

# Feasibility Study

Project Name: **Smart Community Service Hub**

## Introduction

The **Smart Community Service Hub** is a user-friendly web application designed to simplify daily life for people living in apartment complexes. It provides a digital platform where residents can easily pay bills, raise complaints, and manage visitor entries. Meanwhile, admins, staff, and security personnel get their own dedicated dashboards to manage operations efficiently. Smart features like QR-based visitor access, automated bill splitting, and intelligent suggestions through AI make the platform truly modern and future-ready.

## 1. Technical Feasibility

### Objective:

To create a smart, digital management system for residential communities that works efficiently using modern web technologies and intelligent automation.

### Technology Stack Overview:

- **Frontend** : React.js with Tailwind CSS
  - Builds a clean, responsive, and mobile-friendly interface that works on all devices.
  - Helps residents and staff easily navigate features like complaints, bills, and visitor passes.
- **Backend** : Node.js with Express.js
  - Handles all the behind-the-scenes operations like storing data, processing requests, and sending notifications.
  - Keeps things fast and reliable even with many users.
- **Database**: MongoDB
  - Perfect for storing flexible data such as visitor logs, chat messages, or complaint details.
- **Security**: JWT (JSON Web Tokens) & Bcrypt
  - Ensures that only authorized users can access the system securely.
  - Protects user passwords and personal information.

- **AI/ML Integration:**
  - **Sentiment Analysis (spaCy):** To understand how serious or urgent a complaint is.
  - **Smart Predictions (scikit-learn):** To forecast who might delay payments or suggest which staff member is best suited for a task.
  - **Face Recognition (OpenCV):** To verify visitors securely through webcam .
  - **Advanced AI (TensorFlow):** For building smarter features in the future.
- **Chatbot:**
  - A simple, helpful assistant (using Dialogflow, Rasa, or custom bot) that can respond to common queries like “Power is out” or “My friend is visiting at 6 PM”.
- **QR Code Generation:**
  - Automatically creates scannable QR passes for visitors or delivery personnel.
- **Payment Gateway:**
  - Secure online payment using Razorpay or UPI, with downloadable receipts.
- **Data Visualizations:**
  - Interactive charts show trends in payments, complaints, or visitor records, helping admins make better decisions.

### **Assessment:**

All chosen technologies are open-source, free to use, and perfect for student or early-stage projects. AI features can be added gradually using available tools and don’t require building everything from scratch.

## **2. Operational Feasibility**

- The platform is easy to use and works on smartphones, tablets, or computers.
- Every user (resident, admin, staff, or guard) gets a simple, personalized dashboard.
- No technical background is required for residents to use features like bill payment or visitor QR codes.

- Admins can save time by automating tasks such as sending announcements or assigning work.
- The chatbot can support multiple languages or voice queries to assist elderly users or non-English speakers.

### 3. Economic Feasibility

- **Low Development Cost:** Most tools used are free for students or have affordable plans.
- **No Extra Equipment Needed:** Only a regular computer or phone is needed. Webcam is used for face recognition.
- **Cost Savings for Communities:** Helps reduce manual work, saving money for housing societies.
- **Commercial Potential:** Can be turned into a product offered to real-world apartments on a subscription basis, making it sustainable.

### 4. Schedule Feasibility

#### Mini Project (Phase 1)

- Build main modules: Resident, Admin, Staff, Security dashboards, complaint & payment system, visitor QR feature
- Expected duration : 6-8 weeks

#### Main Project (Phase 2)

- Integrate AI features: chatbot, complaint tone detection, auto-split bills, defaulter prediction, face recognition
- Expected duration : 10-12 weeks