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CHENNAI

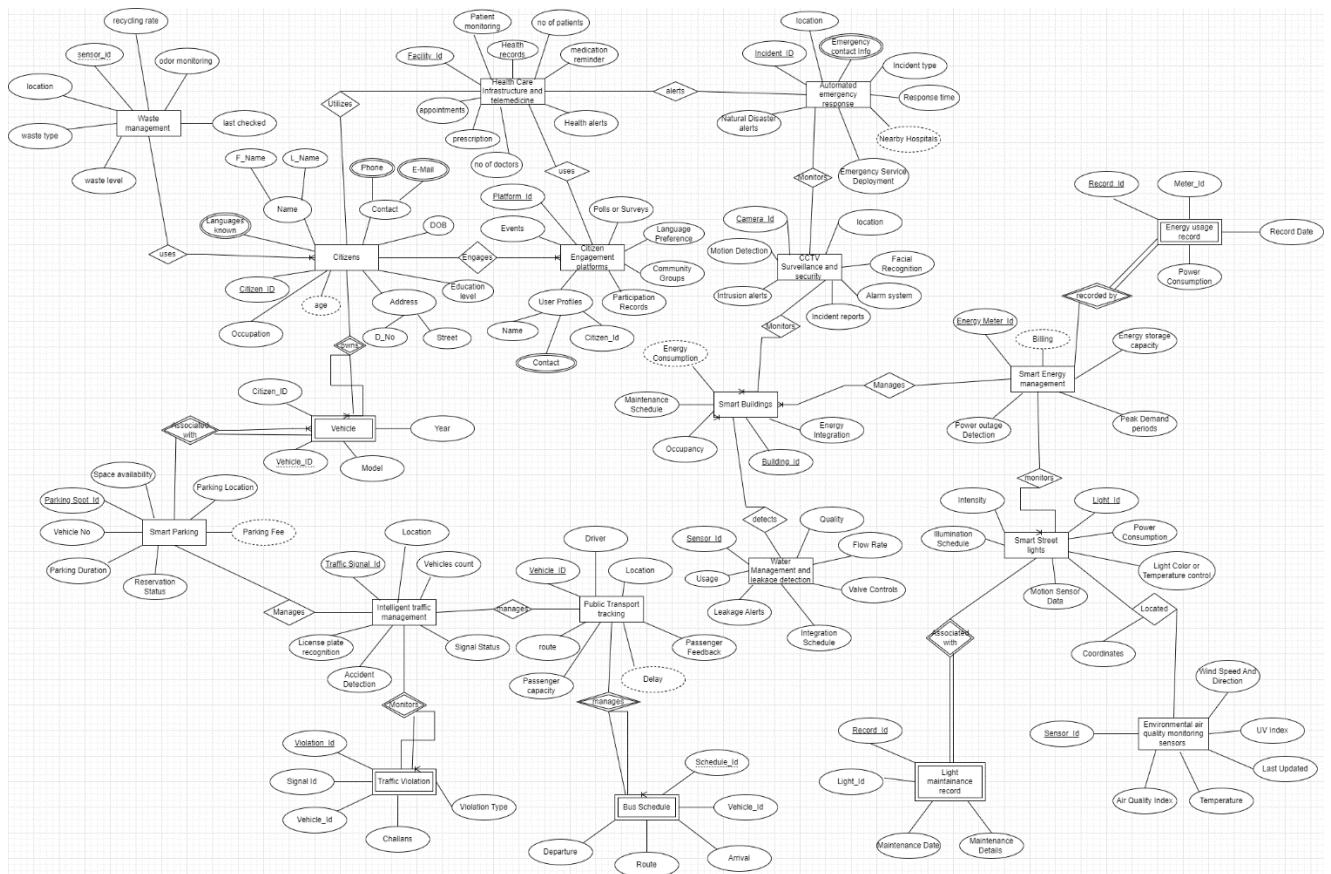| **Name:**	T Umesh Chandra	**Reg No:**	21BCE5606
Course:	DBMS	**Course code:**	BCSE302P
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Smart City Management System

Abstract:

Urban management systems have undergone a revolution with the introduction of smart city technologies, which provide creative answers to the problems posed by an urban population that is expanding at an accelerated rate. An extensive description of a smart city management system intended to improve urban settings' sustainability, efficiency, and quality of life is provided in this abstract. The management system for smart cities consists of a wide range of networked organisations and state-of-the-art technology designed to maximise many facets of urban life. Citizens, infrastructure elements like intelligent lighting, waste management sensors, and digital signs, as well as intelligent systems for traffic control, energy use, water management, and emergency response, are considered key entities. In the ecosystem of smart cities, citizens are essential players who use digital platforms for interaction, communication, and service access. Advanced sensors, data analytics, and real-time monitoring are all used by smart infrastructure components to collect insightful information and facilitate proactive decision-making. Environmental sensors, for example, keep an eye on the quality of the air, while smart streetlights adapt their lighting levels according to ambient circumstances and occupancy, promoting environmental sustainability and energy efficiency. The smooth coordination and optimisation of urban activities is made possible by the integration of intelligent systems. Tracking public transit in real time guarantees effective movement, and automatic emergency response systems bolster security and adaptability. Furthermore, by optimising parking space use, smart parking systems save emissions and traffic. Robust data governance frameworks provide the foundation for the smart city management system's deployment, ensuring data security, privacy, and ethical usage. In addition, systems for participatory government and citizen engagement encourage cooperation among interested parties, giving locals the ability to influence decisions and mould their communities' futures. To sum up, the smart city management system is an all-encompassing approach to urban administration that makes use of data, technology, and public involvement to build resilient, inclusive, and sustainable cities. Through the use of innovation, cooperation, and digital

transformation, urban areas may surmount current obstacles and establish pathways towards a more intelligent and habitable future.

Summary:

Items	Count
Entity	19
Relations	20
Strong Entity	14
Weak Entity	5

ER Database for your Database:

Tables with detailed schema

Citizen Table Components:

Citizen_Id, F_name, L_name, D_no, Street, DOB, Age, Occupation, Education level, languages known, Phnon_no, E-mail

Functional Dependencies: Citizen_Id,

Intelligent Traffic Management:

Traffic Signal_ID, location, vehicle_count, signal Status, license plate recognition, Accident_detection

Waste Management:

Sensor_Id, location, waste type, waste level, recycling rate, odor monitoring, last checked

Smart Parking:

Parking spot_Id, space availability, parking duration, reservation status, Vehicle number, parking location, parking fee,

Smart Street lights:
Light_Id, Location Coordinates, intensity, Power Consumption, motion sensor data. Illumination Schedule, Light color/ temperature control.

Environmental air quality monitoring sensors:

Sensor_Id, Location coordinates, Air Quality Index, temperature, wind speed/direction, UV Index, Last Updated.

Energy Management:

Energy Meter_ID, energy storage capacity, billing, peak demand periods, power outage detection

Public Transport Tracking:

Vehical_Id, driver, route, location, passenger capacity, delay, passenger feedback

Water Management and leakage detection:

Sensor_id, usage, leak alerts, quality, flow rate, valve controls, Irrigation schedule

Automated Emergency Response:

Incident_Id, location, Emergency Contact Info, Incident type, response time, natural disaster alerts, emergency service deployment, nearby hospitals

Citizen engagement Platforms:

Platform Id, Citizen Id(Foreign key), evens, contact, name, polls/surveys, participation records, language preference, community groups

CCTV Surveillance and security:

Camera_Id, motion detection, location, facial recognition, Intrusion alerts, alarm system, incident reports

Smart Buildings:

Building_ID, occupancy, indoor air quality, energy integration, energy consumption, maintenance Schedule

Health Care Infrastructure:

Facility_Id, appointments, patient monitoring, health record, prescription, health alerts, medication remainders, no of patients and doctors

Weak entities:

Citizens Vehicles:

Vehical_Id, Citizen_ID(Foreign key), model, year

Traffic Violation:

Violation_Id, singal_Id(Foreign key), vehical_id(Foreign key), violation type, challans

Light maintenance records:

Record_Id, light_ID(Foreign key), maintenance date, maintenance details

Energy usage record:

Record_ID, meter_ID(Foreign key), consumption, record date

Bus Schedule:

Schedule_Id, Vehicle_ID(Foreign key), route, departure, arrival

FD's:

Citizens:

- {CitizenID} -> {Name, Address, Contact Information}

- {Contact Information} -> {CitizenID} (assuming uniqueness)

Intelligent traffic management:

- {TrafficFlowData} -> {Traffic Congestion Level, Vehicle Count, Vehicle Speed}

Waste management sensors:

- {BinLocation} -> {Waste Type, Bin Fill Level, Collection Schedule}

Smart parking:

- {ParkingSpaceID} -> {Availability, Occupancy Duration, Location}

Smart street lights:

- {Location} -> {Light Intensity, Power Consumption, Maintenance History}

Environmental air quality monitoring sensors:

- {Location} -> {Pollutant Concentration Levels, Temperature, Humidity}

Smart energy management:

- {ElectricityConsumption} -> {Peak Demand Periods, Energy Tariffs}

Public transportation tracking:

- {VehicleID} -> {Location, Arrival/Departure Times, Route Information}

Smart water management and leakage detection:

- {Location} -> {Water Usage, Leak Detection Alerts, Water Pressure}

Automated emergency response:

- {Location} -> {Emergency Contact Information, Incident Type}

Citizen engagement platforms:

- {PlatformID} -> {User Profiles, Activity Logs, Engagement Metrics}

CCTV surveillance and security systems:

- {CameraID} -> {Footage, Location, Timestamp}

Smart buildings with energy-efficient features:

- {BuildingID} -> {Occupancy, Energy Consumption, Environmental Controls}

Smart healthcare infrastructure with telemedicine capabilities:

- {PatientID} -> {Electronic Health Records, Telemedicine Appointments}