**High-Level Design (HLD)**

**Child Safety Application**

**Document Version Control**

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| Date Issued | Version | Description | Author |
| 19th Nov 2024 | 1.0 | Initial Draft | Nivedi |
| 20th Nov 2024 | 1.1 | Added Workflow Diagram | Urvee |
| 21st Nov 2024 | 1.2 | Finalized Technical Details | Onkar |

**Abstract**

The **Child Safety Application** provides a comprehensive solution to address parental concerns about their children's safety. The system enables real-time tracking of geolocations, immediate SOS alerts, and efficient communication with guardians during emergencies. The application is built to function on both web and mobile platforms, ensuring accessibility and reliability.

**Introduction**

The **Child Safety Application** is a user-friendly system designed to enhance child safety. Parents can monitor their children's locations, manage guardians, and receive emergency notifications when needed.

**Goals**

1. Enable real-time location tracking.
2. Provide a responsive SOS alert mechanism.
3. Facilitate seamless communication between parents and guardians.

**Scope**

The system is designed for:

* Real-time geolocation updates for children.
* SOS alerts sent to parents and guardians.
* Parental dashboards for tracking and management.
* Compatibility with GPS-enabled devices and reliable third-party APIs for notifications.

**System Overview**

The application comprises two primary modules:

1. **Parent Module**:
   * Features: View child geolocation, manage guardians, receive notifications.
2. **Child Module**:
   * Features: Update geolocation, trigger SOS, manage guardian details.

**Technical Specifications**

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| --- | --- | --- |
| Component | Technology |  |
| Frontend | HTML, CSS, JavaScript |  |
| Backend | Node.js, Express.js |  |
| Database | MongoDB |  |
| APIs | Google Maps, Twilio |  |
| Deployment | AWS/GCP |  |

**Proposed Solution**

1. **Parent Dashboard**:
   * Displays real-time geolocation on Google Maps.
   * Lists SOS notifications and alerts.
   * Manage guardian details.
2. **Child Dashboard**:
   * Updates current geolocation.
   * Triggers SOS for emergencies.
3. **System Workflow**:
   * Geolocation updates flow from child devices to the backend, stored in MongoDB.
   * Notifications are triggered to parents/guardians through third-party APIs during emergencies.

**Workflow Diagram**

**SOS Alert Workflow**

1. Child presses the SOS button.
2. Backend fetches the current geolocation.
3. Notifications are sent to parents and guardians via SMS and email.

**Geolocation Update Workflow**

1. Child app sends periodic updates to the backend.
2. Data is stored in MongoDB.
3. Parent retrieves location in real-time through the dashboard.

**Constraints**

1. Reliance on GPS-enabled devices and stable internet connectivity.
2. Performance dependent on third-party APIs like Google Maps and Twilio.

**Risks**

1. Data privacy concerns due to geolocation sharing.
2. Potential delays in SOS notifications under high server load.

**Conclusion**

The **Child Safety Application** aims to provide a secure and reliable platform for parents to ensure their children’s safety. Its modular design and use of modern technologies ensure scalability, maintainability, and optimal user experience.

