PARSHWANATH CHARITABLE TRUST'S
A.P. SHAH INSTITUTE OF TECHNOLOGY
Department of Computer Science and Engineering
Data Science

CSE DATA SCIENCE

Semester: VII   **Class / Branch: BE DS**

Academic Year: 2024-25

Group No: 4

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Title: Sentinel AI: Smart City Emergency Response System

Project Proposal

Abstract:

The *"Sentinel AI: Smart City Emergency Response System"* is a comprehensive platform designed to enhance urban safety and efficiency by integrating personal and smart city sensors into a centralized hub. This system leverages advanced multimodal AI models deployed on edge nodes to automatically detect abnormal situations such as gas leaks, accidents, fires, and other emergencies, reporting them to relevant authorities. The platform ensures privacy and security by not preserving data on personal systems unless configured otherwise. It features a centralized hub with dashboards for various emergency services and an easy-to-use mobile app for citizens to report incidents, enhancing the city's overall emergency response capabilities.

Objectives:

- To use multiple sensors and AI models to automatically detect emergency situations such as gas leaks, fires, accidents and immediately intimate responsible teams.

- To implement an advanced analytics dashboard that provides insights based on type of emergencies in specific areas for improving relevant infrastructure in those areas

- To develop a mobile app for common users as well as emergency response teams, such as firefighters, ambulances, traffic police etc. Users can report any emergency and emergency response teams will be immediately intimated of emergencies.

- To build a hardware prototype integrating sensors for detecting smoke and gas leaks.

Technology Stack:

- Docker, Kubernetes, VMWare Pro for deployment

- Django 5.0 with async views for centralized hub

- Django Channels for websockets

- Django Rest Framework for Rest API

- Nginx/S3 for storing and serving media and static files

- FastAPI for edge nodes

- Tensorflow, PyTorch, Keras for fine tuning and deploying pretrained models

- React Native/Flutter for mobile app

- Tailwind CSS, DaisyUI, ChartJS and AlpineJS for web interface

- Custom simulations using Smart Phone Sensors, Prerecorded CCTV feeds and time series Datasets of air quality

Scope:

- Smart cities: Implementation in urban areas with existing smart infrastructure, enhancing emergency response through interconnected devices and sensors.

- Multi-agency coordination: Improving communication and data sharing among various emergency services like police, fire departments, and medical responders.

- High-density areas: Serving populous residential and commercial districts with advanced security features, incident detection, and rapid response capabilities.

- Public spaces and events: Covering critical areas such as parks, transportation hubs, and large-scale event venues for real-time monitoring and emergency management.

- Industrial zones: Extending to factories and hazardous areas for early detection of potential emergencies like gas leaks and fires.