SafeNet: A Rapid Response System

Welcome! Today we'll explore the vital role of rescue management systems in saving lives and ensuring efficient disaster response.

Team members:

Shruti Sen (002057639)

Sanskruti Vinod Mahajan (002055776)

Ishaan Pradeep Samel (002301229)

Project Overview

This system leverages drones and real-time communication to enhance emergency response, optimize response times, and improve coordination among emergency services like police, hospitals, and ambulances. When a victim dials 911, the system identifies the location, routes the call to the nearest emergency department, and deploys a drone for real-time guidance from an on-call doctor.

In the case of an accident, the drone scans the vehicle's license plate and alerts the police to notify the victim's emergency contacts. It also calculates the quickest ambulance route to the scene, ensuring rapid assistance. This system significantly improves coordination and response efficiency, ultimately saving lives.

Problem Statement

During emergencies, timely medical intervention is critical. The average response time for ambulances—approximately 15-30 minutes—can be fatal for conditions like cardiac arrest, where immediate aid is required within 5-10 minutes. This project aims to bridge this time gap and enhance survival chances by deploying an Ambulance Drone equipped with essential life-saving tools and remote medical guidance.

Proposed Solution

- **Ambulance Drone:** A fast-deploying drone triggered by a 911 call, carrying a medical kit with an Automated External Defibrillator (AED), CPR aids, oxygen masks, medications, and other emergency supplies.

- **Efficient Coordination:** Automated routing to the nearest appropriate hospital, real-time alerts to doctors, and optimized ambulance dispatch pathways.

- **Police Collaboration:** In case of accidents, the drone can scan license plates to identify victims and notify their emergency contacts.

Actual working

- In this system, a 911 call triggers the process where the admin retrieves the incident location and routes the call to the nearest Emergency Department.

- A drone is dispatched to the site, streaming live footage to an on-call doctor who provides real-time guidance, such as CPR instructions.

- For accidents, the drone scans the vehicle's license plate, enabling the police to identify the victim and alert their emergency contact.

- Simultaneously, the drone calculates the shortest ambulance route and shares it with the hospital, where an admin dispatches an available ambulance.

- Once the ambulance arrives, the drone returns to its station, ensuring quick, coordinated, and effective emergency response.

Key Enterprises

Emergency 911 Enterprise

Provides the initial point of contact for emergency situations.

Police Enterprise

Responsible for responding to accidents and assisting with identification and contact tracing through the use of license plate scanning and the drone's live feed.

Hospital Enterprise

Coordinates medical response by providing on-call doctors for real-time guidance, dispatching ambulances based on proximity and availability, and receiving information from the drone.

Drone Enterprise

Manages the drone fleet, ensures operational readiness, and provides maintenance and support for the drones used in the system.

Organizations and Roles

Organizations

- Emergency 911 department organisation
- Police Organisation
- Drone Organisation
- Ambulance Organisation
- Doctor Organisation
- Hospital Organisation

Roles

- Enterprise Admin role
- Doctor Role
- Ambulance role
- Drone role
- Hospital Admin role
- Publicsafety Dispatch Admin role
- Police role
- Emergency 911 role

Workflow
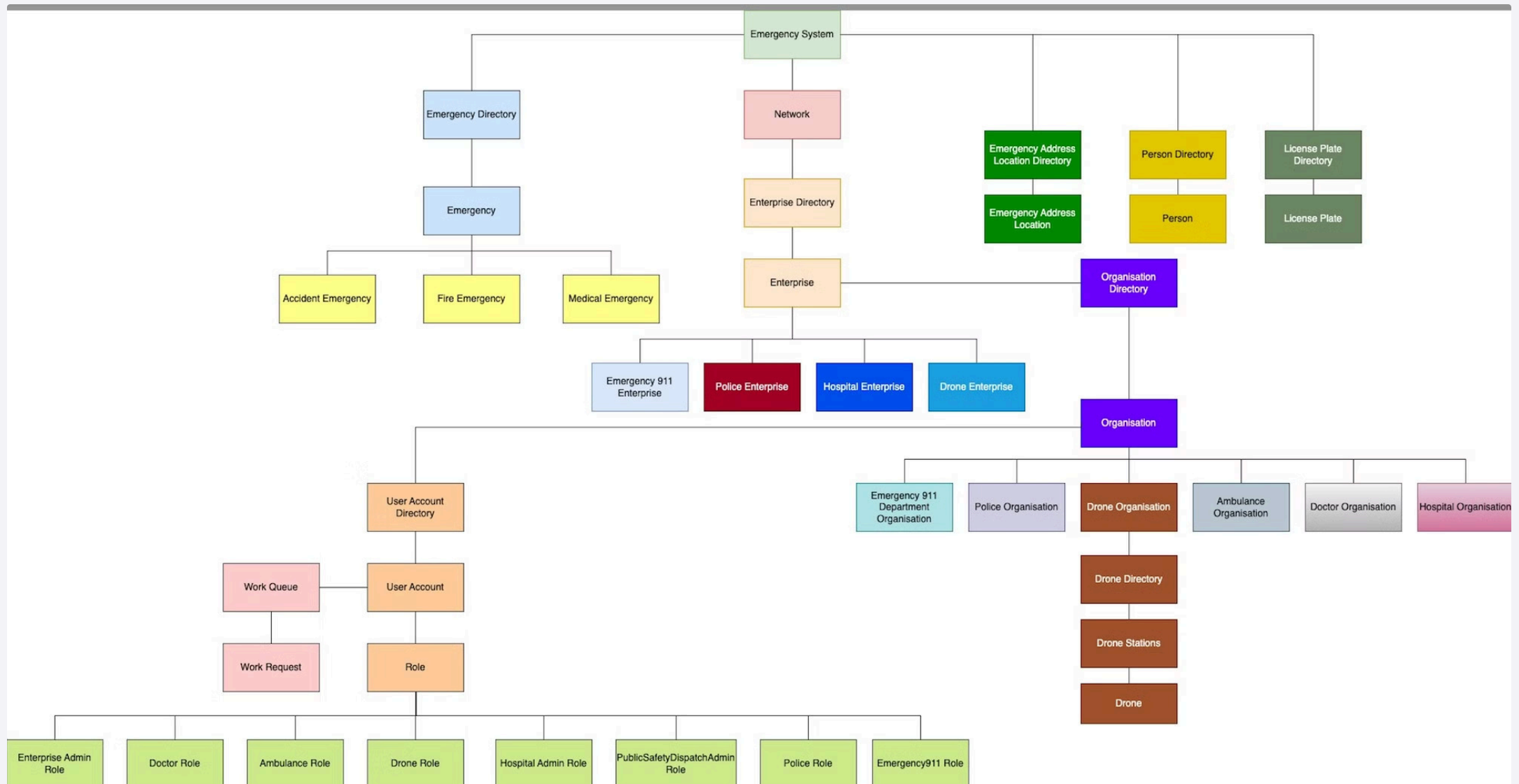
Emergency Response Workflow

- **Emergency Call Handling**:
  - Victim dials 911 for assistance.
  - Admin fetches the incident location and routes the call to the nearest Emergency Department.
- **Drone Activation & Doctor Assistance**:
  - Admin identifies the nearest drone station.
  - Drone streams live footage to the doctor, enabling real-time monitoring and guidance (e.g., CPR instructions).
- **License Plate Scanning (Accidents)**:
  - Drone scans the vehicle's license plate.
  - Police fetch registered car owner details and alert emergency contacts.

Workflow

Ambulance Dispatch & Hospital Coordination

- **Shortest Path Computation**:
  - Drone calculates the shortest route for the ambulance and shares it with the hospital.
- **Ambulance Assignment**:
  - Hospital admin identifies an available ambulance and sends it to the incident location.
- **Drone Recovery**:
  - After the ambulance arrives, the drone returns to its station.

High-level Component Diagram

UML Diagram