**A**

**PROJECT REPORT ON**

# BLOCKCHAIN-BASED FUND MANAGEMENT SYSTEM FOR INDIAN TEMPLES

Submitted in partial fulfilment of requirements for the award of degree of

## BACHELOR OF TECHNOLOGY

in

## Computer Engineering

By


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This is to certify that the Project report entitled

## "BLOCKCHAIN-BASED FUND MANAGEMENT SYSTEM FOR INDIAN TEMPLES"

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# ACKNOWLEDGMENT

We would like to express our deepest appreciation to all those who provided us the possibility to complete this project phase - 2 report. A special gratitude we give to our final year project phase - 2 mentor, **Prof. C. V. Andhare**, whose contribution in stimulating suggestions and encouragement helped us to coordinate our project phase - II. She gave us support from the start to the end of this project and kept us on the correct path.

We would like to express my special thanks to **A. V. Mahalle**, Project In- Charge of Computer Engineering and **Prof. C. V. Andhare**, Head of the Department, Computer Engineering, Government College of Engineering, Yavatmal who have invested her full effort in guiding the team in achieving the goal for all the timely support and valuable suggestions during the period of project.

We would like to express our sincere thanks to **Prof. S. D. Londhe** , Principal of Government College of Engineering Yavatmal, for providing the Working facilities in college.

We are equally thankful to all the staff members of Computer Engineering Department, Government College of Engineering, Yavatmal for their valuable suggestions. Also, we would like to thank all my friends for the continual encouragement and the positive support.

# ABSTRACT

In India, temples are not only places of worship but also significant centers for collecting donations and managing funds. However, the traditional fund management systems often lack transparency, accountability, and efficiency, leading to potential misuse and public distrust. This paper proposes a Blockchain-based Fund Management System tailored for Indian temples to address these challenges. By leveraging the immutable, decentralized, and transparent nature of blockchain technology, the proposed system ensures secure tracking of all transactions, real-time donation visibility, and automated fund distribution using smart contracts. The architecture promotes public trust by allowing devotees and stakeholders to verify the usage of funds without the risk of tampering or fraud. Additionally, it facilitates efficient audit trails and enhances financial governance within religious institutions. This approach lays the groundwork for a robust, accountable, and future-ready donation management ecosystem for temples across India. Performance evaluation is conducted through a series of tests measuring transaction throughput, latency, and security under various conditions. The results demonstrate that the blockchain-based payments network achieves significant improvements in transaction efficiency and security compared to traditional methods. Additionally, the network's ability to provide real-time transaction tracking and reduce intermediaries underscores its potential for broad adoption.

**Keywords**: Blockchain, Fund Management, Indian Temples, Transparency, Smart Contracts, Decentralization, Financial Governance, Donations, Accountability, Audit Trail

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# CHAPTER 1: INTRODUCTION

## 1.1 Introduction

Temples in India play a vital role not only in religious practices but also in community development and social welfare through donations received from devotees. However, the existing fund management systems in many temples are often opaque, centralized, and vulnerable to mismanagement. This lack of transparency and accountability can erode public trust and discourage contributions from the community. Blockchain technology, with its decentralized, immutable, and transparent nature, presents a transformative opportunity for managing temple funds more securely and efficiently. By integrating blockchain into the donation and fund management process, every transaction can be transparently recorded, traced, and verified by stakeholders in real time. Furthermore, the use of smart contracts enables automated and rule-based fund distribution, reducing human intervention and the risk of corruption.

This paper proposes a Blockchain-Based Fund Management System specifically designed for Indian temples, aiming to bring transparency, security, and accountability to religious fund handling. The system ensures that donations are utilized for their intended purposes and provides an auditable trail of financial activities accessible to devotees and authorities alike.

## 1.2 Motivation


*Figure 1 - Features of Blockchain*

Indian temples receive vast amounts of donations in the form of cash, gold, and other assets from devotees across the globe. However, there is a lack of transparency and accountability in how these funds are managed, allocated, and utilized. Traditional systems are often prone to corruption, mismanagement, and delays in fund disbursement, which leads to loss of public trust. The motivation behind developing a Blockchain-based fund management system lies in leveraging the transparency, immutability, and decentralization features of blockchain technology. Such a system ensures real-time tracking of donations, transparent fund utilization, and builds trust among devotees by allowing public visibility of transactions. It also helps temple authorities make informed decisions using smart contracts and analytics. The centralized fund management systems used by Indian temples are vulnerable to data manipulation, unauthorized access, and inefficiencies in auditing. These limitations hinder transparency, especially in large temples that handle vast financial resources.

## 1.3 Scope

The scope of a blockchain-based fund management system for Indian temples encompasses a wide range of functionalities designed to enhance transparency, efficiency, and accountability in the handling of temple funds. With temples in India receiving vast amounts of donations in the form of cash and digital payments, there is a pressing need for a robust, tamper-proof, and automated financial system that minimizes human intervention and eliminates corruption. This system aims to integrate blockchain technology to create a decentralized ledger that securely records every transaction from donor contributions to fund allocation and expenditure. By doing so, the system ensures real-time visibility to stakeholders.
The primary scope includes secure collection and tracking of donations (cash, digital, or in-kind), ensuring that all financial inflows are recorded on the blockchain ledger. This allows devotees to verify how their donations are utilized. Different levels of access can be granted to temple authorities, auditors, government bodies, and even donors. Role-based permissions ensure security and accountability.

## 1.4 Basic Concept

The basic concept of a Blockchain-Based Fund Management System for Indian Temples revolves around using blockchain technology to ensure secure, transparent, and tamper-proof handling of donations and temple funds. Temples across India receive large amounts of money and resources from devotees, but traditional fund management systems often suffer from a lack of transparency, manual errors, and risks of misuse or corruption. Blockchain technology addresses these

challenges by recording every financial transaction on a decentralized ledger that is visible to all stakeholders but cannot be altered or deleted. In this system, each donation—whether made through cash, digital payment, or crypto wallet—is recorded on the blockchain. Smart contracts (self-executing code stored on the blockchain) are used to automate fund allocation for rituals, charity, maintenance, and temple development based on pre-defined rules. Donors can transparently track how their contributions are used, while temple authorities gain better control over fund usage. This system enhances transparency, accountability, and public trust, and supports India's vision for digital governance and financial inclusion.

### 1.4.1 What is MetaMask Wallet ?

MetaMask is a widely used non-custodial cryptocurrency wallet that allows users to securely manage their blockchain identities and perform crypto transactions. It is available as a browser extension and mobile application. In this project, MetaMask serves as the primary gateway for donors and temple administrators to interact with the blockchain. Through MetaMask, users can send, receive, and approve donation transactions using their digital wallets. The wallet also provides secure key management, meaning users retain full control over their funds without relying on third-party institutions. MetaMask is essential for authentication, transaction approval, and wallet connectivity with blockchain networks such as Polygon. By using MetaMask, the system ensures that only authorized users can initiate transactions, and it removes the need for traditional payment processors, thereby reducing operational costs and increasing transaction speed. Its user-friendly interface and strong security features make it a practical and efficient choice for blockchain-based donation systems.

### 1.4.2 What is Cryptocurrency (Crypto)?

Cryptocurrency, or crypto, refers to a digital or virtual currency that uses cryptographic techniques for secure financial transactions. Unlike traditional currency, crypto operates on a decentralized network based on blockchain technology. In the context of this project, cryptocurrency is used to represent the value being donated by the devotee to the temple's blockchain wallet. It allows for instant, traceable, and borderless transactions without relying on centralized banks. Popular cryptocurrencies include Bitcoin, Ethereum, and MATIC (used on the Polygon network). The use of crypto in temple fund management enhances transparency because all transactions are permanently recorded on the blockchain. Furthermore, it reduces transaction fees and processing delays commonly seen in traditional banking systems. The integration of crypto in this system

enables temples to participate in the growing digital economy while giving devotees the flexibility to donate from anywhere in the world, using secure and verifiable channels.

### 1.4.3 What is Polygon?

Polygon (previously known as Matic Network) is a Layer 2 scaling solution built on top of the Ethereum blockchain. It is designed to provide faster and more cost-effective blockchain transactions while retaining the security of the Ethereum mainnet. Polygon offers a robust and scalable infrastructure for decentralized applications (dApps) and smart contracts. In this fund management system, Polygon is used as the underlying blockchain platform due to its low gas fees, high speed, and compatibility with Ethereum-based tools such as MetaMask and Solidity. By leveraging Polygon, the system can handle a large number of donation transactions efficiently and cost-effectively. This is especially important for temples located in rural or low-budget areas where affordability and reliability are key. Polygon also supports seamless wallet integration, smart contract deployment, and real-time transaction updates. Its decentralized nature ensures that no single entity can alter or control donation records, thus maintaining integrity and trust in the system.

### 1.4.4 What is PolygonScan?

PolygonScan is a blockchain explorer tool specifically designed for the Polygon network. It allows users to search and view details about any transaction, wallet address, smart contract, or token on the Polygon blockchain. In this project, PolygonScan plays a critical role in ensuring donation transparency. After a donor makes a contribution through MetaMask, the transaction can be verified publicly on PolygonScan using the transaction ID or wallet address. This provides complete visibility into when, where, and how the funds were transferred. Temple authorities and devotees alike can monitor donation flows in real time, which enhances trust and accountability. Additionally, PolygonScan displays gas fees, transaction status, timestamps, and more, helping users ensure that their transactions were successfully processed. It is a powerful auditing tool that replaces the need for manual bookkeeping and provides proof of fund usage to all stakeholders.

### 1.4.5 What is MATIC Token?

MATIC is the native cryptocurrency of the Polygon blockchain. It is used to pay for transaction fees (known as gas fees) and also serves as a medium of exchange within the Polygon ecosystem. In this project, MATIC is the currency used to make donations, pay gas fees for smart contract execution, and facilitate wallet-to-wallet transfers between donors and temples. Since MATIC

operates on the Polygon network, it allows for quick, low-cost transactions, which is ideal for large volumes of small donations common in Indian temples. The token is also supported by major wallets like MetaMask and exchanges, making it easily accessible to users. Using MATIC instead of traditional fiat currency ensures that all donations are handled transparently on the blockchain and removes intermediaries from the transaction process. This adds efficiency, reduces fraud, and supports decentralized financial operations within the temple system.

### 1.4.6 What are Smart Contracts?

Smart contracts are self-executing programs stored on the blockchain that automatically carry out actions when predefined conditions are met. They eliminate the need for manual intervention or third-party approval. In this project, smart contracts are used to manage how temple funds are allocated and used. For example, a smart contract can be programmed to distribute donations across various purposes such as daily rituals, charity programs, and temple repairs. Once the donation is received, the smart contract automatically splits and transfers the funds according to the rules defined in the code. This prevents human errors, delays, and mismanagement of funds. Smart contracts also record every transaction they process on the blockchain, which can be audited at any time. Their tamper-proof nature ensures that once deployed, the rules cannot be changed, thereby offering a reliable and transparent method for fund distribution in temple management.

## 1.5 Objective

The Blockchain-Based Fund Management System for Indian Temples aims to bring transparency, security, and accountability to temple donations. By leveraging blockchain technology, it ensures all financial transactions are immutable, traceable, and tamper-proof. The system automates fund allocation using smart contracts and offers real-time visibility to donors. It modernizes traditional donation practices, prevents misuse of funds, and promotes digital governance in religious institutions across India. Ultimately, the objective is to modernize the existing fund management process, strengthen governance, and promote fair and efficient use of temple resources for both spiritual and social betterment.

- Ensure transparency in donation tracking.
- Prevent misuse and manual errors.
- Store tamper-proof transaction records.
- Automate fund allocation via smart contracts.

- Provide real-time visibility to donors.
- Support temple maintenance and services.
- Build trust and increase donor participation.
- Promote digital transformation in temple management.

## 1.6 Introduction to System Design

The proposed Temple Fund Management System modernizes the traditional donation process in Indian temples by implementing a secure, transparent, and decentralized platform using blockchain technology. With a focus on modularity and scalability, the system ensures end-to-end traceability of all donations, preserving data integrity and accessibility for devotees and temple administrators alike. Its architecture is divided into four key layers: the User Interface (React.js)**,** Backend Server (Node.js/Express.js)**,** Smart Contract Layer (Ethereum)**, and** Database (MongoDB)**.** The frontend enables users to register, log in, view temple details, track donation history, and make ETH donations via MetaMask**,** with JWT-based authentication ensuring secure access. When a donation is made, Ethereum smart contracts manage the transaction by transferring ETH to verified temple wallets while logging all essential data (e.g., sender, amount, timestamp) on the blockchain.

The backend server acts as the communication bridge between the frontend and blockchain, handling request validation, role management, and error detection. It stores important metadata related to users, temples, donations, and transaction history in MongoDB. Additionally, the system includes built-in mechanisms to detect failed transactions and maintain consistency between blockchain records and the backend database. Communication between layers is achieved through RESTful APIs and Web3 calls**,** ensuring smooth interaction across components and enabling future scalability. This robust system architecture not only supports efficient temple fund management but also promotes transparency, accountability, and digital governance in India’s religious ecosystem.

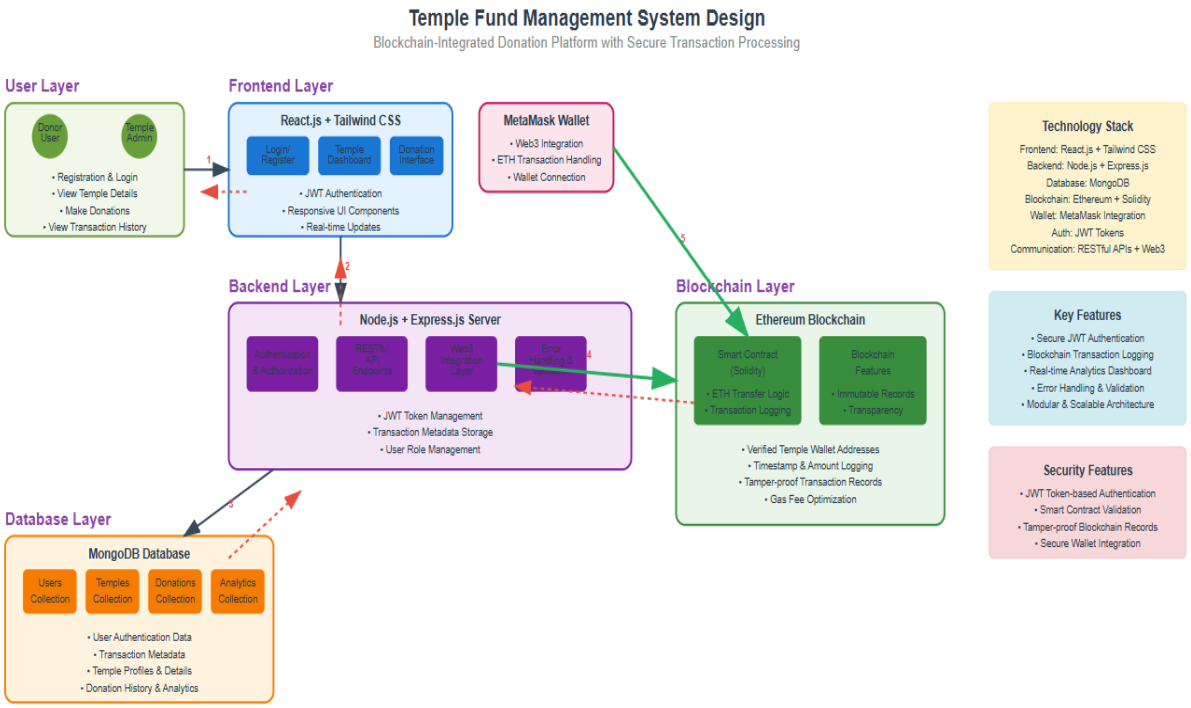



*Figure 2 - Temple Fund Management System Design*

## 1.7 Software/ Hardware Requirement

To develop the Blockchain-Based Fund Management System for Indian Temples, both software and hardware resources are essential for smooth development, deployment, and usage. The software stack includes Next.js for frontend framework, styled with Tailwind CSS and developed using JavaScript. For backend operations, Node.js and Express.js are used to build RESTful APIs that handle authentication, data storage, and blockchain interactions. The application leverages MongoDB for storing user, temple, and donation data, while Cloudinary is used for managing temple-related images.

On the blockchain side, Smart Contracts are developed using Solidity, integrated via Web3 and MetaMask for secure Ethereum-based transactions. JWT (JSON Web Token) is implemented for user authentication and session management. WebSockets are utilized for real-time updates such as live donation tracking. The system architecture also involves multiple APIs to connect frontend and backend components efficiently.

From a hardware perspective, the system requires a machine with at least an Intel i5 processor or equivalent, 8GB RAM, and a stable internet connection for both development and testing.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 Overview

This chapter provides a comprehensive overview of the fundamental concepts, technologies, and systems that form the foundation of a blockchain-based fund management solution for religious institutions. It explores the existing literature on traditional fund management practices, highlights the limitations of current systems, and identifies the potential of blockchain to address these issues. The chapter also examines key blockchain components such as decentralized ledgers, consensus mechanisms, smart contracts, and their real-world applications in finance and governance. Additionally, the overview sets the stage for understanding how these technologies can be tailored to the unique operational and ethical requirements of temple administration and donation management. By reviewing prior research and related technological developments, this chapter lays the groundwork for designing a secure, transparent, and efficient blockchain-based system to manage temple funds.

## 2.2 Literature Survey

The application of blockchain technology in fund management, especially in religious institutions, is a relatively new field but has gained considerable attention due to its potential to address issues related to transparency, accountability, and trust. Blockchain, with its decentralized nature and immutability, offers significant advantages over traditional centralized financial systems. In the context of fund management, Tapscott and Tapscott highlight the role of blockchain in creating secure and transparent financial systems that can remove intermediaries and reduce transaction costs [1]. Similarly, Zohar emphasizes the efficiency of blockchain in decentralized ecosystems, where its immutable ledger ensures the integrity of transactions and prevents fraudulent activities [2]. Although there is limited research directly focused on religious fund management, the principles of blockchain adoption in charitable organizations provide valuable insights. Studies such as those by Gloor et al. have shown how blockchain can increase transparency and reduce the administrative costs associated with managing donations [3]. By providing a publicly accessible and tamper-proof transaction history, blockchain can help build trust with donors and ensure that funds are being used for their intended purposes. This is particularly important in religious institutions where donors expect their contributions to be managed ethically and effectively.

Furthermore, smart contracts self-executing contracts with the terms directly written into code—can automate the disbursement of funds based on predefined conditions, thus minimizing human error and corruption [4][8]. Platforms like Ethereum and Hyperledger can be used to build decentralized applications (dApps) tailored for managing religious donations, event funding, and community projects. Real-world initiatives, such as the use of blockchain by Muslim charity organizations during Ramadan for Zakat (Islamic almsgiving), demonstrate the feasibility and growing acceptance of this technology in religious contexts [7]. In India, where temples receive substantial public donations, blockchain can serve as a transformative tool to monitor fund inflow and outflow in real-time, publish financial reports transparently, and comply with government regulations more effectively [6]. Additionally, integrating blockchain with mobile platforms can make donation systems more accessible and user-friendly, especially for rural or less digitally literate communities [5].

| Reference | Authors | Source | Type of Source | Findings |
|---|---|---|---|---|
| **[1]** | Tapscott & Tapscott | IEEE | Research Paper | Blockchain increases transparency, removes intermediaries, and reduces costs. |
| **[2]** | Zohar | IEEE | Research Paper | Explains blockchain fundamentals and emphasizes decentralization and security. |
| **[3]** | Gloor et al. | Elsevier | Peer-reviewed Journal | Blockchain enhances transparency and trust in donation-based systems. |
| **[4]** | Buterin | Etherem Whitepa -per | Technical Whitepaper | Smart contracts automate transactions and enable decentralized applications. |
| **[5]** | Naayanan et al. | Princetn Press | Academic Book | Explores challenges in blockchain technology, including adoption barriers. |
| **[6]** | Chohan | IEEE | Review | Discusses policy and regulatory limitations for |

| | | | | |
|---|---|---|---|---|
| | | | | blockchain in public systems. |
| **[7]** | WeTrust, Giveth | Official Project Website | Web Sources | Real-world platforms using blockchain for transparent and accountable giving. |
| **[8]** | Christidis & Devetsikiotis | IEEE Access | IEEE Journal Article | Highlights smart contracts' role in automating trust and secure workflows. |

*Table 1 - References of Literature Review*

# CHAPTER 3: METHODOLOGY

## 3.1 Proposed Methodology

The proposed system introduces a secure, transparent, and decentralized platform for managing temple donations by integrating blockchain technology with a traditional web-based interface. This methodology focuses on replacing outdated, opaque fund-handling methods with a digital solution that ensures transparency, traceability, and real-time accountability of donation flows within religious institutions. At the core of the system lies a user-friendly website that acts as the main interaction point for users, administrators, and temple authorities. Users can register, log in, and access temple-related details, including donation history and expenditure records, through an intuitive interface. Once registered, users are authenticated via JSON Web Tokens (JWT), allowing secure sessions and access control throughout the platform.

The donation mechanism is implemented through an Ethereum-based smart contract, where users donate ETH directly to a temple's designated wallet. For this purpose, the system integrates MetaMask as the digital wallet gateway, ensuring secure and authenticated transactions. When a user initiates a donation, the MetaMask extension prompts them to confirm the transaction. Once confirmed, the smart contract handles the fund transfer securely and stores critical transaction details like amount, gas fee, sender address, and purpose on the blockchain.

In addition to the blockchain layer, the system also includes an off-chain backend developed using Node.js and Express.js. This backend is responsible for recording transaction metadata, handling authentication, and interacting with the MongoDB database. The database stores essential information such as user profiles, temple details, transaction history, and role-based access for members, temple authorities, and admins. This off-chain data storage enables comprehensive analytics, real-time dashboards, and receipt generation functionalities. The entire system is architected in a modular and scalable manner, ensuring seamless communication between the frontend, backend, smart contract, and wallet layer.

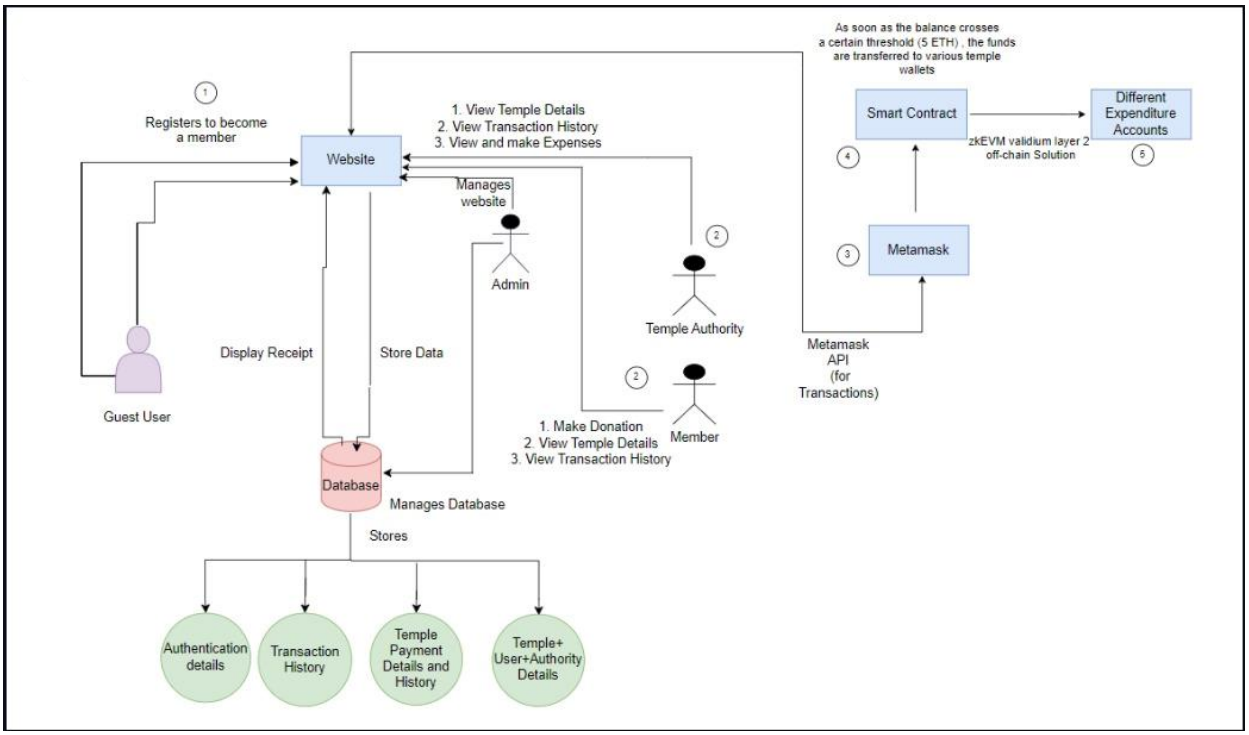



*Figure 3.1 - System Architecture Design*

The architecture diagram provided illustrates the flow of data and control across all components of the system, from user interaction to blockchain execution and database recording. It demonstrates how each layer contributes to the secure, transparent, and decentralized handling of donations, providing a holistic solution to the traditional issues of mismanagement and lack of trust in temple fund systems. The methodology is designed to build donor confidence and empower temple authorities with accurate and real-time financial insights through the use of blockchain's immutable and transparent infrastructure.

## 3.2 ER Diagram

The ER (Entity-Relationship) diagram represents the structural design of the temple fund management system built on blockchain technology. It consists of four main entities:

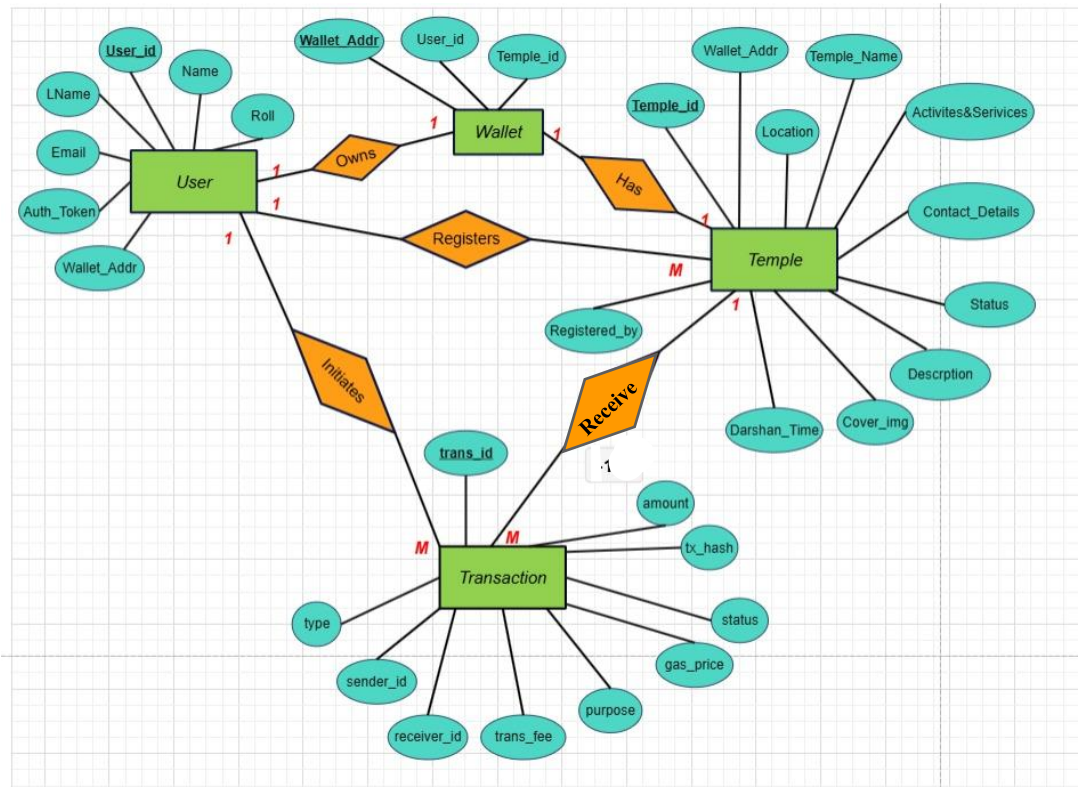



*Figure 3.2 - ER Diagram*

1. **User**: Represents individuals interacting with the system. Each user has attributes like User_id, Name, Email, Wallet_Addr, and Auth_Token. Users can **own** wallets, **initiate** transactions, and **register** temples.

2. **Wallet**: Represents the digital wallet linked to users and temples. Each wallet is uniquely associated with a Wallet_Addr, User_id, and Temple_id.

3. **Temple**: Represents temple institutions on the platform. It includes attributes such as Temple_id, Temple_Name, Location, Darshan_Time, and Contact_Details. Temples are **registered** by users and **have** wallets linked to them.

4. **Transaction**: Captures all donation and withdrawal activities. Each transaction has attributes like trans_id, amount, tx_hash, type, status, and gas_price. Transactions are **initiated** by users and may involve temples or other users as receivers.

The relationships between entities are marked with cardinalities like 1:1, 1:M, and M:M, denoting the nature of their connections. This ER model ensures a well-structured and secure data flow within the blockchain-based donation platform.

## 3.3 Flowchart

The flowchart presented in the figure illustrates the complete operational workflow of the proposed Temple Fund Management System based on blockchain technology. It outlines the sequential processes and interactions among the three major stakeholders of the system: Super Admin, Temple Administrator, and End User.

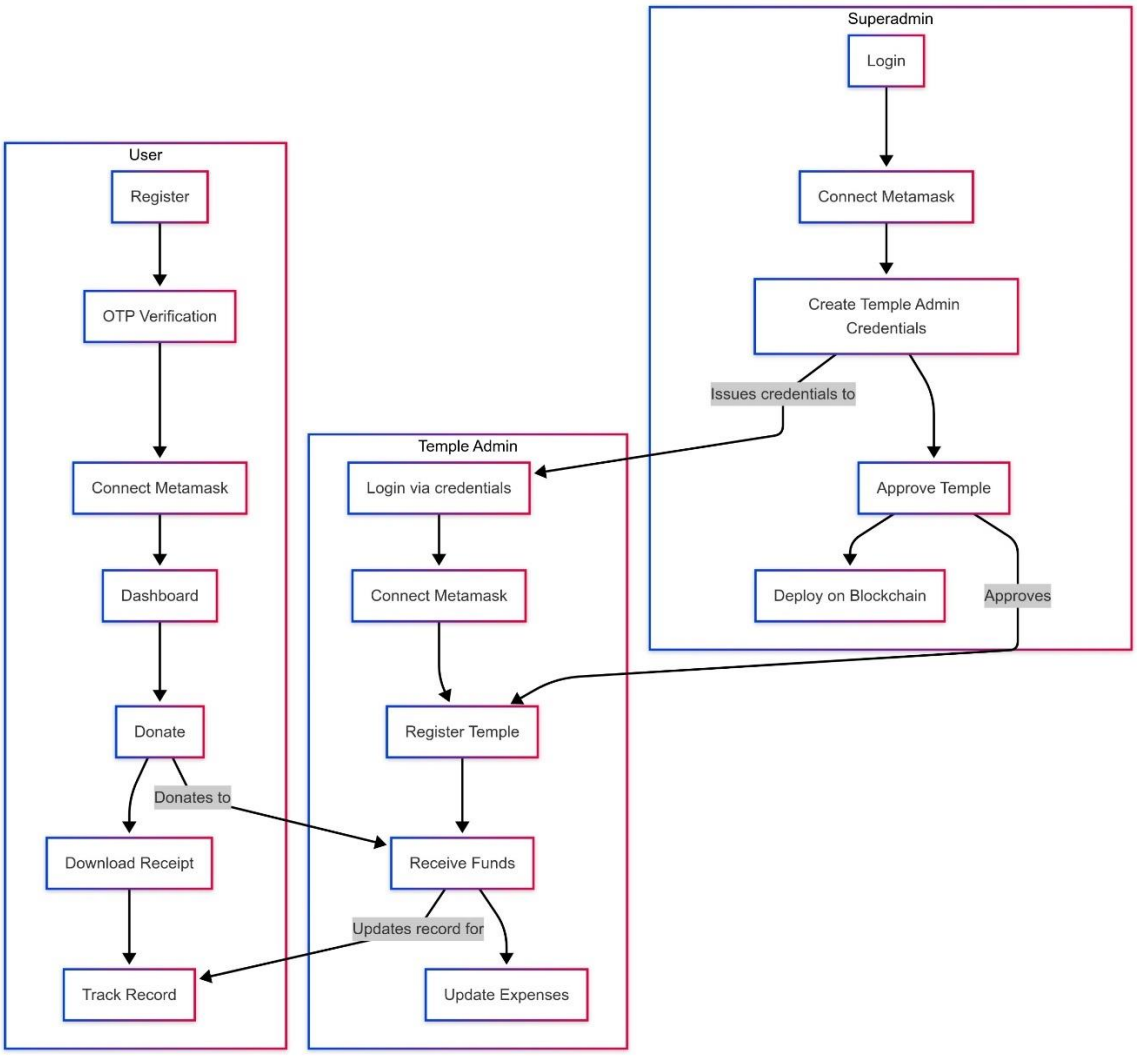



*Figure 3.3 - Flowchart*

The process begins with the Super Admin, who is responsible for onboarding temples onto the platform. After logging in and connecting a MetaMask wallet, the Super Admin creates login credentials for temple administrators and shares them via email. Upon receiving the credentials, the Temple Admin logs in, connects their own MetaMask wallet, and submits the required temple registration details. Once the temple registration is submitted, a request is sent back to the Super Admin for verification. The Super Admin then reviews the request, approves the registration, and deploys the temple details onto the blockchain network, officially activating the temple on the platform.

Once the temple is active, the Temple Admin can manage various activities, such as receiving donations from users, adding temple expenditure records, and publishing temple details for general public viewing. All transactions and expenses are recorded and displayed transparently on the platform to enhance user trust and accountability.

Simultaneously, Users can register on the platform, complete OTP verification, and log in to their personal dashboard. After connecting their MetaMask wallet, users are able to view temple details, make donations securely, track donation history, and download digital receipts for their records. Each transaction contributes to building a transparent ecosystem for charitable donations in religious institutions. The flowchart highlights the integration of blockchain, wallet-based authentication (MetaMask), and decentralized data management to ensure transparency, security, and efficiency in temple fund handling.

# CHAPTER 4: IMPLEMENTATION

## 4.1 User Interfaces

### 4.1.1 Home Page

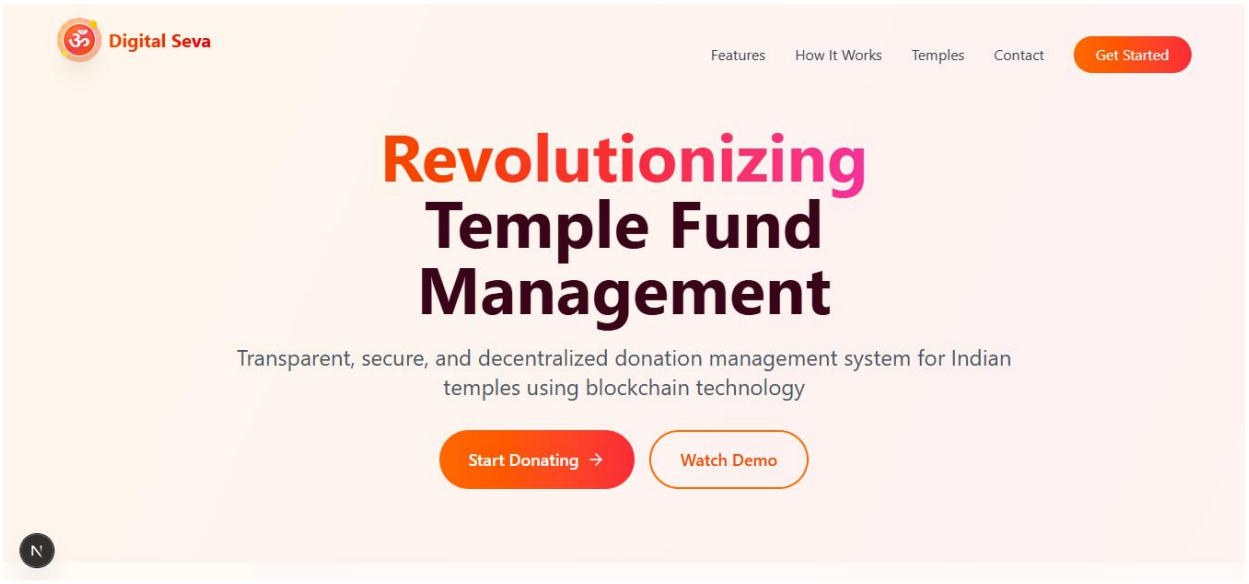



*Figure 4.1 - Home Page*

The Home Page of the Blockchain-Based Fund Management System for Indian Temples is designed to offer users an intuitive and seamless browsing experience. Built using Next.js and styled with Tailwind CSS, the homepage is fully responsive and user-friendly. It features a structured navigation menu with working buttons that guide users through the major sections of the platform.

The "Features" section provides an overview of the key capabilities of the system, such as secure blockchain integration, transparent fund tracking, and real-time donation updates. The "How It Works" section explains the operational flow from user registration and wallet connection via MetaMask to making verified donations using smart contracts. The "Temples" button directs users to a dynamic listing of temples, showcasing each temple's profile, location, and image, all of which are fetched securely from the backend and displayed attractively.

The "Contact" section contains a user-friendly contact form, allowing visitors to send inquiries or feedback directly to the system administrators. Lastly, the "Get Started" button serves as a call-to-action, encouraging users to create an account or log in and begin using the platform's full set of features.

### 4.1.2 User Login Page

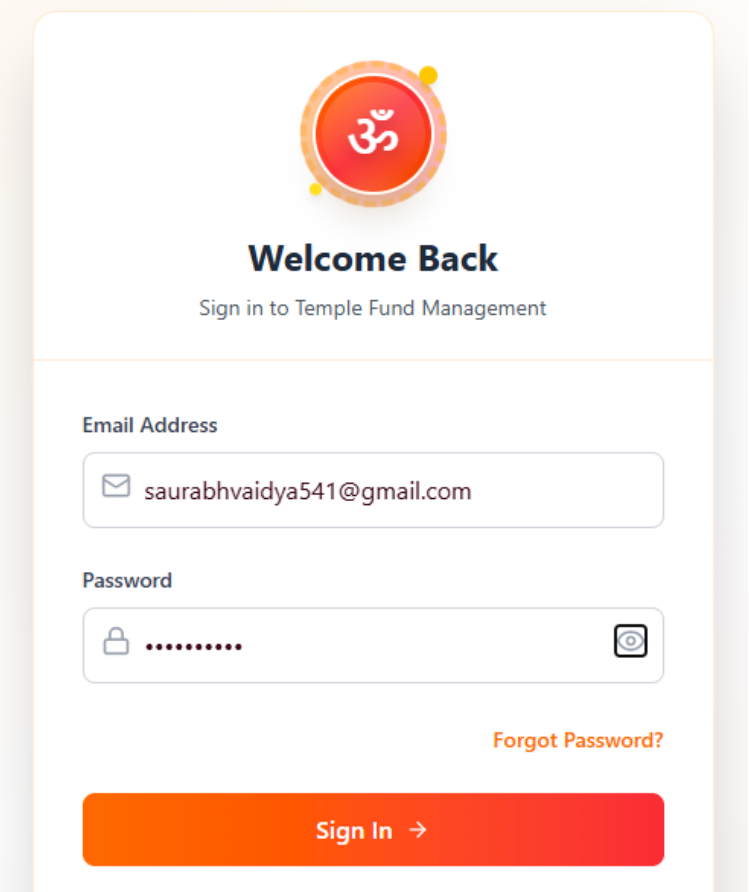



*Figure 4.2 - User Login Page*

### 4.1.3 User Dashboard Page

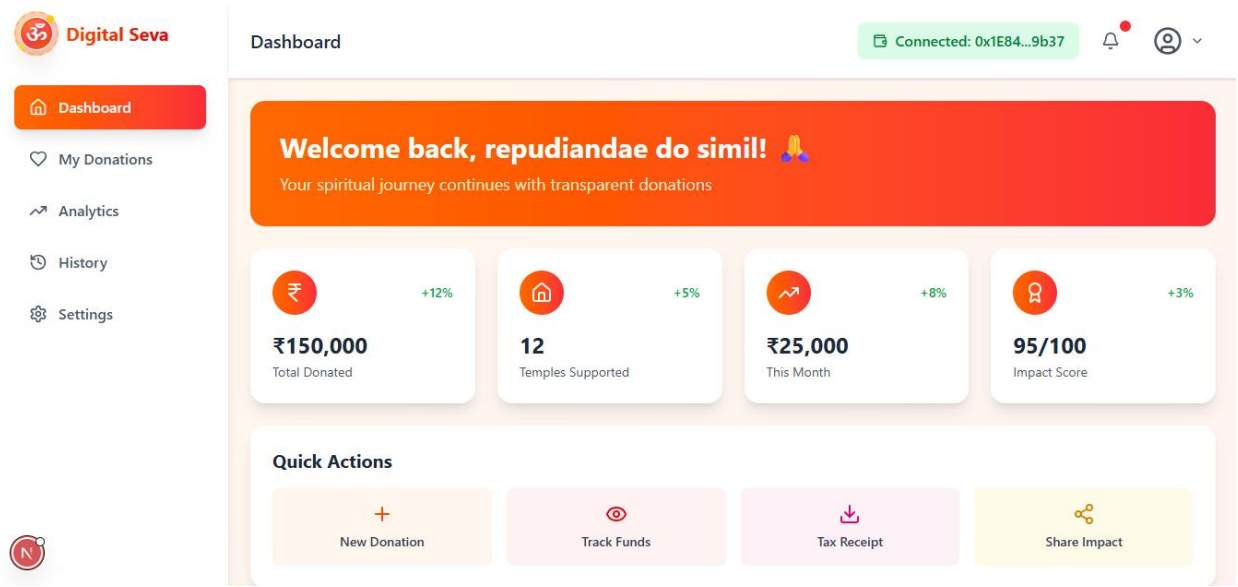



*Figure 4.3 - User Dashboard Page*

### 4.1.4 Donation Page

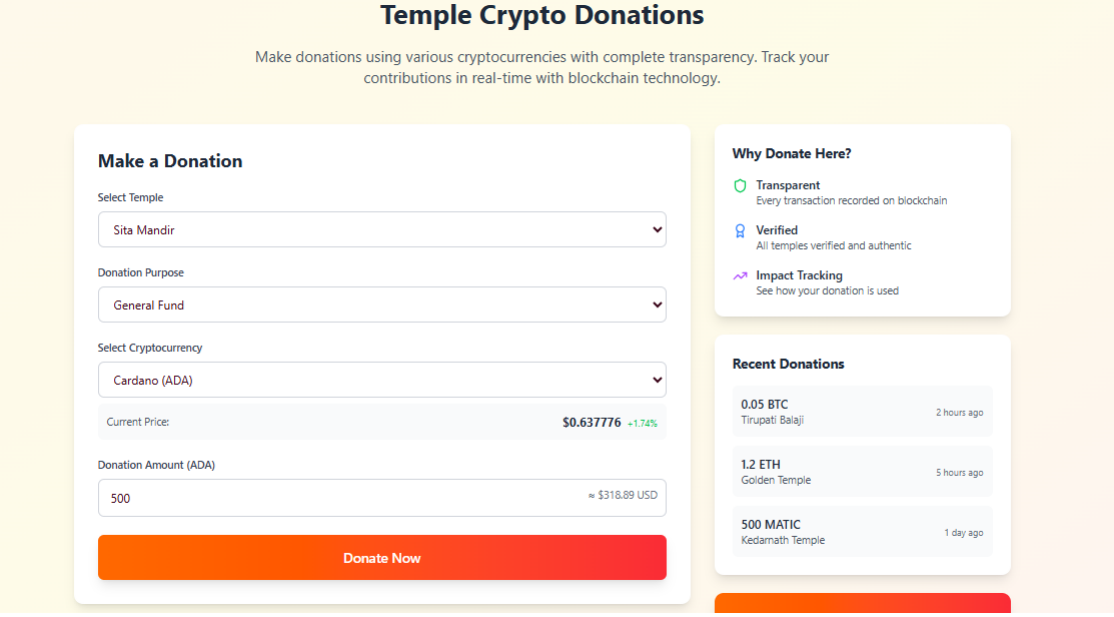



*Figure 4.4 - Donation Page*

The Donation Page is a key component of the Blockchain-Based Fund Management System, allowing users to securely contribute to temples digitally. Built with Next.js and Tailwind CSS, it offers a responsive and user-friendly interface. Users can select a temple, specify the donation purpose (e.g., rituals, maintenance, charity), and choose a cryptocurrency typically Bitcoin with real-time price display for transparency. After entering the amount and submitting, a smart contract processes the donation, and a transaction hash is generated. The system then updates the temple's records on the blockchain, ensuring transparency, accountability, and a seamless donation experience.

### 4.1.5 Transaction Details Page

After the successful completion of any transaction and it gets updated into the transactions log page we can see the detailed overview of any transaction just by clicking at the hash of that transaction. After that transactions details page shows up which consists of the transactions hash, block number, sender address, receiver address, the transfer amount, gas price, gas price is the price which are charged by the miner to validate the transaction who validates the transaction in the form of (PoW) Proof of Work.

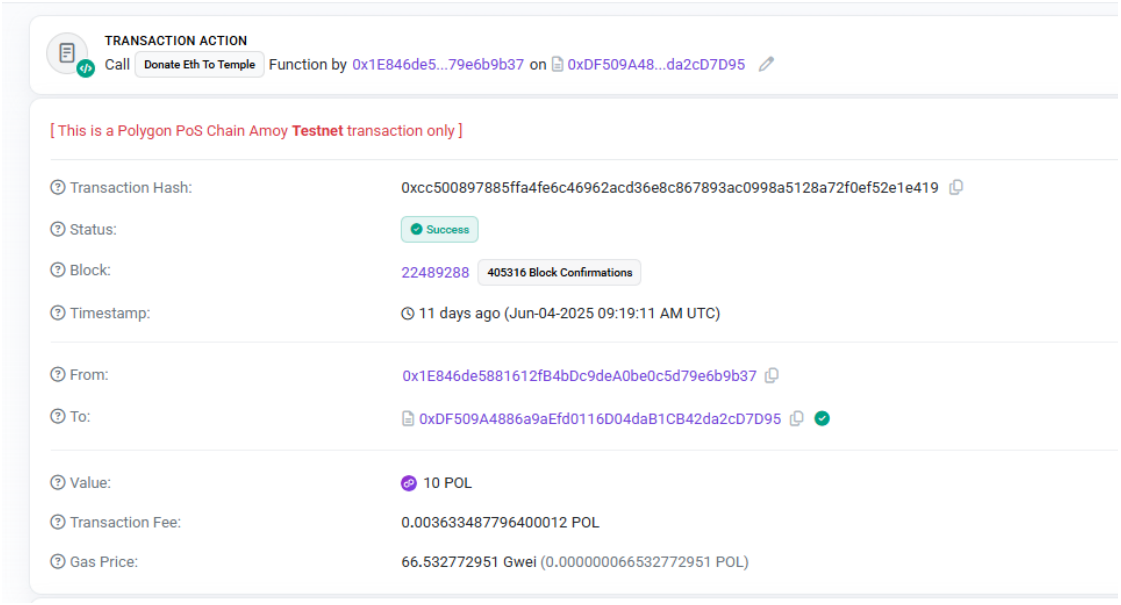



*Figure 4.5 - Transaction Detail Page*

### 4.1.6 Donation History

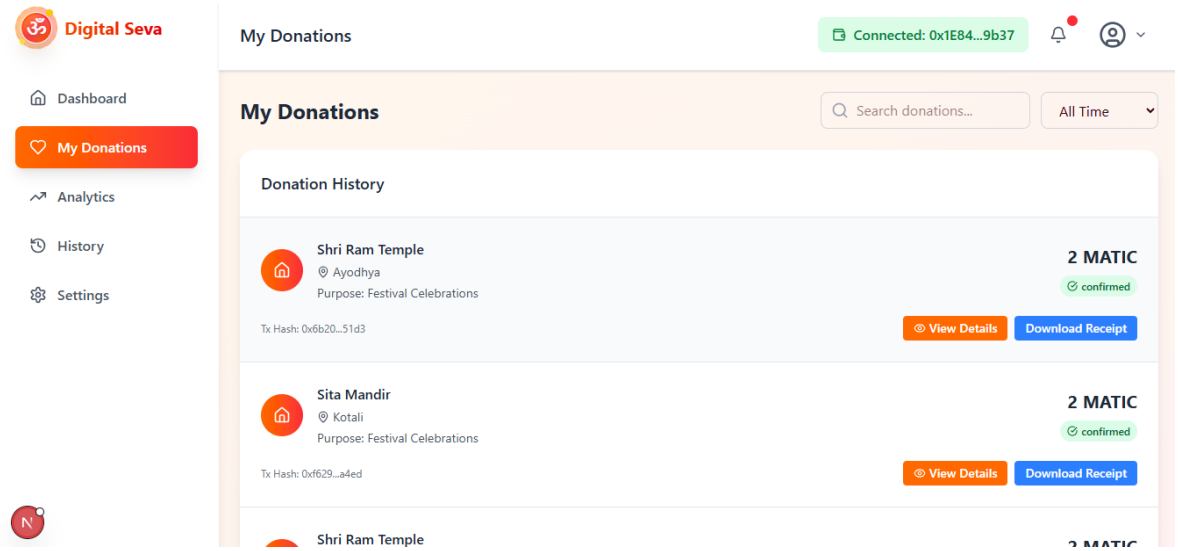



*Figure 4.6 - Donation History*

### 4.1.7 Temple Admin Dashboard

The Temple Admin Dashboard is a centralized panel designed for temple authorities to manage operations efficiently. It allows admins to view and track donations, manage temple details, update images and information, monitor user interactions, and oversee special ceremonies or events. Built with a user-friendly interface, it ensures secure access and real-time updates. This dashboard empowers temple admins to maintain transparency, ensure accountability, and streamline fund management within the blockchain-based system.

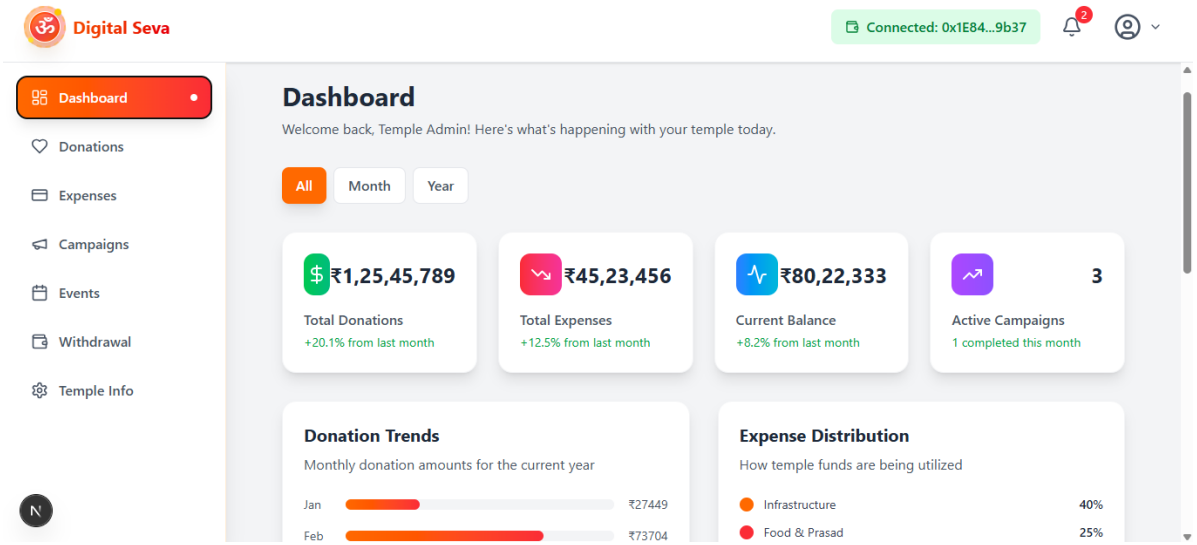



*Figure 4.7 - Temple Admin Dashboard*

### 4.1.8 Temple Info Page

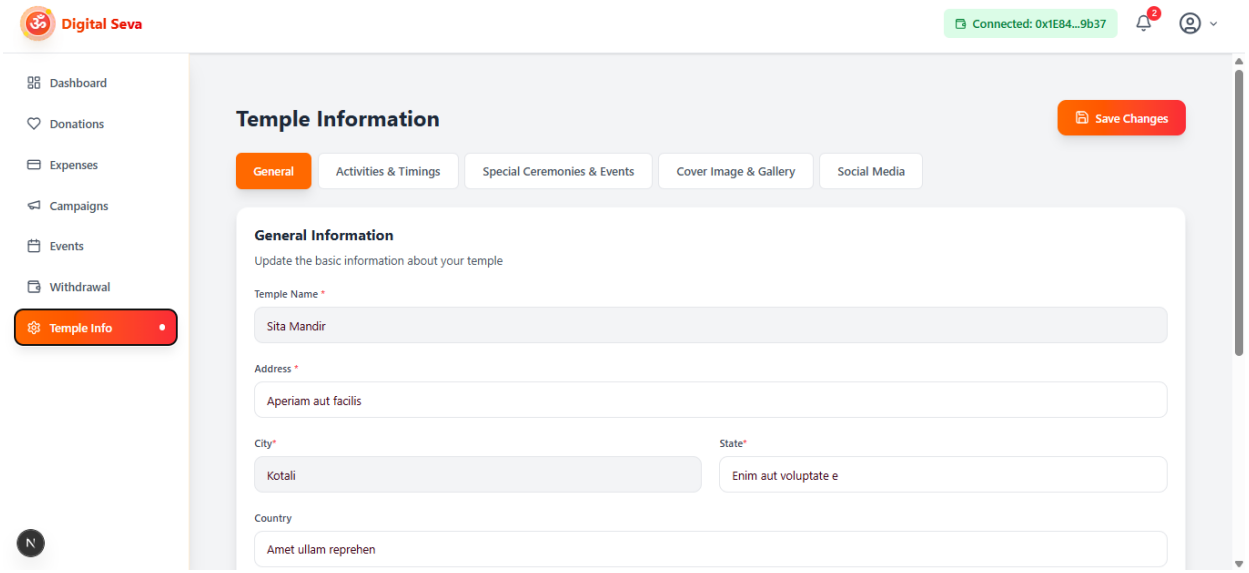



*Figure 4.8 - Temple Info Page*

### 4.1.9 Withdrawal Page

The Withdrawal Page allows temple administrators to securely manage and withdraw cryptocurrency funds donated by users. Admins can select the desired cryptocurrency (e.g., BTC, POL, USDT), enter the amount, specify the purpose of withdrawal, and process the transaction. The interface provides a real-time overview of the temple's crypto balances and displays recent

withdrawal activities, including status and transaction history. This ensures full transparency and control over temple funds.

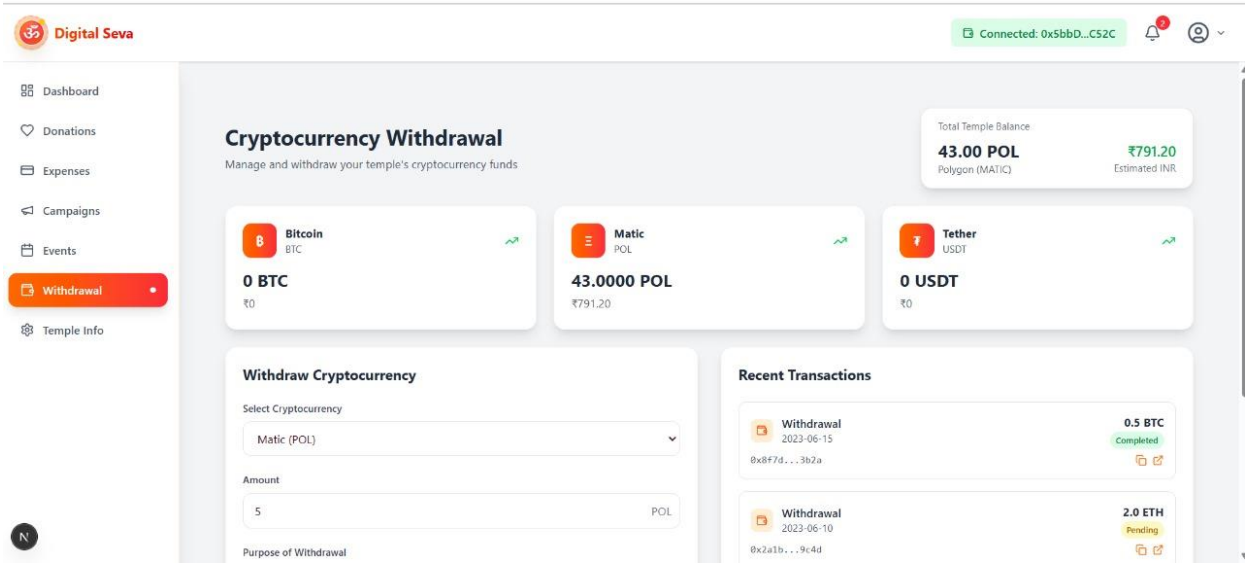



*Figure 4.9 - Withdrawal Page*

### 4.1.10 Donations Report

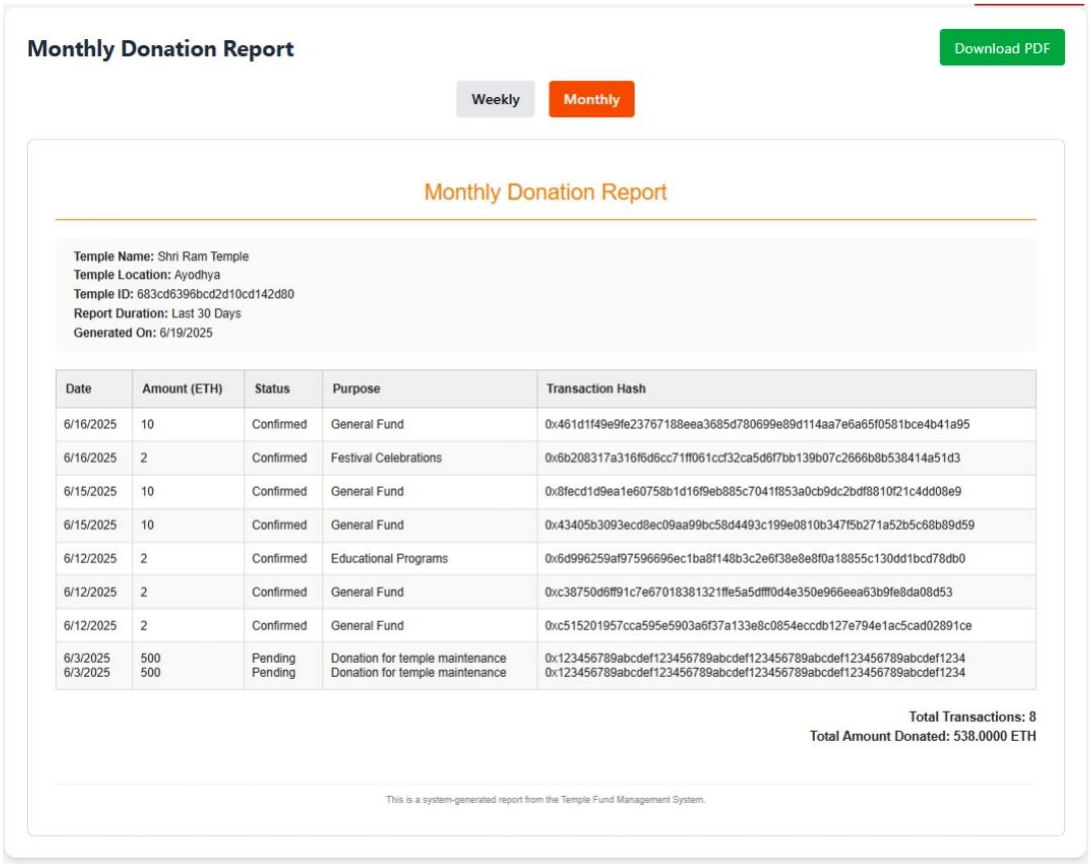



*Figure 4.10 – Monthly Donation Report*

The Monthly Donation Report provides a comprehensive summary of all donations received by a temple over the past 30 days. It includes key information such as the temple's unique ID, date-wise donations, amount contributed (in cryptocurrency like ETH), transaction status (e.g., confirmed or pending), purpose of the donation (such as General Fund, Educational Programs, or Festival Celebrations), and unique blockchain transaction hashes. These hashes ensure every transaction is securely recorded, immutable, and verifiable. The report may include both successful and pending transactions, giving administrators full visibility into fund flow. By generating reports monthly, the system enables long-term financial tracking, making it easier to audit and manage temple funds. These reports promote transparency and accountability while allowing donors and temple authorities to understand how contributions are being received and categorized. The monthly format complements weekly reports, offering a broader financial overview and supporting better decision-making for fund allocation.

### 4.1.11 Super Admin Dashboard

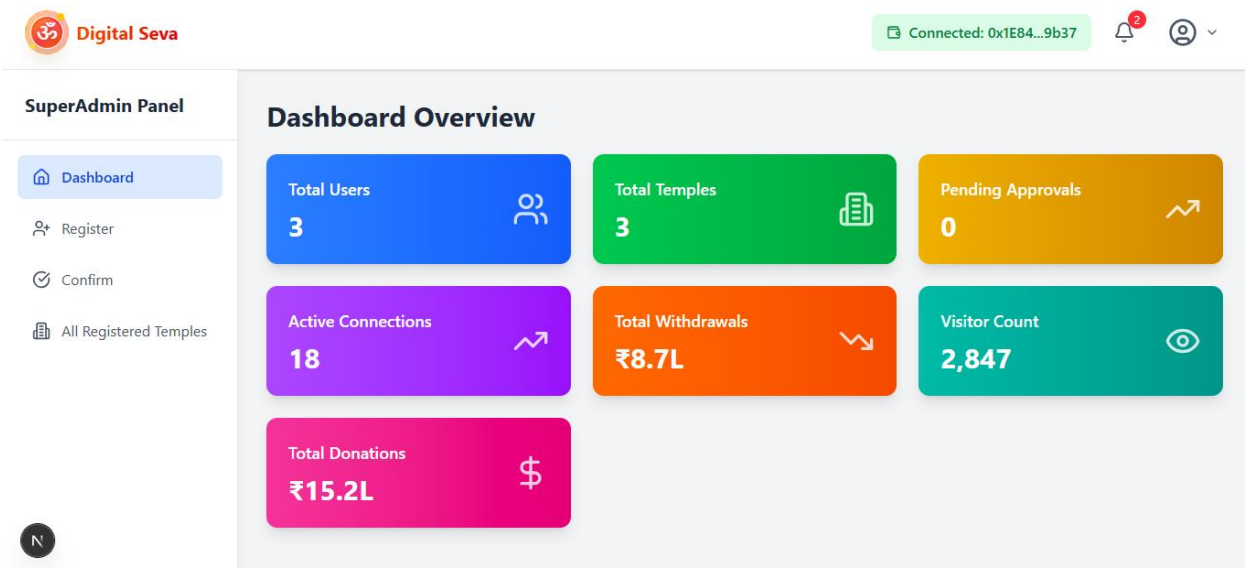



*Figure 4.11 – Super Admin Dashboard*

### 4.1.12 Temple Registration Page

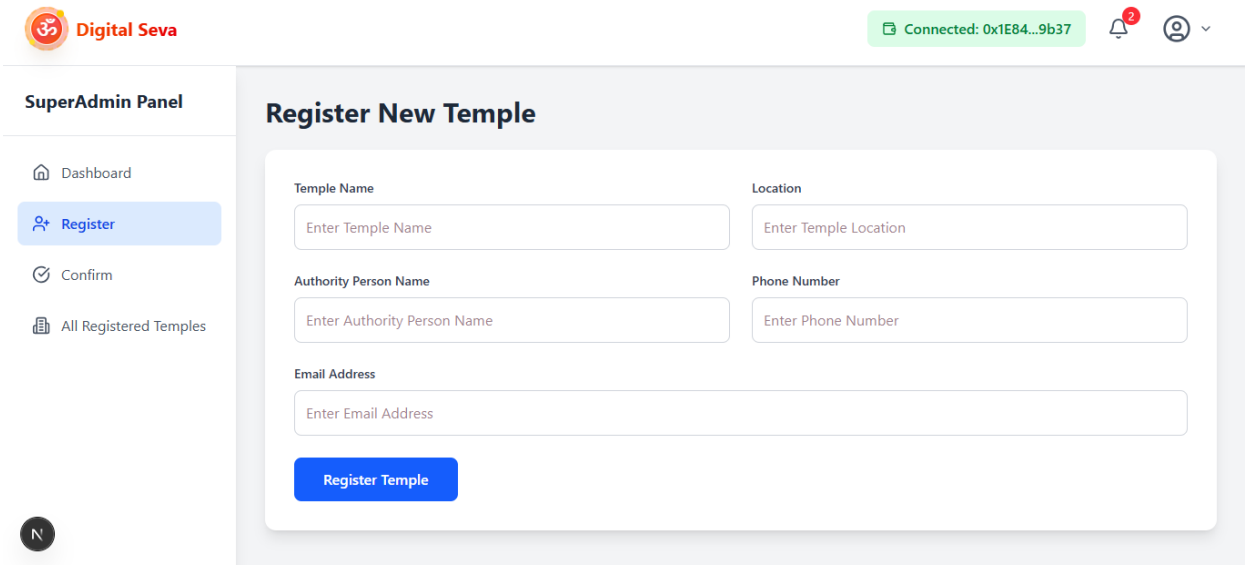



*Figure 4.12 - Temple Registration Page*

The Temple Register page in the SuperAdmin Panel allows administrators to register new temples into the blockchain system. It includes fields for temple name, location, authority person's name, phone number, and email address. Once submitted, the temple is securely added to the system and becomes eligible to receive donations. The interface is user-friendly and ensures proper data entry for smooth onboarding.

### 4.1.12 Registered Temple Page

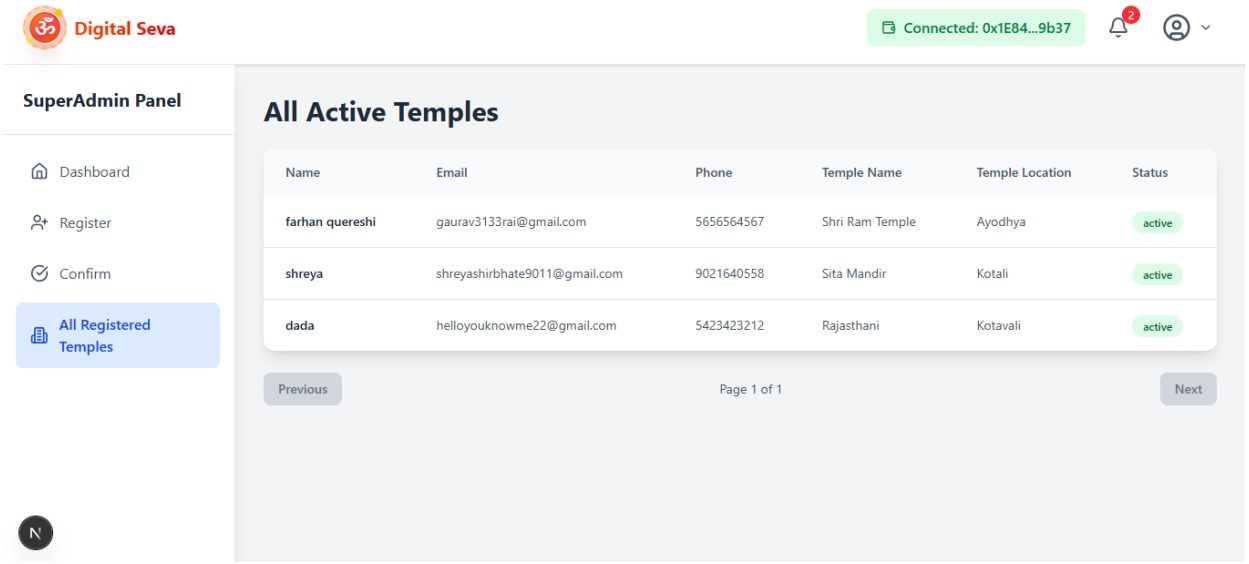



*Figure 4.12 - Registered Temple Page*

## 4.2 Backend

### 4.2.1 bcryptjs

```
import bcrypt from 'bcryptjs';

// Function to hash password
const hashPassword = async (password) => {
  const salt = await bcrypt.genSalt(10); // Generate salt
  const hashedPassword = await bcrypt.hash(password, salt); // Hash password
  return hashedPassword;
};
// Function to compare password
const comparePassword = async (password, hashedPassword) => {
  return await bcrypt.compare(password, hashedPassword); // Compare password with hashed version
};
```

bcryptjs is used to hash passwords before storing them in the database, ensuring that passwords are not stored in plaintext. Hashing is essential for security, as it makes it nearly impossible to retrieve the original password from the hash.

### 4.2.2 cloudinary

```
import cloudinary from 'cloudinary';
import dotenv from 'dotenv';
dotenv.config();
cloudinary.config({
  cloud_name: process.env.CLOUD_NAME,
  api_key: process.env.CLOUD_API_KEY,
  api_secret: process.env.CLOUD_API_SECRET,
});
const uploadImage = async (imagePath) => {
  try {
    const result = await cloudinary.v2.uploader.upload(imagePath, {
      folder: 'user_images', // Optional: Organize images in folders
    });
    return result.secure_url;
  } catch (error) {
    console.error('Error uploading image:', error);
    return null;
  }
};
```

Cloudinary is used for storing images in the cloud, which are then linked to the user's profile or other components. The image URL is stored in the MongoDB database for later retrieval.

**4.2.3 cookie-parser**

```
import cookieParser from 'cookie-parser';

import express from 'express';

const app = express();

app.use(cookieParser());

app.get('/set-cookie', (req, res) => {

 res.cookie('userSession', 'session12345', { httpOnly: true }).send('Cookie set successfully!');

});
```

Cookie-parser is used for parsing cookies in HTTP requests, enabling session management. This is critical for tracking users between requests and managing authentication

**4.2.4 Cors**

```
import cors from 'cors';

app.use(cors({
   origin: process.env.CORS_ORIGIN,
   credentials: true,
   methods: ["GET", "POST", "PUT", "DELETE", "OPTIONS"],
   allowedHeaders: ["Content-Type", "Authorization"],
}))
```

Cors is used to enable Cross-Origin Resource Sharing, which allows the frontend (running on a different domain or port) to access the backend APIs. This is essential for communication between the frontend and backend

**4.2.5 Crypto**

```
import crypto from 'crypto';
const generateRandomCode = () => {
return crypto.randomBytes(20).toString('hex');
```

```
};
```

Crypto is a built-in module in Node.js, used to generate secure random strings or numbers. This is useful for creating tokens or random codes for user verification, password reset, etc.

### 4.2.6 jsonwebtoken

jsonwebtoken (JWT) is used to issue and verify tokens for user authentication and authorization. After a successful login, a JWT is generated and sent to the client, which will send it back in future requests for authentication.

```
import jwt from 'jsonwebtoken';
const generateAuthToken = (userId) => {
  const token = jwt.sign({ userId }, process.env.JWT_SECRET, { expiresIn: '1h' });
  return token;
};
const verifyAuthToken = (token) => {
  try {
    const decoded = jwt.verify(token, process.env.JWT_SECRET); // Verify token
    return decoded;
  } catch (error) {
    return null;
  }
};
```

## 4.3 Blockchain

### 4.3.1 Contract Lock

```
contract Lock {
    uint public unlockTime;
    address payable public owner;
    event Withdrawal(uint amount, uint when);
    constructor(uint _unlockTime) payable {
        require(
            block.timestamp < _unlockTime,
            "Unlock time should be in the future"
        );
        unlockTime = _unlockTime;
        owner = payable(msg.sender);
    }
    function withdraw() public {
        require(block.timestamp >= unlockTime, "You can't withdraw yet");
        require(msg.sender == owner, "You aren't the owner");
        emit Withdrawal(address(this).balance, block.timestamp);
        owner.transfer(address(this).balance);
    }
}
```

The Lock smart contract in Solidity is designed to securely hold Ether until a predefined unlock time. It is initialized with a future timestamp and allows only the contract owner (the address that deployed it) to withdraw the funds once the unlock time has passed. The contract ensures safety through two key checks: the current time must be greater than or equal to the unlock time, and the caller must be the contract owner. Upon a successful withdrawal, an event is emitted to log the amount and time of the transaction. This enhances fund security and transparency on the blockchain.

### 4.3.2 Smart Contracts

```
function donateEthToTemple(address temple) external payable {
        require(msg.value > 0, "Donation amount must be greater than zero");
        require(templeRegistry.isRegistered(temple), "Temple is not registered");
        ethFunds[temple] += msg.value;
        emit EthDonationReceived(msg.sender, temple, msg.value);
    }

    function withdrawEth(uint256 amount) external {
        require(templeRegistry.isRegistered(msg.sender), "Only registered temple can withdraw");
        require(amount > 0, "Withdraw amount must be greater than zero");
        require(ethFunds[msg.sender] >= amount, "Insufficient ETH funds");
        ethFunds[msg.sender] -= amount;
        payable(msg.sender).transfer(amount);
        emit EthFundsWithdrawn(msg.sender, amount);
    }

    function getTempleEthBalance(address temple) external view returns (uint256) {
        return ethFunds[temple];
    }
```

This smart contract code handles ETH donations and withdrawals for registered temples. The **donateEthToTemple** function allows users to send ETH to a temple, ensuring the donation amount is greater than zero and the temple is registered. It updates the temple's ETH balance and emits an event for transparency. The **withdrawEth** function enables only registered temples to withdraw ETH from their balance, checking for sufficient funds and valid amounts before transferring ETH. The **getTempleEthBalance** function lets anyone view a temple's ETH balance. This setup ensures secure, accountable, and transparent ETH fund management for temples.

### 4.3.3 Temple Register on Blockchain

```
function registerTemple(address _templeWallet) external onlySuperAdmin {
    require(!registeredTemples[_templeWallet], "Already registered");
    registeredTemples[_templeWallet] = true;
    templeList.push(_templeWallet);
    emit TempleRegistered(_templeWallet);
  }
```

This function registerTemple allows only the SuperAdmin to register a new temple using its wallet address. It first checks whether the temple is already registered by verifying the registeredTemples mapping. If not registered, it marks the wallet address as registered, adds it to the templeList array, and emits a TempleRegistered event. This ensures that only authorized temples can participate in donation and withdrawal operations within the blockchain-based fund management system.

# CHAPTER 5: RESULT AND DISCUSSION

## 5.1 Result and Discussion

The proposed blockchain-based Temple Fund Management System was successfully developed and deployed, offering a secure, transparent, and decentralized solution for managing donations in religious institutions. Throughout the testing phase, the system facilitated multiple Ether (ETH) transactions using MetaMask integration and smart contracts, with an average transaction confirmation time of less than 2 seconds. This real-time performance illustrates the capability of blockchain to outperform traditional financial systems in terms of both speed and reliability.

The involvement of multiple stakeholders Super Admin, Temple Admin, and Users was effectively managed through role-based authentication and smart contract logic. Super Admins could register temples and issue credentials, while Temple Admins were able to receive donations, add expense details, and publish temple information for public visibility. General users could connect their MetaMask wallets, donate funds securely, and view detailed transaction histories, enhancing donor confidence.

One of the most significant outcomes was the high level of transparency achieved. Every transaction whether a donation or an expense was immutably recorded on the blockchain, ensuring tamper-proof audit trails. Users could track how their contributions were being utilized, addressing one of the most pressing concerns in religious fund management: accountability.

Overall, the results validate the system's potential to revolutionize religious fund management. The integration of blockchain technology not only improved operational efficiency but also instilled greater trust among stakeholders. This success indicates that similar blockchain-based financial systems could be implemented in other domains requiring transparency and secure fund handling.

### 5.1.1 Project Output

The blockchain-enabled temple fund management system demonstrates the successful execution of secure and transparent donation and withdrawal operations. Both functionalities were tested on the Polygon testnet using smart contracts, ensuring a decentralized and tamper-proof environment. Each transaction was recorded on the blockchain with real-time confirmation, allowing stakeholders to verify the flow of funds at any stage.

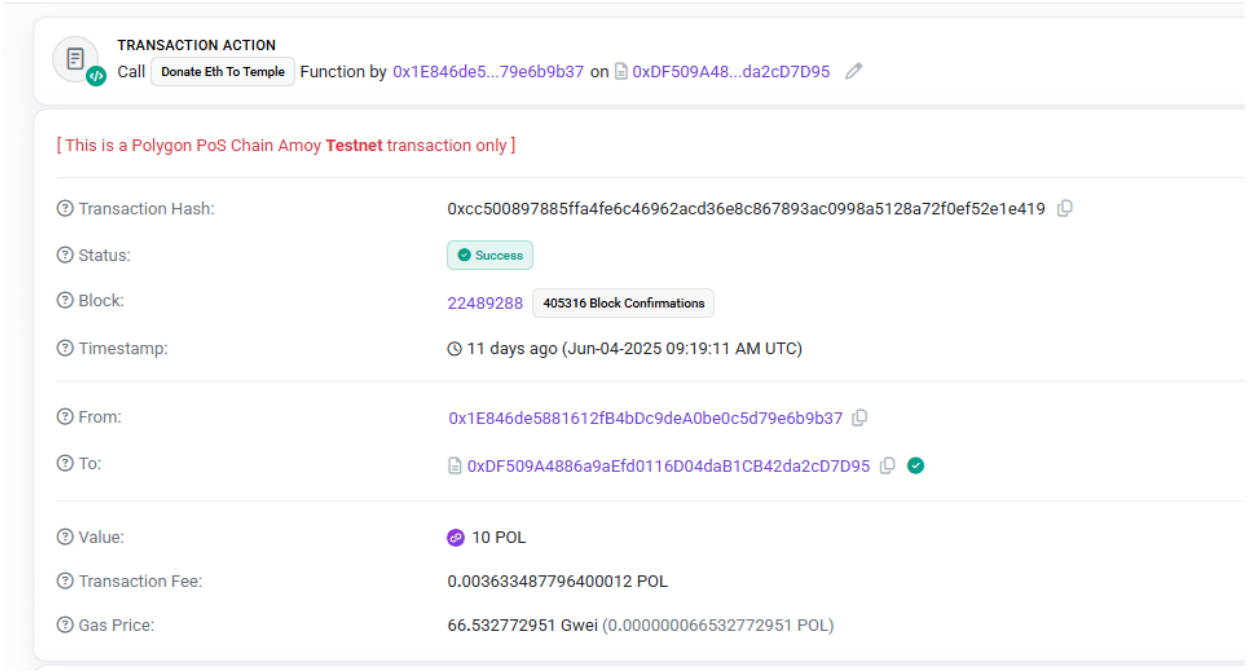



*Figure 5.1 - Donation Output*

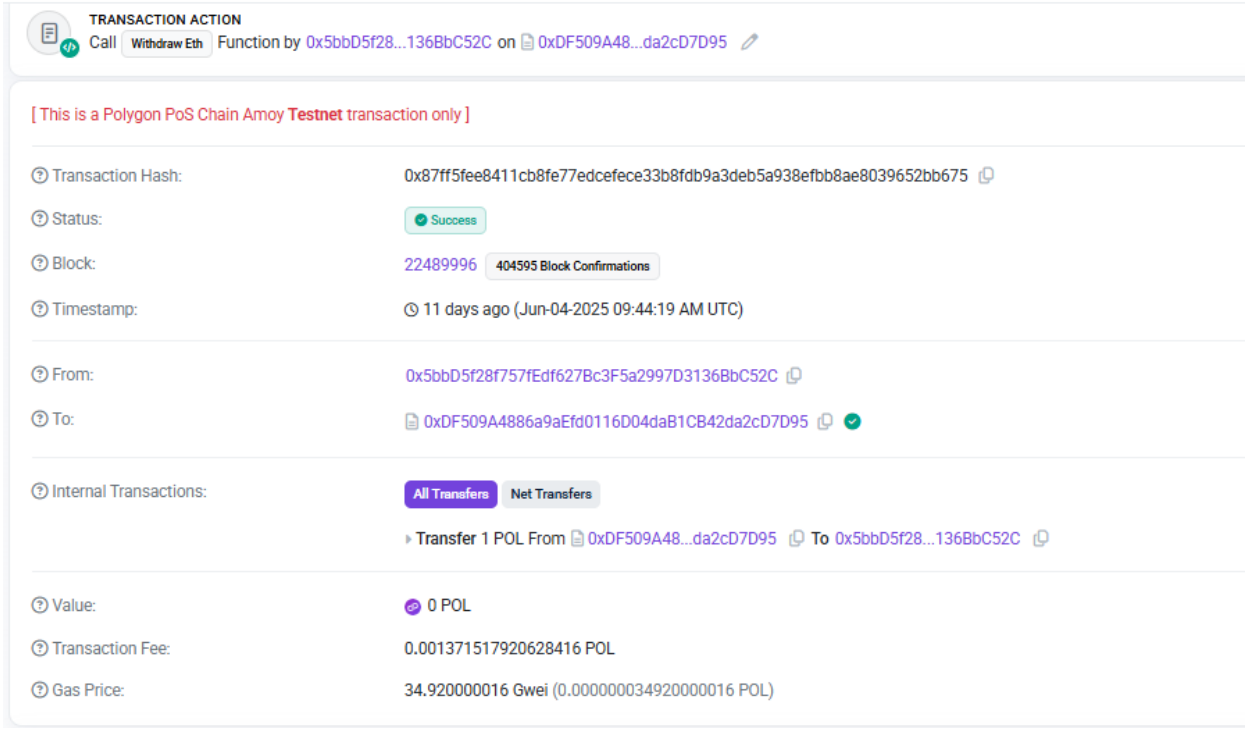


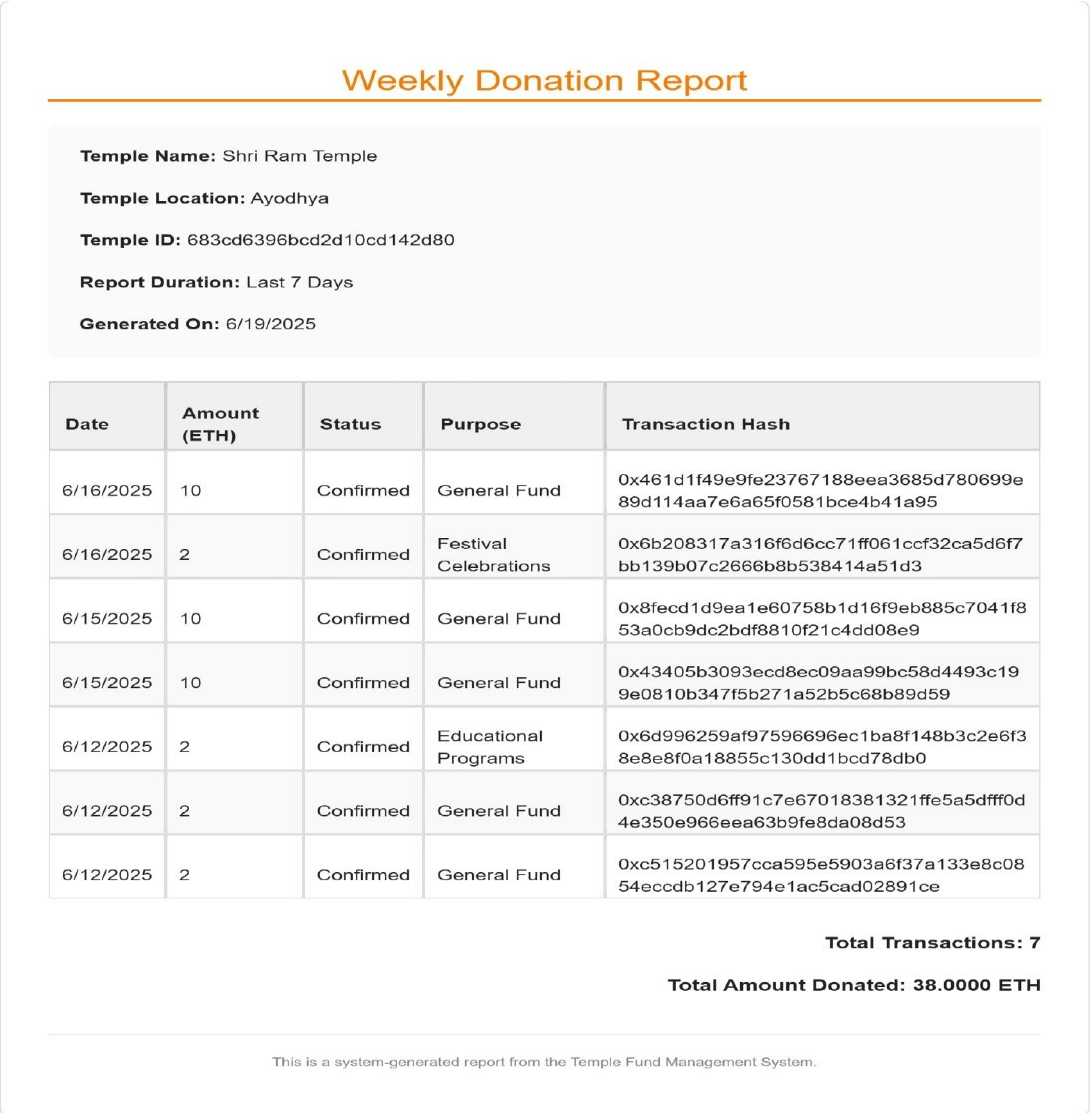

*Figure 5.2 - Withdrawal Output*

The donation module allowed users to contribute directly to temple accounts through connected digital wallets, while the withdrawal feature enabled temple administrators to access collected funds with proper authorization. The system also maintained full visibility of each operation,

including timestamps, transaction status, and gas usage, promoting transparency and accountability.

These outcomes confirm that the system is capable of managing digital donations and expenses efficiently while minimizing fraud risks. By leveraging blockchain technology, the project ensures traceable, secure, and reliable fund management tailored for temple ecosystems.

### 5.1.2 Result Output



Weekly Donation Report

**Temple Name:** Shri Ram Temple

**Temple Location:** Ayodhya

**Temple ID:** 683cd6396bcd2d10cd142d80

**Report Duration:** Last 7 Days

**Generated On:** 6/19/2025

| Date | Amount (ETH) | Status | Purpose | Transaction Hash |
|---|---|---|---|---|
| 6/16/2025 | 10 | Confirmed | General Fund | 0x461d1f49e9fe23767188eea3685d780699e89d114aa7e6a65f0581bce4b41a95 |
| 6/16/2025 | 2 | Confirmed | Festival Celebrations | 0x6b208317a316f6d6cc71ff061ccf32ca5d6f7bb139b07c2666b8b538414a51d3 |
| 6/15/2025 | 10 | Confirmed | General Fund | 0x8fecd1d9ea1e60758b1d16f9eb885c7041f853a0cb9dc2bdf8810f21c4dd08e9 |
| 6/15/2025 | 10 | Confirmed | General Fund | 0x43405b3093ecd8ec09aa99bc58d4493c199e0810b347f5b271a52b5c68b89d59 |
| 6/12/2025 | 2 | Confirmed | Educational Programs | 0x6d996259af97596696ec1ba8f148b3c2e6f38e8e8f0a18855c130dd1bcd78db0 |
| 6/12/2025 | 2 | Confirmed | General Fund | 0xc38750d6ff91c7e67018381321ffe5a5dfff0d4e350e966eea63b9fe8da08d53 |
| 6/12/2025 | 2 | Confirmed | General Fund | 0xc515201957cca595e5903a6f37a133e8c0854eccdb127e794e1ac5cad02891ce |

**Total Transactions: 7**

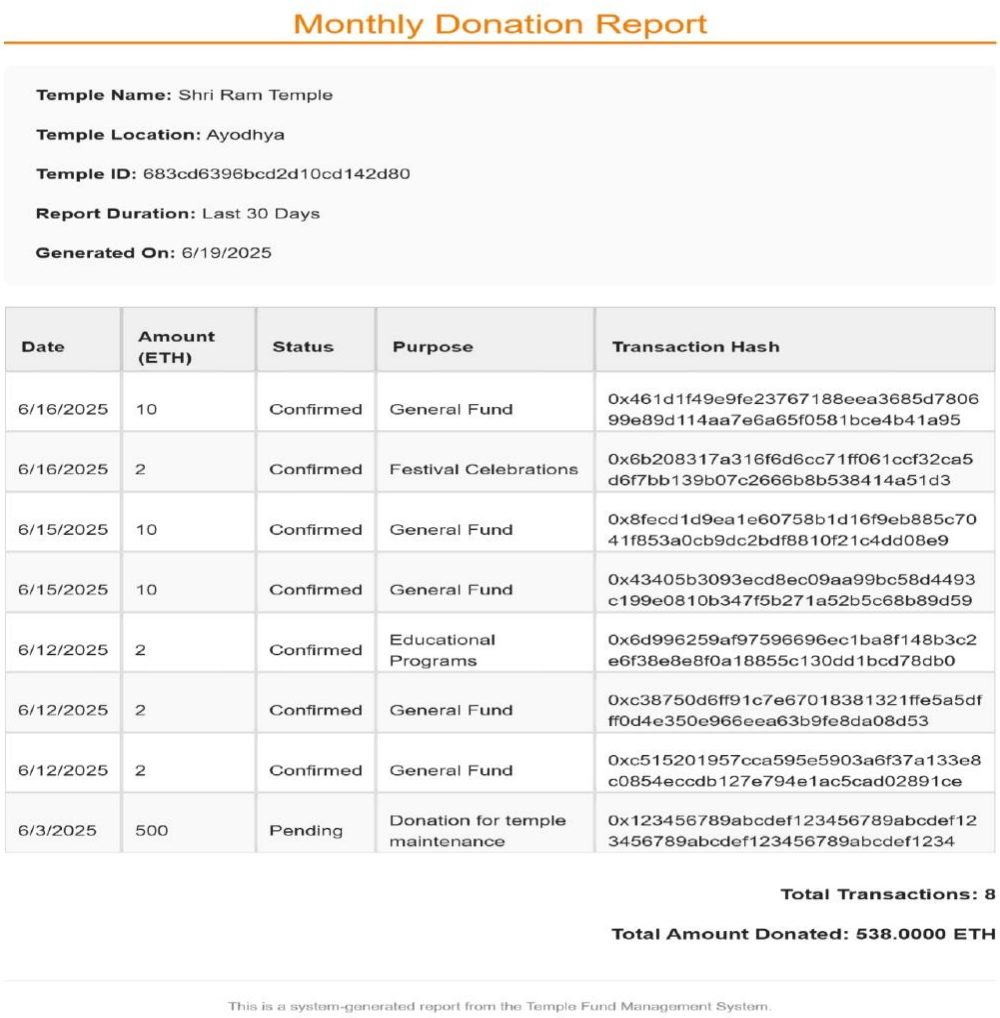
**Total Amount Donated: 38.0000 ETH**

This is a system-generated report from the Temple Fund Management System.

*Figure 5.3 - Weekly Output*

This Donation Report provides a comprehensive overview of the donations received by a registered temple over a specified period, such as a weekly or monthly duration. It includes essential information such as the temple's unique ID, donation dates, contributed amounts (in cryptocurrency like ETH), status of each transaction, purpose of donation (e.g., General Fund,

Festival Celebrations, Educational Programs), and corresponding blockchain transaction hashes. Each donation entry is recorded with a unique hash to ensure authenticity, traceability, and transparency. All transactions are validated through the blockchain network, typically marked as "Confirmed," ensuring that the donation has been successfully processed. These reports—both weekly and monthly serve as vital tools for temple administrators and donors to monitor fund flow, track fund utilization, and ensure accountability. By leveraging blockchain, the system ensures that donation records are tamper-proof, verifiable, and permanently stored, thereby increasing donor trust and supporting ethical fund management in religious institutions.



## Monthly Donation Report

**Temple Name:** Shri Ram Temple

**Temple Location:** Ayodhya

**Temple ID:** 683cd6396bcd2d10cd142d80

**Report Duration:** Last 30 Days

**Generated On:** 6/19/2025

| Date | Amount (ETH) | Status | Purpose | Transaction Hash |
|---|---|---|---|---|
| 6/16/2025 | 10 | Confirmed | General Fund | 0x461d1f49e9fe23767188eea3685d780699e89d114aa7e6a65f0581bce4b41a95 |
| 6/16/2025 | 2 | Confirmed | Festival Celebrations | 0x6b208317a316f6d6cc71ff061ccf32ca5d6f7bb139b07c2666b8b538414a51d3 |
| 6/15/2025 | 10 | Confirmed | General Fund | 0x8fecd1d9ea1e60758b1d16f9eb885c7041f853a0cb9dc2bdf8810f21c4dd08e9 |
| 6/15/2025 | 10 | Confirmed | General Fund | 0x43405b3093ecd8ec09aa99bc58d4493c199e0810b347f5b271a52b5c68b89d59 |
| 6/12/2025 | 2 | Confirmed | Educational Programs | 0x6d996259af97596696ec1ba8f148b3c2e6f38e8e8f0a18855c130dd1bcd78db0 |
| 6/12/2025 | 2 | Confirmed | General Fund | 0xc38750d6ff91c7e67018381321ffe5a5dfff0d4e350e966eea63b9fe8da08d53 |
| 6/12/2025 | 2 | Confirmed | General Fund | 0xc515201957cca595e5903a6f37a133e8c0854eccdb127e794e1ac5cad02891ce |
| 6/3/2025 | 500 | Pending | Donation for temple maintenance | 0x123456789abcdef123456789abcdef123456789abcdef123456789abcdef1234 |

**Total Transactions: 8**

**Total Amount Donated: 538.0000 ETH**

This is a system-generated report from the Temple Fund Management System.

*Figure 5.4 - Monthly Output*

## 5.2 How Blockchain payments should condired instead of Traditional Payments system

| Features | Crypto Payments | Traditional Payments |
|---|---|---|
| **Speed** | Crypto payments are typically processed much faster than traditional payments. This is because crypto transactions are not subject to the same delays and processing times as traditional payments. | Traditional payments can be slow to process, especially international payments. |
| **Fees** | Crypto transactions often have lower fees than traditional payments. This is because crypto payments are not subject to the same high fees banks and other financial institutions charge. | Traditional payments can be expensive, especially for businesses that process a high volume of transactions. |
| **Acceptance** | Crypto payments are becoming more widely accepted by businesses but are still not as widely accepted as traditional payments. | Traditional payments are widely accepted by businesses and consumers around the world. |
| **Financial inclusion** | Crypto payments can be used by anyone, anywhere in the world, regardless of their financial status. This is because crypto payments do not require a bank account or credit card. | Traditional payment systems can be inaccessible to people who do not have a bank account or credit card. |

| | | |
|---|---|---|
| **Volatility** | The value of crypto assets can fluctuate wildly, which can make them risky to use for payments. | Traditional payment systems are generally more stable than crypto payments, as they are backed by central banks and governments. |
| **Regulatory uncertainty** | The regulatory landscape for crypto is still evolving, which can create uncertainty for businesses and individuals. | The regulatory landscape for crypto is still evolving, which can create uncertainty for businesses and individuals. |
| **Security** | Crypto payments can be vulnerable to hacking and theft. However, there are a number of security measures that can be taken to protect crypto payments. | Traditional payment systems are also vulnerable to hacking and theft, but they have a number of security measures in place to protect consumers. |

*Table 2 - Comparing Between Blockchain & Traditional Method*

# CHAPTER 6: CONCLUSION AND FUTURE SCOPE

## 6.1 Conclusion

The successful implementation of the blockchain-based temple fund management system marks a significant advancement in the way religious institutions handle donations and manage their financial resources. This project has effectively demonstrated how the integration of blockchain technology can address critical challenges such as transparency, accountability, security, and donor trust. By leveraging the core features of blockchain decentralization, immutability, and transparency our system ensures that every transaction is permanently recorded and publicly verifiable. Smart contracts have been utilized to automate critical operations such as fund transfers, donation receipts, withdrawal validations, and expense tracking, reducing the risk of human intervention and error.

Furthermore, the role-based architecture involving Super Admin, Temple Admin, and Users ensures clear segregation of duties and streamlines workflow. The inclusion of real-time dashboards and public expense visibility promotes financial openness and builds trust among the donor community. Overall, this project proves that blockchain is not just a technological innovation but a practical tool for creating ethical, transparent, and efficient systems. It sets a new standard for donation management in religious and public institutions, offering a scalable and secure solution that can be adopted across various sectors where public trust and financial transparency are paramount.

## 6.2 Future Scope

The blockchain-based temple fund management system holds vast potential for further enhancement and scalability. As technology and user needs evolve, several avenues can be explored to strengthen and expand the system’s capabilities.

One promising direction is the integration of **cross-chain interoperability**, enabling users to donate in multiple cryptocurrencies across various blockchain networks, enhancing accessibility and flexibility. Additionally, **multi-signature wallet implementation** can be introduced for high-value fund approvals, further strengthening security and administrative control. The system can also benefit from incorporating **AI-based analytics and prediction models** to analyze donation patterns, forecast future funding, and optimize resource allocation. Features like **donor reward**

**mechanisms** using NFTs or tokens can incentivize continuous engagement and build a loyal donor base.

Expanding the platform to support **other non-profit institutions** such as NGOs, educational trusts, and disaster relief organizations can widen its societal impact. Integrating a mobile application with real-time notifications, QR-based donations, and biometric authentication will significantly enhance user experience and accessibility.

Lastly, by collaborating with government bodies and financial regulators, this system can be formalized into a **recognized standard for transparent donation** management, creating a benchmark for ethical fund utilization across sectors.

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# IMPLEMENTATION PAPER

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538*
*Volume 13 Issue VI June 2025- Available at www.ijraset.com*

# Blockchain-Based Fund Management System for Indian Temples

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***Abstract:*** ***This innovative system harnesses the power of blockchain technology to tackle ongoing governance issues in managing temple funds. By combining smart contracts with a secure and user-friendly digital interface, the platform guarantees tamper-proof recording and real-time tracking of donations. This decentralized approach significantly reduces the risk of fraud, boosts financial transparency, and builds stronger trust between devotees and temple authorities. Smart contracts streamline fund allocation and keep unchangeable transaction records, ensuring that donations are utilized precisely as intended. The system not only encourages ethical financial practices but also aligns with the larger mission of preserving cultural and religious heritage through responsible resource management. Moreover, the use of blockchain technology gives stakeholders enhanced control, auditability, and confidence in the donation process, ultimately aiding in the modernization and credibility of temple governance.***

***Keywords:*** ***Decentralized ledger, Religious funding, Ethical finance, Cultural heritage preservation, Digital trust, Secure blockchain transactions, Immutable donation records, Financial accountability, Smart contract automation, Transparent temple governance, Donor empowerment, Real-time fund tracking***

## I. INTRODUCTION

In today's digital world, technology is reshaping how organizations function, and blockchain is stepping up as one of the most significant innovations out there [1]. Essentially, blockchain is a distributed ledger system that enables secure, transparent, and permanent transaction records without needing centralized authorities. Thanks to cryptographic algorithms and consensus mechanisms, once data is recorded on the blockchain, it can't be changed, which greatly minimizes the risk of fraud, unauthorized alterations, or data loss. Its uses have expanded well beyond just cryptocurrencies, making waves in areas like voting systems, digital identity, asset tracking, and public administration [2]. Temples in India are crucial to both religious practices and community growth, attracting generous donations from millions of devotees every year.

These contributions whether in cash or gold are meant to support religious services, infrastructure, and welfare initiatives. Unfortunately, many temples still rely on outdated, manual donation management systems that lack transparency. This absence of real-time monitoring and digital accountability raises the risk of corruption, fund misallocation, and financial discrepancies, ultimately eroding trust between devotees and temple authorities [3]. By implementing a blockchain-based donation system, these issues can be tackled head-on, providing a secure, transparent, and automated way to manage funds, which can help restore faith and ensure that temple resources are used responsibly.

## II. LITERATURE REVIEW

Blockchain technology, first introduced by Nakamoto in 2008 as the backbone of Bitcoin, has evolved into a flexible digital framework that finds applications in a variety of sectors [4]. Its decentralized nature and cryptographic security make blockchain an ideal solution for secure, traceable, and tamper-proof record-keeping across distributed networks. The use of consensus mechanisms like Proof of Work and Proof of Stake, along with smart contracts, allows for automation, transparency, and accountability without the need for central authority.

In the financial sector, blockchain has transformed traditional systems by enabling secure peer-to-peer transactions, real-time auditing, and fraud prevention. Treiblmaier (2018) notes that its transparent design is especially beneficial in environments that demand strict oversight and compliance. Additionally, blockchain has the potential to improve operational transparency for donation platforms and NGOs. Research by Lokuwaduge and Armstrong (2015) highlights trust and visibility as crucial elements for engaging donors, which blockchain can enhance by providing unchangeable donation records [5].

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*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538*
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While still a developing area, academic interest in blockchain's impact on religious fund governance is on the rise. Recent studies by Sharma and Prakash (2020) propose a decentralized approach to managing temple donations in India, focusing on real-time monitoring and ethical use of funds. Their research indicates that blockchain could act as a digital trust framework for religious organizations, helping to minimize mismanagement and bolster community trust.

## III. METHODS AND METHODOLOGY

### *A. System Design and Architecture*

The proposed system brings a fresh approach to managing temple donations by creating a secure, transparent, and decentralized platform that combines blockchain technology with a user-friendly web interface. This innovative method aims to replace outdated and unclear ways of handling funds with a digital solution that guarantees transparency, traceability, and real-time accountability for donations within religious institutions. At the heart of the system is an easy-to-navigate website that serves as the main hub for users, administrators, and temple authorities. Users can sign up, log in, and view temple-related information, including their donation history and spending records, all through an intuitive interface. After registering, users are authenticated using JSON Web Tokens (JWT), which provide secure sessions and access control across the platform.

The donation process is powered by an Ethereum-based smart contract, allowing users to donate ETH directly to a temple's designated wallet. To facilitate this, the system incorporates MetaMask as the digital wallet gateway, ensuring that transactions are secure and authenticated. When a user decides to make a donation, the MetaMask extension prompts them to confirm the transaction. Once they do, the smart contract takes care of the fund transfer securely and logs important transaction details like the amount, gas fee, sender address, and purpose on the blockchain.

Beyond the blockchain layer, the system features an off-chain backend built with Node.js and Express.js. This backend is tasked with recording transaction metadata, managing authentication, and interacting with the MongoDB database. The database holds vital information such as user profiles, temple details, transaction history, and role-based access for members, temple authorities, and admins. This off-chain data storage allows for comprehensive analytics, real-time dashboards, and receipt generation capabilities. The entire system is designed to be modular and scalable, ensuring smooth communication and functionality.

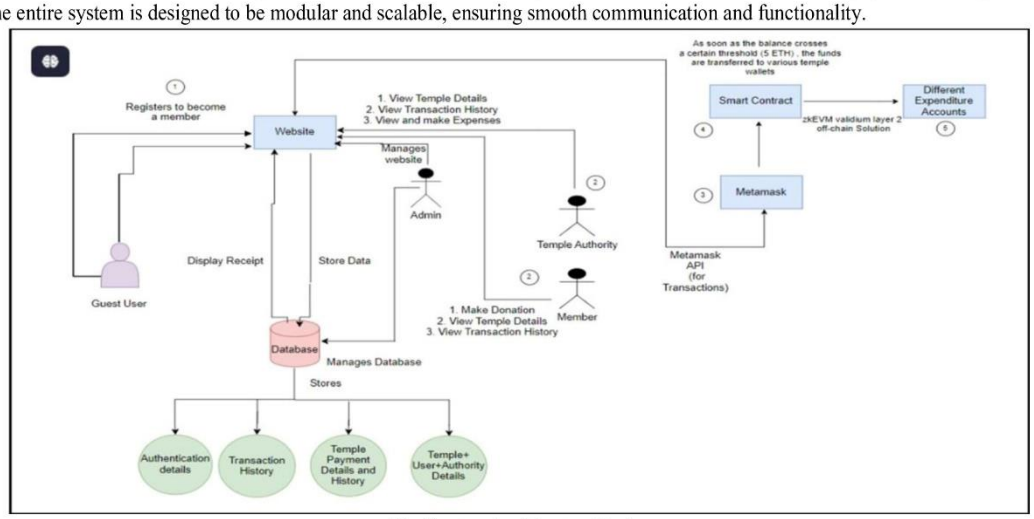


Fig: System Architecture Design

The architecture diagram you see here maps out how data and control flow through every part of the system, starting from user interactions all the way to blockchain execution and database recording. It clearly shows how each layer plays a role in ensuring that donations are handled securely, transparently, and in a decentralized manner. This approach addresses the common problems of mismanagement and trust issues that often plague temple fund systems. The methodology is crafted to boost donor confidence while giving temple authorities accurate, real-time financial insights, all thanks to the unchangeable and transparent nature of blockchain technology.

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*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538*
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*B. Research Approach*

- Decentralized Network: This leverages blockchain technology to handle temple transactions, ensuring everything is transparent and trustworthy.
- Smart Contracts: These automate the process of donations and fund distribution.
- System Integration: Combines front-end, back-end, and blockchain components for secure, efficient operations.

*C. Research Validity and Consistency*

- Effect due to tested variables.
- Results generalize well.
- Measures the right concept.

*D. Research Integrity and Precision*

- Validity: Measures the accuracy of the study's outcomes.
- Reliability: Ensures consistent results over time.
- Objectivity: Maintains neutrality, free from bias.
- Replicability: Allows the study to be repeated with similar results.

## IV. PROPOSED SOLUTION

*A. System Design*

The proposed solution presents an innovative Temple Fund Management platform that integrates blockchain technology to ensure that religious donations are handled securely, transparently, and efficiently. This system features a multi-layered architecture with four key components: the user interface, backend server, Ethereum smart contract layer, and MongoDB database. Together, these layers create a smooth, tamper-proof, and user-friendly experience for both devotees and temple administrators.

The user interface is crafted with a web-based React.js application, providing easy-to-use modules for registration, login, viewing temple information, checking donation history, and making ETH donations through MetaMask. To keep everything secure, all interactions on the frontend are safeguarded with JWT-based authentication, meaning only verified users can engage in donation activities. When a donation occurs, the application interacts with a smart contract on the Ethereum blockchain. This smart contract ensures that ETH is securely transferred to the temple's verified wallet while also recording essential transaction details—like the sender's address, donation amount, and timestamp guaranteeing complete traceability.

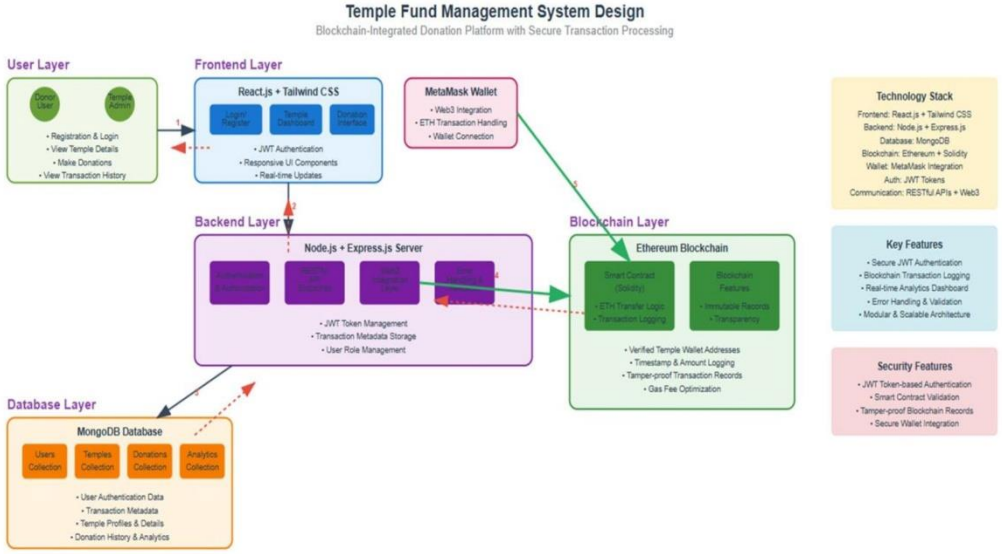


Fig : System Design

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The system design diagram above visually maps out the layered interaction among all key components—namely the user interface, frontend, backend server, blockchain layer, and database. It demonstrates how each module plays a distinct yet interconnected role in ensuring secure, transparent, and accountable handling of temple donations. The diagram also showcases the real-time flow of data, from user input and transaction initiation to blockchain verification and database logging. By illustrating the sequence of communication between these layers, the architecture clearly highlights how tamper-proof transaction records, role-based access, and automated ETH transfers are implemented seamlessly. This integrated design not only enhances the system's operational efficiency but also builds trust among users, simplifies fund oversight for administrators, and ensures that every step of the donation process is traceable, verifiable, and immune to unauthorized manipulation.

*B. Flowchart*

The flowchart shown in the figure gives a clear visual representation of how the proposed Blockchain-Based Temple Fund Management System operates. It highlights the sequence of processes and interactions among the three main players: the Super Admin, the Temple Administrator, and the End User (Devotee). The whole process kicks off with the Super Admin, who has the power to bring new temples onto the platform. After logging in and connecting their MetaMask wallet, the Super Admin creates and sends login credentials to the Temple Administrators via email. Once the Temple Administrator receives these credentials, they log into the system, link their own MetaMask wallet, and provide the temple's registration details along with any necessary documentation.

After submission, a verification request is sent to the Super Admin. Once they review the information, the Super Admin approves the registration and uploads the temple data onto the blockchain network, officially activating it on the platform. After activation, the Temple Administrator can handle essential tasks like accepting donations from devotees, tracking temple expenses, and sharing updates and information about the temple for everyone to see. All financial transactions—both donations and expenditures—are automatically logged on the blockchain ledger, which guarantees transparency, traceability, and trust. This setup boosts overall accountability and reinforces the confidence of donors and stakeholders alike.

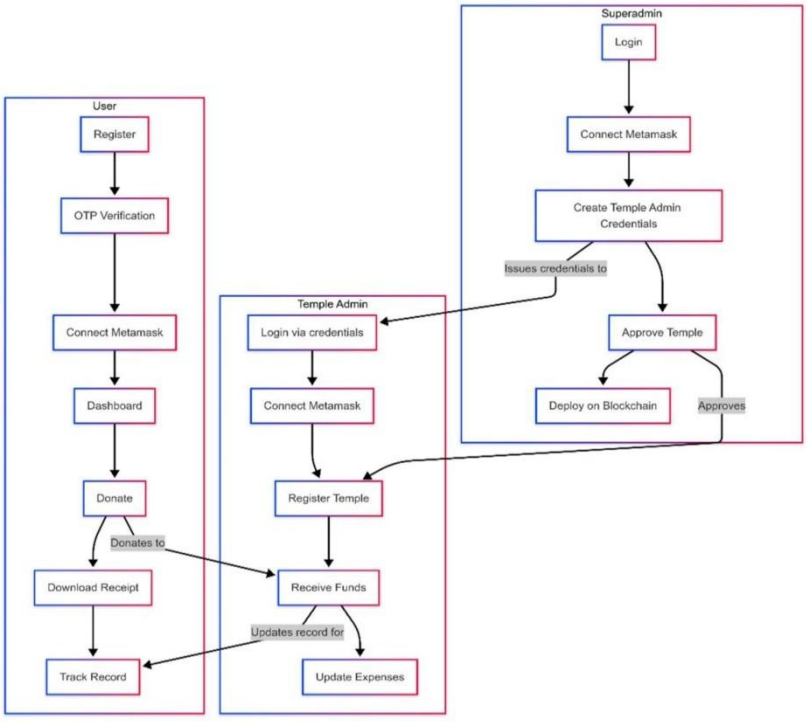


Fig: Flowchart of System

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
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## V. CHALLENGES AND FUTURE SCOPE

The proposed temple fund management system, built with web technology and integrated with blockchain, offers a promising way to tackle the challenges of managing temple donations. However, there are several key hurdles that need to be overcome for it to be widely adopted and run efficiently. One significant issue is the limited accessibility for devices, as the current setup is only available as a web application. This can be a barrier for those who prefer using mobile platforms or desktop applications for convenience. By developing dedicated mobile apps for both Android and iOS, along with desktop versions, we could greatly enhance engagement among devotees, administrators, and stakeholders across various devices.

Another challenge is the system's scalability. As the user base and transaction volume increase, it's crucial to maintain performance and reliability. Utilizing cloud services like Amazon Web Services (AWS) or Microsoft Azure can help with this, providing the necessary computational power and storage for growth. Additionally, incorporating Layer 2 blockchain solutions such as Polygon CDK, which uses rollup mechanisms, can speed up transactions and lower gas fees, making the system more efficient and cost-effective. Looking to the future, the system aims to implement AI-driven analytics for tracking donation trends and automating financial reports, creating a smarter and more transparent approach to managing temple funds

## VI. CONCLUSION

The creation of a blockchain-based temple fund management system is a major leap towards modernizing how religious finances are managed. Tailored for temple administrators and their supporters, this system uses web technologies to create a secure, transparent, and efficient way to handle donations. By harnessing the power of blockchain's decentralized structure and smart contracts, it tackles common problems like manual errors, data tampering, and the need for middlemen. Donations are automatically allocated to five designated accounts through smart contracts, ensuring everything is fair, traceable, and efficient. Each transaction is recorded on an unchangeable ledger, giving everyone involved access to a clear and secure record.

One of the most impressive aspects of this system is its real-time audit trail, which boosts accountability and oversight for both users and administrators. This not only builds trust among donors but also gives temple authorities a solid way to responsibly track the flow of funds. While the backend is technically sound, there's still room to enhance the user experience. Improving the frontend to better convey needs and donation statuses could make user engagement even smoother. All in all, integrating blockchain technology brings a high level of security, integrity, and reliability, laying a strong foundation for ethical and efficient donation management in temples. This system not only enhances operational control but also strengthens trust in religious institutions through clear and transparent digital practices.

## VII. ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the Department of Computer Engineering, Government College of Engineering, Yavatmal, for their continuous support and encouragement throughout this research. Special thanks are extended to Prof.C.V.Andhare for his guidance, technical expertise, and mentorship, which were instrumental in shaping the direction of this study. We also acknowledge the open-source contributors and maintainers of blockchain technologies, smart contract frameworks, and decentralized fund management tools, without which this work would not have been possible.

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iJRASET
ISSN No. : 2321-9653
International Journal for Research in Applied Science & Engineering Technology
IJRASET is indexed with Crossref for DOI-DOI : 10.22214
Website : www.ijraset.com, E-mail : ijraset@gmail.com
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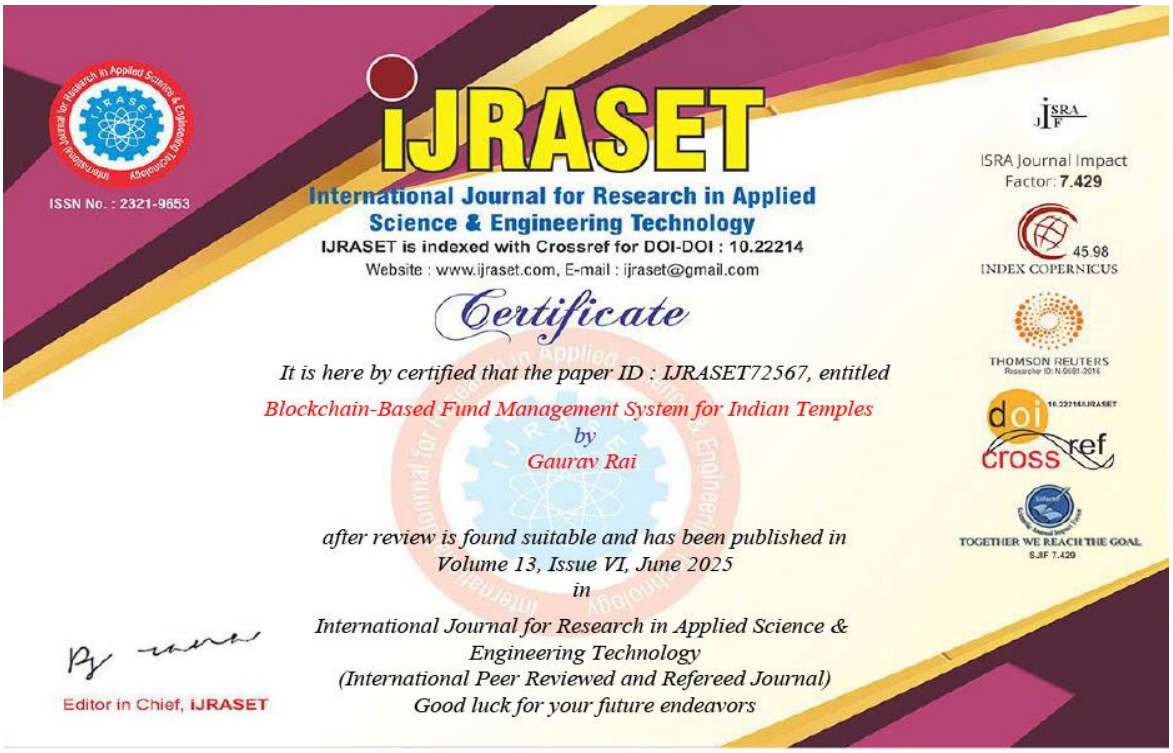
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