Video As a Sensor

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Background

Real Time Object Detection:

- Re-training YOLO: You Only Look ***Once*** detection system
- Optimization of runtime in a Convolutional Neural Network
- Maximizing information coming out of each frame

Project Goals

- Streamline process where available, and **multithread** parallelizable components
- Protect the **privacy** of road users
- Develop a **global context** for system interpretation of detections

Current Progress Video

Video Link

Multithreading YOLO

Be able to run the system at the same speed as before, without the burden of running our system in series

- Instantiating two Conv-Nets together on the same GPU
- Split processes into parallel threads
- Stitch results back together

Facenet and ALPR: Background

Ensuring the privacy of motorists and pedestrians

- Facenet is a specific computer vision system to automatically detect and identify faces, utilizing Google's Tensorflow
- Automated License Plates Recognition (ALPR) systems function to automatically detect, localize, and characterize vehicle license plates
- We utilize the tool OpenALPR for accomplishing this task

Facenet and ALPR: Progress and Final Steps

- Resolving detection accuracy:
  - High accuracy detections run slower and require higher resolution imaging
  - Low accuracy detections do not protect the privacy of all individuals
- Isolation of conditions with False Negatives, reducing their impact
- Ignoring conditions with False Positives, and not drawing those detections

Context Aware Detections

Bringing the global context of the image into independent detections

- Manage what independent readings mean all together
- Using work from this Summer, we've combined bicycle, person, and helmet detections into two, unified detections: "helmeted cyclist" and "unhelmeted cyclist"
- This will continue to be an important step when bringing privacy detections into a single process with our Conv-Net

Bringing It All Together

- Assemble our work so far into a single, unified process
- Package our work in a more user-friendly way: making our system easy to implement for non-insiders
- We have a more informed set of new classifiers we'd like to train into our network