Beacon Tracking System for Land Plot Validation

Project Document

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1. Introduction

Land ownership disputes and illegal sales are common problems in many regions due to **mismanaged land records and unclear boundaries**. Traditional methods for tracking land ownership are often manual, slow, and prone to errors.

The **Beacon Tracking System for Land Plot Validation** is designed to improve land management by linking **physical plots with BLE beacons**, validating ownership, and allowing government authorities, buyers, and inspectors to detect whether a plot is legally registered. The system is easy to use, secure, and scalable for both small and large land parcels.

2. Problem Statement

Landowners, buyers, and government authorities often face challenges such as:

- Difficulty verifying the **legality of land sales**.
- Unauthorized or duplicate land transactions.
- Disputes over ownership due to lack of **real-time tracking**.
- Manual monitoring methods are **time-consuming and error-prone**.

There is a need for a **simple, reliable system** that links physical plots to official land records, validates ownership, and provides real-time information to stakeholders.

3. Project Objective

The main objective of this system is to provide a **secure and automated land validation system** using beacon technology. Specific objectives include:

- Attach BLE beacons to physical land plot boundaries.
- Link each beacon to official government land records.
- Enable buyers and inspectors to **verify plot validity instantly**.
- Track ownership changes and historical transactions.

- Alert authorities if a plot is being sold illegally or a beacon is invalid.
- Provide a dashboard for government and administrative monitoring.

4. System Overview

The system works by placing **BLE beacons** at the corners of each land plot. Each beacon has a **unique ID** linked to the official land registry database. Users can detect beacons using a mobile app or handheld reader, which verifies the plot's ownership and legal status in real-time.

Key Functions:

1. Beacon installation on plot boundaries
2. Data recording and registration with government database
3. Real-time detection and validation of beacons
4. Ownership verification and alert generation
5. Historical tracking of plot sales and changes
6. Dashboard visualization for authorities

5. Methodology

5.1 Beacon Installation

- Beacons are installed at **strategic corners or boundaries** of each plot.
- Each beacon is programmed with a **unique ID** linked to the land registry.

5.2 Data Recording

- Beacon IDs, plot numbers, and ownership details are **entered into a secure government database**.
- Each plot's data is linked to the corresponding owner and transaction history.

5.3 Data Processing & Analysis

- The system checks the beacon ID against the **official database**.
- Determines if the plot is valid, sold legally, or has discrepancies.
- Generates alerts for invalid or duplicate beacons.

5.4 Validation & Reporting

- A **real-time validation report** is generated for inspectors or buyers.
- Dashboard shows all plots, their status, and ownership information.

5.5 Recommendations

- Alert authorities about illegal sales or unregistered plots.
- Advise buyers on legal validation before purchase.
- Support historical analysis for land management and planning.

6. System Features

- User-friendly mobile and web app for detection and validation
- Secure government database linking beacons to official records
- Automatic detection and verification of plot ownership
- Alerts for invalid or duplicate beacons
- Visualization of plot locations and status
- Historical tracking of land transactions
- Scalable for small and large land registries

7. Expected Impact

The system is expected to:

- Reduce land disputes and fraudulent sales
- Ensure buyers only purchase **legally registered plots**
- Provide real-time monitoring and verification for authorities
- Save time in inspections and approvals
- Support **transparent and accountable land management**

8. Target Users

- Government land registry offices
- Land inspectors and surveyors
- Buyers of land plots
- Real estate agencies
- NGOs and organizations working on land rights
- Urban planning authorities

9. Conclusion

The **Beacon Tracking System for Land Plot Validation** offers a practical solution for modern land management. By combining beacon technology with a centralized database and mobile validation tools, it provides **secure, transparent, and real-time verification** of land ownership. The system helps reduce disputes, prevent fraud, and ensures proper management of land resources.