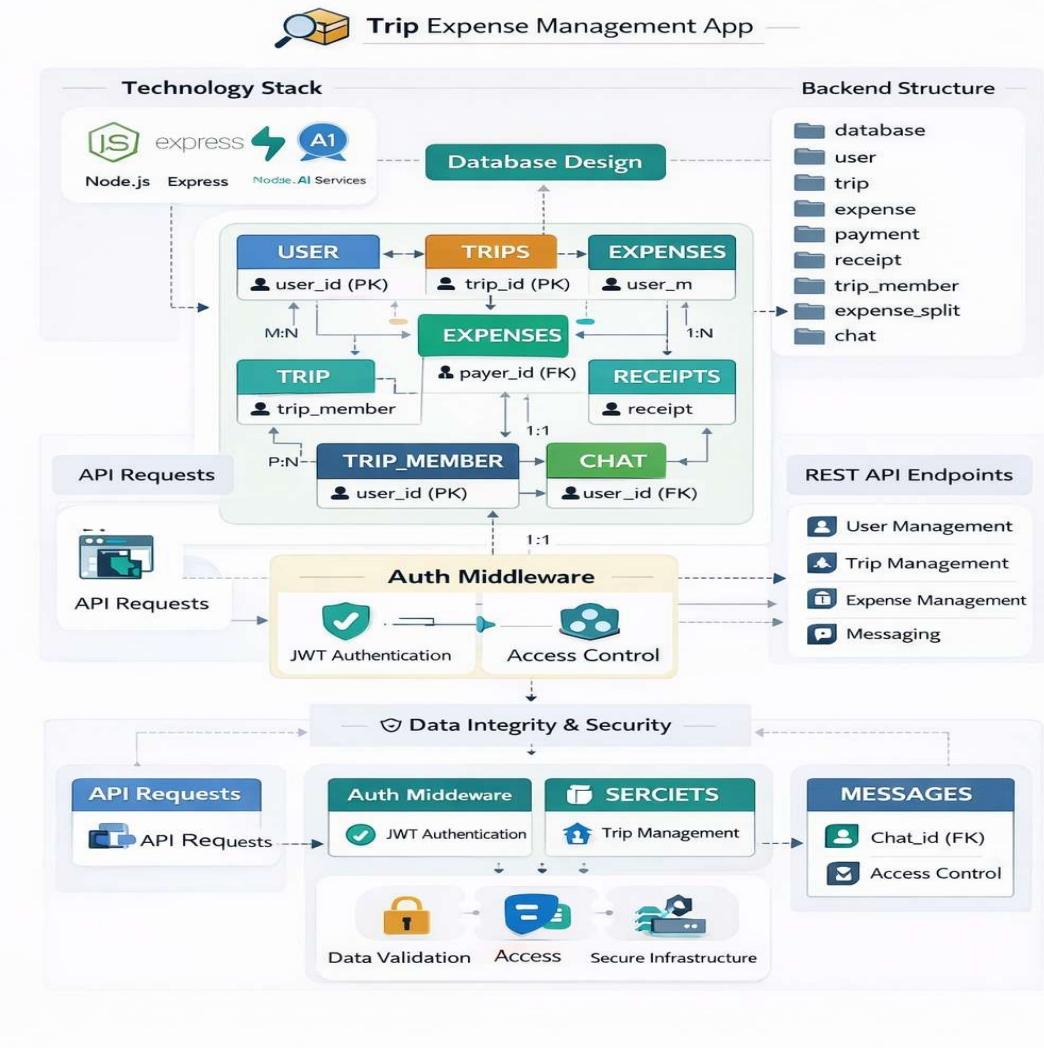
## Leaderboard Page

The screenshot shows the 'Leaderboard' page of the EcoShare app. At the top, there's a navigation bar with 'EcoShare' logo, 'Profile', 'My Trips', 'Impact', 'Leaderboard' (highlighted in green), and 'Logout'. The main title is 'Eco Champions 🏆' with the subtitle 'See who is leading the sustainable movement.' Below is a table of users:

Rank	User	Green Points	Impact (Donated)
1	Harsh Bafna	110	-
2	Panchami P	110	-
3	John	60	-
#4	Panchami P	60	-
#5	Harsh Bafna	17	-
#6	Nikhitha Shivakumar	15	-
#7	pavan	12	-
#8	panchami	12	-

## 6. BACK-END DESIGN

### 6. DATABASE DESIGN



## 6.1 Overview

The backend of the Trip Expense Management and Lost & Found Web Application is designed to manage application logic, data storage, security, and communication between the frontend and the database. It follows a modular architecture to ensure scalability, maintainability, and efficient data handling.

## 6.2 Technology Stack

The backend is developed using:

Node.js for server-side execution

Express.js for RESTful API development

Database System for data storage

JWT for authentication and authorization

Cloud Storage for storing uploaded receipt images

## 6.3 Backend Architecture

The backend is organized into the following layers:

API Layer for handling client requests

Authentication Layer for secure access control

Business Logic Layer for processing application rules

Database Layer for data persistence

This layered architecture improves code organization and system scalability.

## 6.4 Database Design

The database consists of multiple interconnected entities:

User – Stores registered user details

Trip – Represents travel events created by users

Trip Member – Manages user participation in trips

Expense – Stores trip-related expenses

Expense Split – Divides expenses among users

Payment – Records settlements between users

Chat – Represents trip-specific conversation space

Message – Stores individual messages within a chat

Lost Item / Found Item – Manages lost and recovered items

## 6.5 Chat and Messaging Module

The Chat module enables communication between users participating in the same trip. Each trip has a dedicated chat, and multiple messages can be exchanged within it. This separation ensures organized communication and efficient message management.

## 6.6 Security and Scalability

Security is ensured using JWT-based authentication and access control mechanisms. The modular backend design supports scalability and allows easy integration of future features.

## 6.7 Summary

The backend design provides a secure and scalable foundation for the application by combining modular architecture, efficient database design, and reliable communication mechanisms.

## 7. CONCLUSION AND FUTURE WORK

### CONCLUSION

EcoShare successfully combines **expense management with sustainability awareness**, offering a unique platform that simplifies group trip finances while promoting environmentally responsible behavior. By integrating modern web technologies with eco-intelligence, the application encourages transparency, collaboration, and positive environmental impact.

### FUTURE ENHANCEMENTS

1. Integration with real CO<sub>2</sub> calculation APIs
2. Online payment gateway for settlements
3. Real-time notifications using WebSockets
4. Mobile application using React Native
5. AI-based eco-friendly recommendations
6. Integration with real NGOs for donations

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