Case Study: Tumkur Smart City and Computer Vision

Introduction:

Tumkur is a rapidly growing city in the Indian state of Karnataka. In recent years, the city has been selected as one of the Smart Cities by the Government of India. As part of the Smart City initiative, Tumkur has been implementing several technology-based solutions to improve the quality of life for its citizens. One such solution is the use of computer vision technology to enhance safety and security in the city. In this case study, we will explore how Tumkur has been using computer vision to improve the city's safety and security and the technologies behind it.

Objective:

The primary objective of using computer vision in Tumkur is to improve safety and security in the city. The technology is being used to monitor traffic, detect crime, and identify potential threats to public safety. Additionally, computer vision is being used to gather data on various aspects of the city's infrastructure, such as roads and buildings, to help with future planning and development.

Technologies Used:

Tumkur Smart City has implemented several technologies to support its computer vision system. Some of the key technologies include:

1. CCTV Cameras: The city has installed CCTV cameras throughout the city to monitor traffic, pedestrian movement, and public spaces. These cameras are equipped with high-resolution sensors that can capture clear images even in low-light conditions.
2. Machine Learning Algorithms: Machine learning algorithms are used to analyze the data captured by the CCTV cameras. These algorithms can detect and recognize various objects such as vehicles, people, and animals.
3. Edge Computing: The data collected by the CCTV cameras is processed at the edge of the network. This approach reduces the load on the city's data center and ensures that real-time data is available to decision-makers.
4. GIS Mapping: Geographic Information System (GIS) mapping technology is used to visualize and analyze the data collected by the CCTV cameras. GIS mapping provides valuable insights into the city's infrastructure, including roads, buildings, and other landmarks.

Use Cases:

Tumkur Smart City's computer vision system has several use cases, including:

1. <u>Traffic Management:</u> The system monitors traffic flow in real-time and provides insights into traffic congestion, accidents, and other incidents. This information is used to improve traffic management in the city and reduce travel times for citizens.
2. <u>Crime Detection:</u> The system uses machine learning algorithms to detect and recognize criminal activity, such as theft and vandalism. This information is shared with law enforcement agencies to help prevent crime and apprehend criminals.
3. <u>Disaster Management</u>: The system can detect and monitor natural disasters, such as floods and landslides. This information is used to alert citizens and coordinate relief efforts.
4. <u>Infrastructure Planning</u>: The system provides valuable data on the city's infrastructure, including roads, buildings, and other landmarks. This information is used to plan future development projects and improve the overall infrastructure of the city.

EFKON India also helped in development and implementation of the below Smart City solutions

'One Tumakuru' Mobile App

Emergency Response System

Environment Monitoring System

Variable Messaging System (VMS)

Satellite Control Centre

Disaster Recovery Centre

Benefits of the implemented system:

Benefits to the local administrations, citizens and commuters of Tumkur

PAS installed at 8 junctions with 16 speakers allowing officials to address large public gatherings, emergencies, and movements across the city

ANPR installed at 8 junctions ensuring the continued safety of all road users and monitoring traffic activities

Variable Messaging System installed at 5 junctions to provide real-time information about traffic conditions, weather conditions, and speed limit

RLVD systems installed at 8 junctions to improve compliance with road traffic rules concerning red light violation and ensuring a smooth movement of vehicles

Environment Monitoring System monitoring real-time pollution levels

ATCS improving travel time and reduce congestion installed at 7 junctions

Traffic Surveillance Systems ensuring the safety and security of citizens using city surveillance cameras

E-challan issuing of automatic e-challan for the violators on a 24*7 basis

Conclusion:

Tumkur Smart City's use of computer vision technology has improved safety and security in the city. The system has enabled real-time monitoring of traffic and public spaces, detection of criminal activity, and identification of potential threats to public safety. The system has also provided valuable data on the city's infrastructure, which can be used to plan future development projects. With the continued implementation of technology-based solutions, Tumkur is on its way to becoming a truly Smart City.

References:

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