SOFTWARE ENGINEERING BCSE301P

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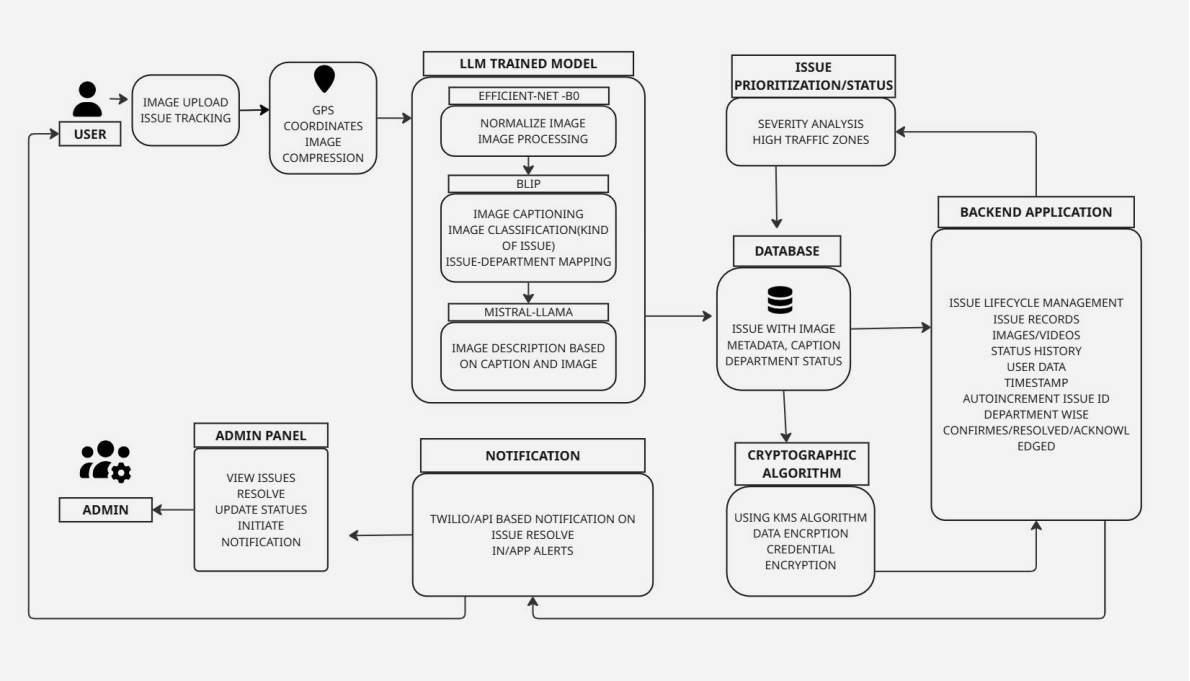
ARCHITECTURE DIAGRAM

CROWD-SOURCED CIVIC ISSUE REPORTING AND RESOLUTION SYSTEM



Introduction

In today's era of urbanisation, it is difficult for the government to track everyday civic issues, which include potholes, broken streetlights, overflowing trash bins, and other water, electricity, and sanitation issues. To make the process efficient, we introduce a crowd-sourced civic issue reporting and resolution, a mobile / web app where citizens can report any issue detected and track the progress of the issue submitted by them. The app makes it very easy and less time-consuming to report the issue using a trained model that interprets the category of the issue, the department it belongs to, and the GPS with just a single image of the issue submitted. Hence, auto-detect all the required parameters from the image.

Scope

The system enables citizens to report civic issues using images, automatically detects GPS location and issue category, prioritizes issues, and allows real-time tracking. It includes an admin panel for authorities to manage, update, and resolve complaints securely.

Constraints

- Depends on image quality and GPS accuracy
- Requires internet connectivity
- Performance may vary with high user traffic
- AI models require periodic updates

Assumptions

- Users have smartphones with camera and GPS
- Internet access is available
- Authorities actively use the admin panel
- Submitted issues are genuine

Acceptance Criteria

- Successful one-click issue submission
- Correct issue category and department detection
- Automatic GPS tagging
- Real-time status tracking
- Secure data storage
- Proper notifications on issue updates

FUNCTIONAL REQUIREMENTS

1. User Management

- The system shall allow citizens to submit civic issues via mobile/web application.
- The system shall store user details securely.
- The system shall associate each issue with a unique user ID.

2. Issue Submission

- The system shall allow users to upload an image or video of the civic issue.
- The system shall automatically extract GPS coordinates from the device.
- The system shall compress and normalize uploaded media before processing.

3. AI Processing

- The system shall classify the type of civic issue using a trained image classification model.
- The system shall generate an image caption describing the issue.
- The system shall generate a detailed issue description using an LLM.
- The system shall automatically map the issue to the appropriate department.

4. Issue Prioritization

- The system shall analyze issue severity based on visual cues.
- The system shall prioritize issues occurring in high-traffic or critical zones.
- The system shall update issue priority dynamically if conditions change.

5. Issue Tracking

- The system shall allow users to track the status of their submitted issues.
- The system shall maintain a status history (Confirmed → Acknowledged → Resolved).
- The system shall timestamp all status updates.

6. Admin Operations

- The system shall allow administrators to view all reported issues.
- The system shall allow administrators to update issue status.
- The system shall allow administrators to initiate notifications to users.
- The system shall log all admin actions for accountability.

7. Notification System

- The system shall send notifications when issue status changes.
- The system shall support API-based notifications (SMS / In-app).
- The system shall notify both citizens and administrators.

8. Data Security

- The system shall encrypt stored data using cryptographic algorithms.
- The system shall encrypt user credentials and sensitive information.
- The system shall ensure secure data transmission between modules.

NON-FUNCTIONAL REQUIREMENTS

1. Performance

- The system shall process image uploads with minimal latency.

- The system shall generate AI predictions within acceptable response time.
- The system shall support concurrent submissions from multiple users.

2. Scalability

- The system shall scale horizontally to handle increased user traffic.
- The system shall support addition of new issue categories without redesign.
- The system shall support multiple city or region deployments.

3. Reliability

- The system shall ensure high availability of services.
- The system shall prevent data loss during system failures.
- The system shall maintain consistency of issue records.

4. Security

- The system shall follow secure authentication and authorization mechanisms.
- The system shall protect against unauthorized access.
- The system shall comply with data privacy regulations.

5. Usability

- The system shall provide a simple and intuitive user interface.
- The system shall minimize user effort during issue reporting.
- The system shall be accessible on both mobile and web platforms.

6. Maintainability

- The system shall be modular and easy to maintain.
- The system shall allow updates to AI models without system downtime.
- The system shall support logging and monitoring for debugging.

7. Compatibility

- The system shall support major mobile operating systems and browsers.
- The system shall be compatible with different device cameras and resolutions.