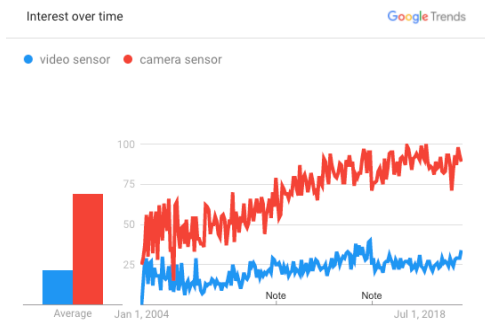


Dynamic Optimization Using Object Detection in Bandwidth Constrained Automatic Multi-camera Networks

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Background: Increasing Need For Surveillance Camera



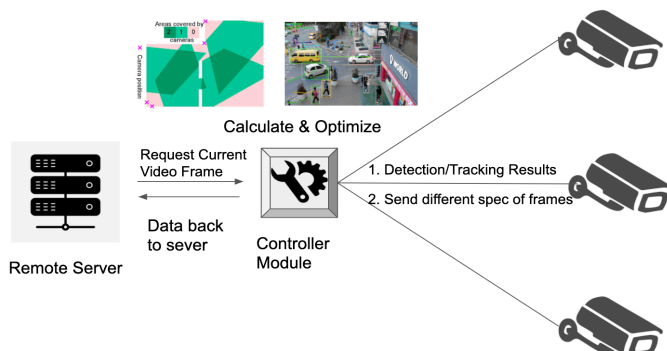
- Estimated over 1 billion surveillance cameras globally by 2021
- More interests for multi-camera network on computer vision tasks such as object tracking and re-identification

Problem: Bandwidth Limitation on Multi-camera System

The available bandwidth for multi-camera system can be limited by:

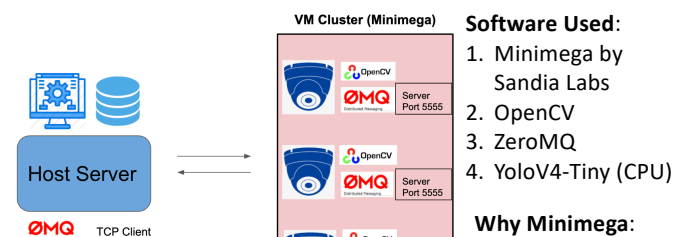


Proposed System Design



- A controller module to prioritize the camera stream importance based on current bandwidth & frame information (1st request).
- On-board object detection on native stream to do object count
- 2nd request to individual cam with various video spec based on:
 - Camera placement & relation
 - Current object information

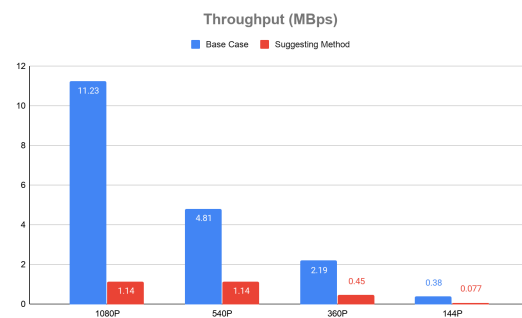
Controlled Experiment: An Emulation Testbed For Bandwidth Consumption



2 Cases: traditional/base & proposed

- Base: stream same spec & post-processing
- Proposed: send on-board detection result first then stream on specs system decide

Preliminary Results



Proposed Method:

- ~ 10 times improve in bandwidth on FHD
- Steady, accurate (97%) counting

Next Step: Optimization Strategy

- Explore and design formula for optimization based on shared multi-camera information (tracking ID, objects count, camera location, ...)
- Hardware understanding: How much computation power will be needed for real-time on-board detection & tracking

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