CSC 495/583 2018 Spring Final Project.

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Video Privacy for Public IP Camera

Background

Network or internet cameras are famous for keeping an eye on your property and your family. These cameras provide live video and audio feeds that you can access remotely using an internet browser. In this project, we analyze the network throughput of the public IP camera. Throughput is a critical, yet under-emphasized aspect of video surveillance. By examining the change of bandwidth for a certain IP camera, we may infer many important pieces of information. Understanding the network throughput is also critical to fully understand the mechanism behind the IP camera. We show how significantly real-time throughput can change in different scenes and with different settings. For this project, we use **Public IP camera** to study how to measure and analysis the video bandwidth. To start, you need to pick several public IP cameras from the list (http://www.insecam.org/en/). Alternatively, you can set up your IP camera if possible. Please make sure the camera URL you picked is working, and the camera supports H.264 CODEC.

Objectives and Targets

Answer the following questions, put the answer into your report:

Target 0

- Determine the model/band of this IP camera.

- Determine the location and IP address of this IP camera.

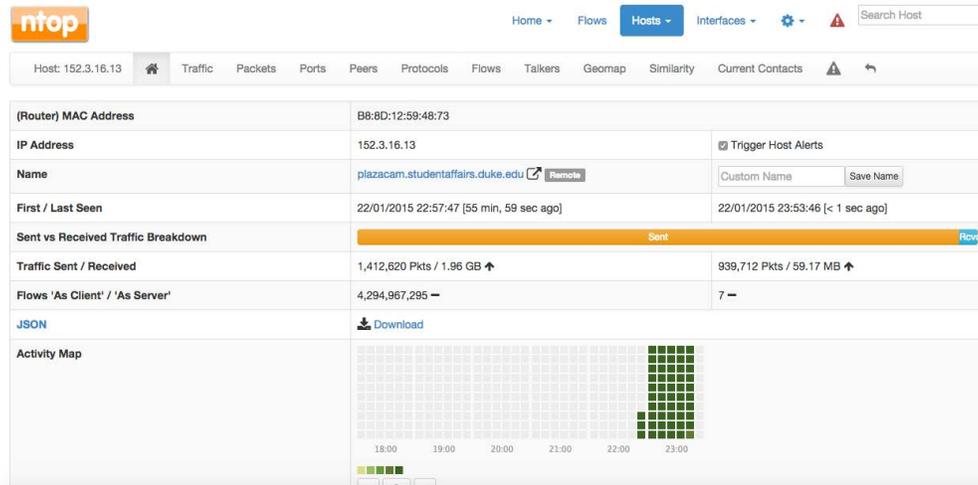- Determine the supported encoding CODECs of this camera. (Google the brand)

Figure 1: WebGUI of the ntopng system.

Then, we need to find a way to monitor and store the traffic data of this IP camera. One way to do this is using ntopng (http://www.ntop.org/products/ntop/). ntopng is an open-source network traffic monitor software. It is available for Unix, Linux, BSD, Mac OS X, and Windows. You can download the software from their website. For more information, you can check the online user's guide (https://www.ntop.org/support/documentation/documentation/). After logging into the ntopng system through a browser, you can set the monitoring interface and choose the host IP address that you want to monitor. Once finish the setup, you can watch the sent/received traffic through the web GUI (shown in Fig. 1). Note that you can also choose other methods/software to monitor the video traffic.

Target 1

Write a program continually monitoring and storing the traffic data of the IP camera. Then, process the traffic data to calculate the throughput consumption of the IP camera. Plot a figure to elaborate the result over time.

Target 2

Write a program to calculate the average/max/min throughput usage.

Next, design your own experiments to answer the following questions. You need to provide a write-up that describes your methodology (when and how you capture the data, how to record the ground truth... etc.)

Target 3

Is the throughput affected by the movement in a scene? If so, what's the relation? Please explain the reason.

Target 4

By comparing different lightning conditions (e.g. day mode and night mode), please answer which lightning condition is more sensitive to the movement in a scene. Why?

Target 5

Choose an IP camera facing an indoor environment (e.g. room). Write a program, use the throughpuyt data to detect if someone is inside the scene. State your methods and compare your result with the ground truth. Explain the reason.

Submission

- The project is due by 05/11/2018. Late submission will not be accepted;

- The assignment should be submitted to D2L directly.

- Your submission should include:

  1. A **detailed project report** to describe what you have done, including screenshots and code snippets. You also need to provide explanation to the observations that are interesting or surprising. You are encouraged to pursue further investigation, beyond what is required by the project description. Your can earn bonus points for extra efforts.

  2. Your **program source files** in any language you like. Note: ***DO NOT*** submit your binary result or raw data files.

- **No copy or cheating is tolerated**. If your work is based on others', please give clear attribution. Otherwise, you **WILL FAIL** this course.