

Title: Tracking and Surveillance of Multiple Objects over a Camera Network

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Abstract: Computer vision is highly data driven as it is a field of study, and has always got open room or future scope for more research. With the advancement of machine learning and pattern recognition methods, computer vision has become even more accessible. Object detection and tracking are building blocks of modern artificial intelligence systems relating to surveillance. The aim of this thesis work is to create a system that can uniquely identify and track multiple human targets across the camera network. We use a variety of object detection and tracking algorithms in conjunction with object registration methods. Conventional feature extraction methods and numerous other image processing and computer vision techniques to aid our task. Problem statement is approached in a step by step manner. First task of detection and tracking is accomplished. Later reidentification of targets across camera networks is done using feature extraction and key point matching techniques. Finally formulating the whole network communication to keep track of multiple targets inside the network. We utilize existing algorithms and suggest proposed modifications of our own to accomplish our task. We implement this project using Python library OpenCV with occasional usage of libraries like Pytorch, NumPy and TensorFlow.

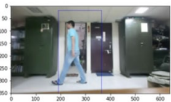


FIGURE 3.1: YOLO Detection for Single Human Target

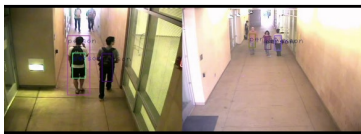


FIGURE 3.2: YOLO Detection for Multiple Human Target in two different camera frame

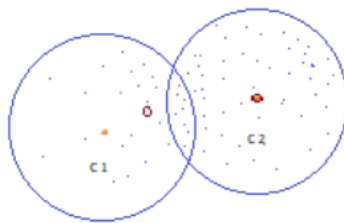


FIGURE 4.1: Virtual boundaries

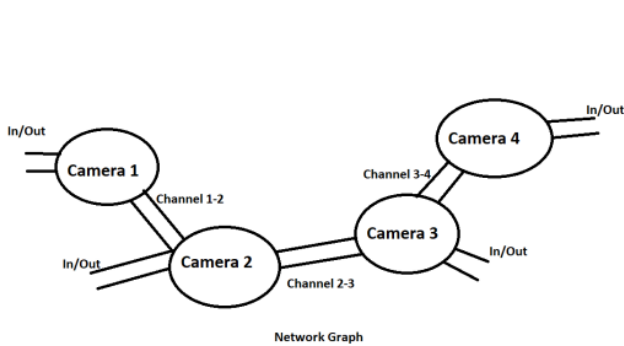


FIGURE 4.3: Camera Network



FIGURE 4.6: Channel data



FIGURE 5.6: Tracking with background subtraction