Scalable Real-Time Person Tracking System

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Introduction:

The Real-Time Person-Tracking System for Multiple Cameras project at IIT Goa is an advanced video processing solution tailored for surveillance and monitoring purposes. This system boasts the capability to detect and track suspicious individuals across multiple camera feeds or videos in real time. Presently, our focus lies on enhancing the system's performance and conducting comprehensive latency assessments across its various components. Additionally, we aim to undertake a series of experiments to evaluate the system's scalability and overall effectiveness.

Step-by-Step Deliverables:

1. Understanding Current System Architecture:
   i. Analyze the existing system architecture to gain insights into its functionalities and limitations.
   ii. Identify areas for potential improvement and optimization.
2. Performing Latency Characterization Across Different Components:
   i. Identify bottlenecks and areas for optimization to enhance real-time tracking capabilities.
   ii. Conduct detailed latency characterization studies to assess the performance of individual system components.
3. System Performance and Scalability Evaluation Using Parallel Processing Concepts
   i. Design and execute a series of experiments to evaluate the system's performance under various load conditions.
   ii. Assess the system's scalability to handle large-scale surveillance environments efficiently.

Eligibility:

Must have completed at least 3 years (6 semesters) of B.Tech/BE in CSE/ECE/EE.
M.Tech (CSE/ECE/EE) students who have completed 2 semesters of studies are also eligible.

Expected Skills:

1. Proficiency in Python programming, including multithreading and multiprocessing modules.
2. Experience with PyTorch and OpenCV for implementing computer vision algorithms.
3. Familiarity with object detection techniques, particularly YOLO (You Only Look Once).
4. Knowledge of object tracking algorithms, such as correlation filters, to facilitate efficient person-tracking.
5. Ability to develop and deploy REST APIs for seamless integration with other systems.
6. Understanding of Docker containers and High-Performance Computing (HPC) systems to facilitate deployment and scaling of the solution