A distributed system for video processing using deep learning across a wireless network
- Network devices answer queries by retrieving information from videos stored across the network and reduce query response time by computation **offload** from mobile devices to the video-cloud.
- Scheduler (running on video-cloud) minimizes query response time

### System Design

#### Network Setup:
- **Mobile devices**: (Nexus 9) running Android
- **Video-cloud**: (Dell Precision T7500) equipped with a GPU (GeForce GTX TITAN X 12 GB) for deep learning acceleration and running Linux.
- **Data Communication**: wireless link (WiFi) using TCP/IP

#### Scheduler
- Collects information of pertinent videos and the processing time on each device
- Determines each video offload at runtime, considering: processing delay, communication delay, and queuing delay, data transmission rate of device
- Scheduling stops when video offload does not further reduce processing time
- Mobile devices report the results of locally processed videos to the video-cloud

#### Parameters

**Top-k**
- Collects information of pertinent videos and the processing time on each device

**Data Rates**
- Dynamic wireless channels, and node mobility

### Related Publications
- **On-demand Video Processing in Wireless Networks**, Lu, Chan, Urgaonkar, La Porta, IEEE ICNP 2016
- **Video Processing of Complex Activity Detection in Resource-Constrained Networks**, Felemban, Lu, La Porta, Chan, IEEE GlobalSIP 2016

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