

Demo: On-demand Information Retrieval from Videos Using Deep Learning in Wireless Networks

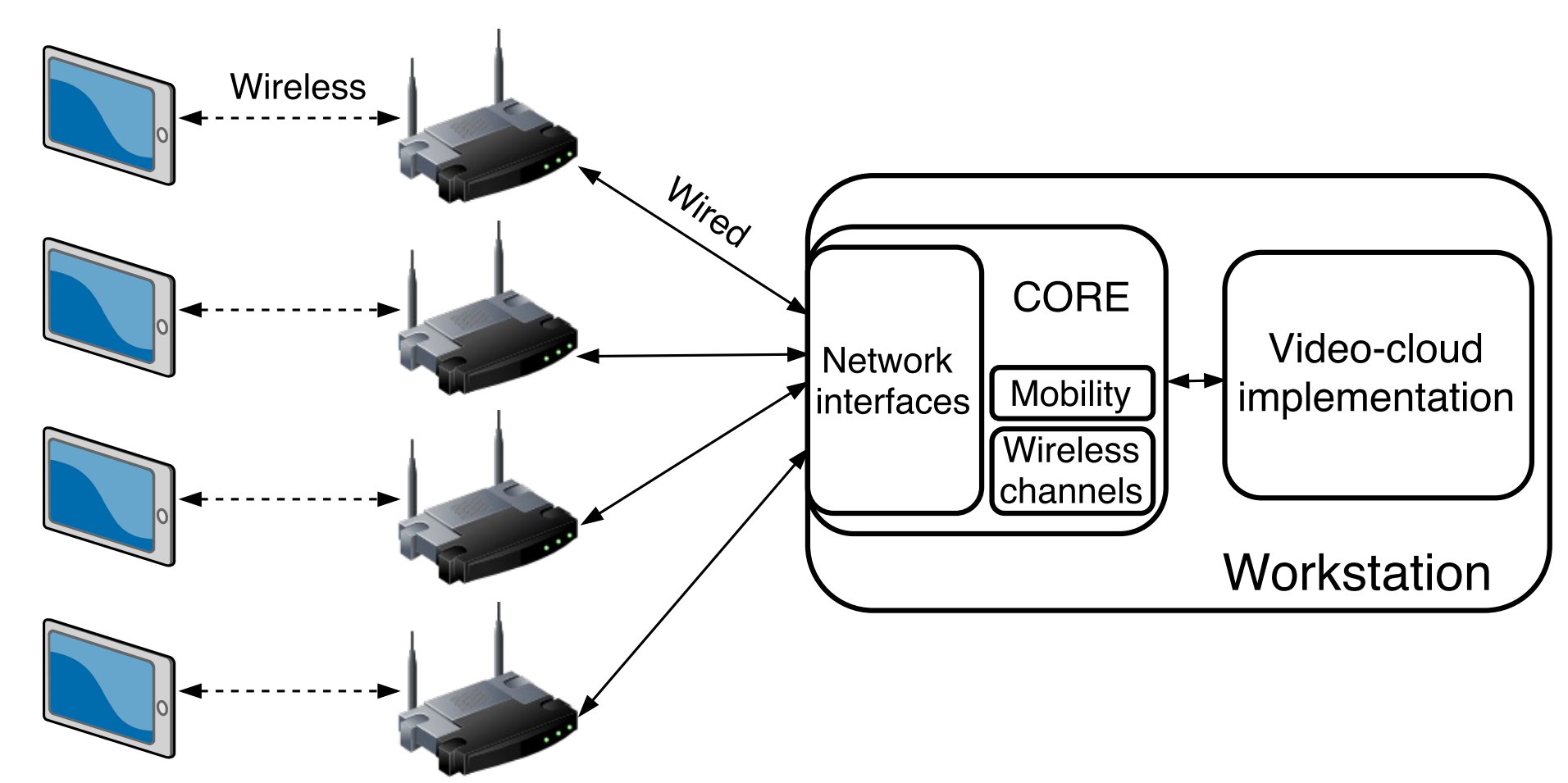
Z. Lu, N. Felemban, K. Chan, T. La Porta

- 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



Emulation environment

CORE handles the data between each device and the cloud

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