SIH-FRD

Functional Requirements Document (FRD)

Title: Women Safety Analytics – Functional Requirements

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1. Purpose:

This document defines the functional requirements of the Women Safety Analytics system to ensure it meets the objectives of enhancing public safety and protecting women from potential threats. It outlines what the system should do to provide real-time monitoring, anomaly detection, and alert generation.

2. System Overview:

Women Safety Analytics is an intelligent surveillance and analytical tool designed to monitor public spaces, detect threats, and provide alerts to law enforcement for immediate intervention. The system uses advanced computer vision techniques, machine learning algorithms, and gesture recognition to identify potential safety risks and proactively protect women.

3. Functional Requirements:

1. **Person Detection and Gender Classification:**
    - The system should detect all individuals present in the monitored scene.
    - It should classify each detected person by gender using machine learning models.
    - The accuracy of gender classification should exceed 95% under various environmental conditions (e.g., different lighting, occlusions).
2. **Gender Distribution Analysis:**
    - The system should provide real-time data on the number of men and women present in a given location.
    - It should generate hourly reports on gender distribution to identify patterns and trends.
    - The system should display this information on a centralized dashboard for quick reference.
3. **Lone Woman Detection at Night:**
    - The system should identify situations where a lone woman is present in a public space during nighttime hours (e.g., between 8 PM to 6 AM).
    - When such a scenario is detected, the system should generate an alert to notify law enforcement or security personnel.
    - Alerts should include the location, time, and a short video clip or image for verification purposes.
4. **Detection of a Woman Surrounded by Men:**

- The system should monitor and detect scenarios where a woman is surrounded by multiple men, which may indicate a potential safety threat.
- Upon detection, an alert should be generated with location details and a timestamp.
- The system should be capable of filtering false positives, such as crowded public events.

5. **SOS Situation Recognition through Gesture Analytics:**
   - The system should use gesture analytics to recognize distress signals (e.g., waving hands, defensive postures).
   - When an SOS gesture is detected, the system should immediately trigger an alert.
   - Alerts should include the person's location, time, and context images to aid law enforcement response.
6. **Hotspot Identification:**
   - The system should analyze past alerts and surveillance data to identify high-risk areas ("hotspots") where incidents are more likely to occur.
   - It should provide periodic reports to law enforcement, highlighting these areas for increased vigilance.
   - The system should allow for customization of hotspot criteria based on local needs and historical data.

4. Non-Functional Requirements:

- **Performance:**
  - The system should operate in real-time, with minimal latency (less than 1 second) for detecting and generating alerts.
- **Scalability:**
  - It should support deployment across multiple locations and handle increasing numbers of cameras and sensors without degradation in performance.
- **Reliability:**
  - The system must maintain an uptime of 99.9% to ensure continuous monitoring.
  - False positive and negative rates should be minimized to below 5%.
- **Security:**
  - All data transmission between the system components should be encrypted.
  - The system should comply with local privacy laws and data protection regulations.
- **Usability:**
  - The user interface for law enforcement should be intuitive, with easy-to-understand alerts, notifications, and control options.
  - The system should provide training modules and documentation to ensure efficient usage by end-users.

5. Assumptions and Constraints:

- The surveillance cameras and sensors are operational and of high quality (minimum 1080p resolution).
- Adequate internet connectivity is available for real-time data transmission.

- The system must comply with local and international privacy and surveillance laws.
- The deployment environment should be weather-resistant to ensure continuous operation.
