**Adejare Fasiku - ITAI 2372 - Smart Cities.**

1. **Smart Traffic Management**
   * Systems and technologies used to optimize vehicle flow and reduce congestion across urban roads.
   * **Real-time event reporting:** Allows users to report accidents, closures or hazards instantly so others can reroute.
   * **Adaptive traffic controls:** Traffic signals that dynamically adjust timing based on current volumes and patterns.
2. **Efficiency & Energy**
   * **Energy management:** Monitors usage (e.g., buildings, street lighting) and automatically adjusts heating, cooling or lighting to save power.
3. **Security & Safety**
   * **Smart surveillance systems:** Camera networks with analytics (motion detection, facial recognition) to detect and alert on unusual activity.
   * **Predictive policing:** Data-driven models that forecast likely crime hotspots so law enforcement can allocate patrols more effectively.
4. **Waste & Environmental Monitoring**
   * **Waste collection management:** Coordinated scheduling and routing of collection vehicles based on fill levels and traffic.
   * **Recycling optimization:** Monitors recycling rates and optimizes pickup to encourage proper sorting and resource recovery.
   * **Smart bins:** IoT-enabled containers that report fill status, so collection only occurs when needed.
   * **Air quality sensors:** Distributed monitors measuring pollutants (e.g., PM2.5, NO₂) to inform health advisories.
   * **Water quantity sensors:** Track levels in reservoirs and pipes to detect leaks or anticipate shortages.
   * **Water quality sensors:** Continuously test for contaminants (e.g., pH, turbidity) to ensure safe drinking water.
5. **Public Transport Management**
   * **Dynamic service adjustment:** Modifies frequency and routes in response to special events or real-time demand.
   * **Smart ticketing:** Contactless or mobile payment systems for faster boarding and flexible fares.
   * **Integrated transit systems:** Unified platforms linking bus, rail and bike-share for seamless full trip planning and payment.
6. **Healthcare for Smart Cities**
   * **Remote health monitoring:** Wearables;(e.g. Apple Watch, iPhone) and home sensors that track vital signs and alert providers as needed.
   * **Real-time care coordination:** Telemedicine and emergency dispatch systems linking patients to providers without delay.
   * **Health data analytics:** Uses aggregated data to identify service gaps and plan new clinics or resources.
   * **Smart hospital platforms:** Digital systems letting patients view doctor availability, specialties and book appointments instantly.
7. **Citizen Engagement & E-Governance**
   * **Streamlined online workflows:** Digital channels for permits, licenses and other administrative tasks.
   * **Mobile city apps:** Let residents pay bills, report issues or access services from anywhere.
   * **Public kiosks:** Self-service terminals providing information, payments and forms.
   * **Decision-support AI:** Analyzes citizen feedback and service data to guide policy.
   * **Automated record retention:** Digital record-keeping (permits, filings) to comply with legal requirements.
   * **Online court services:** Virtual case filing, hearings and status updates to reduce delays.
8. **Challenges**
   * **Algorithmic transparency:** “Black-box” AI makes it hard to audit decisions, risking unfairness or error.
   * **Data breaches:** Sensitive personal or infrastructure data could be exposed or misused.
   * **Interoperability & cost:** Integrating diverse systems and funding deployments remain significant hurdles.