

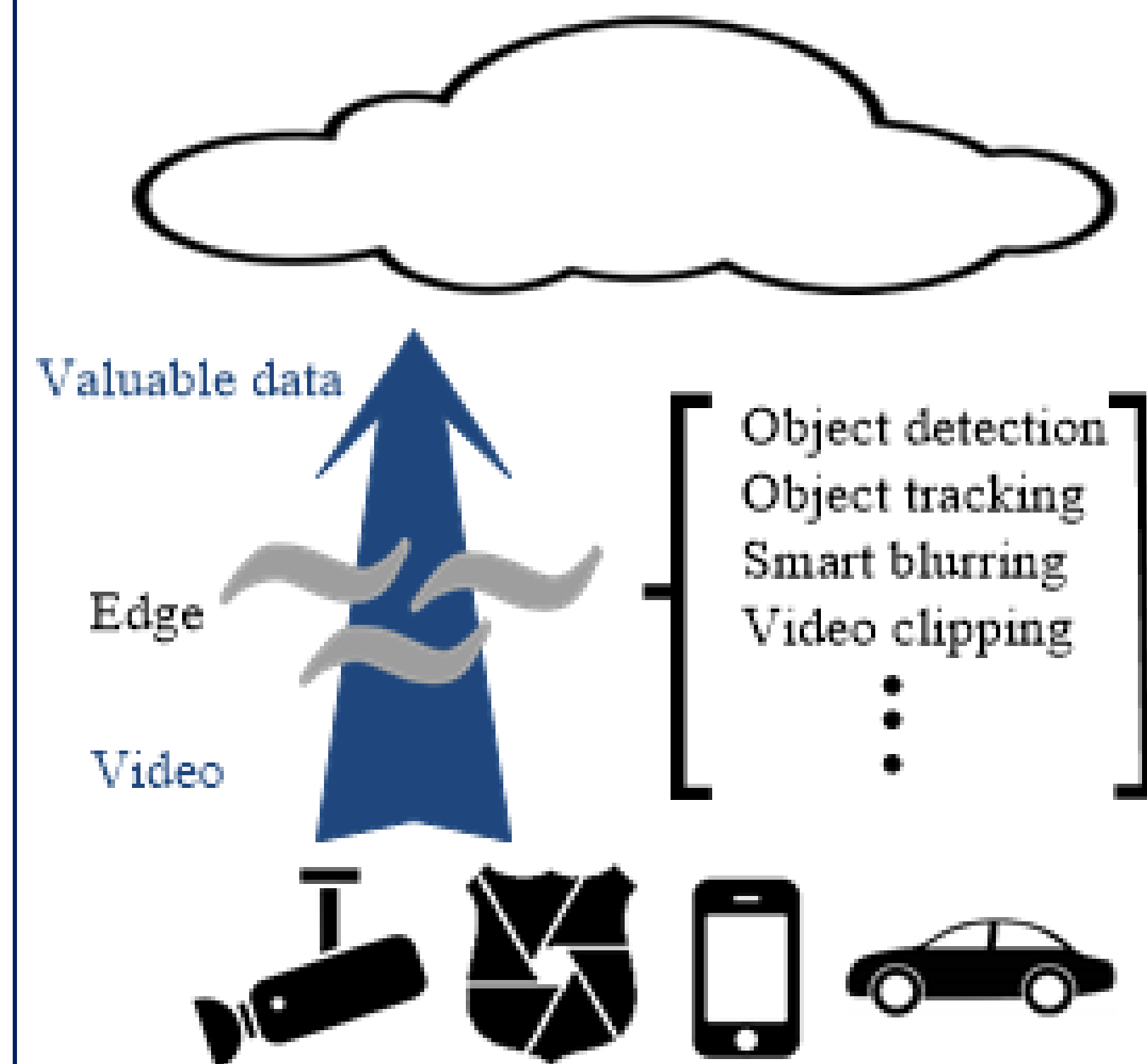
Qingyang Zhang<sup>1,2</sup>, Zhifeng Yu<sup>3</sup>, Weisong Shi<sup>1</sup> and Hong Zhong<sup>2</sup>

<sup>1</sup>Wayne State University, USA. <sup>2</sup>Anhui University, China. <sup>3</sup> Mobihealth Technologies LLC, USA

## Disadvantage for Live Video

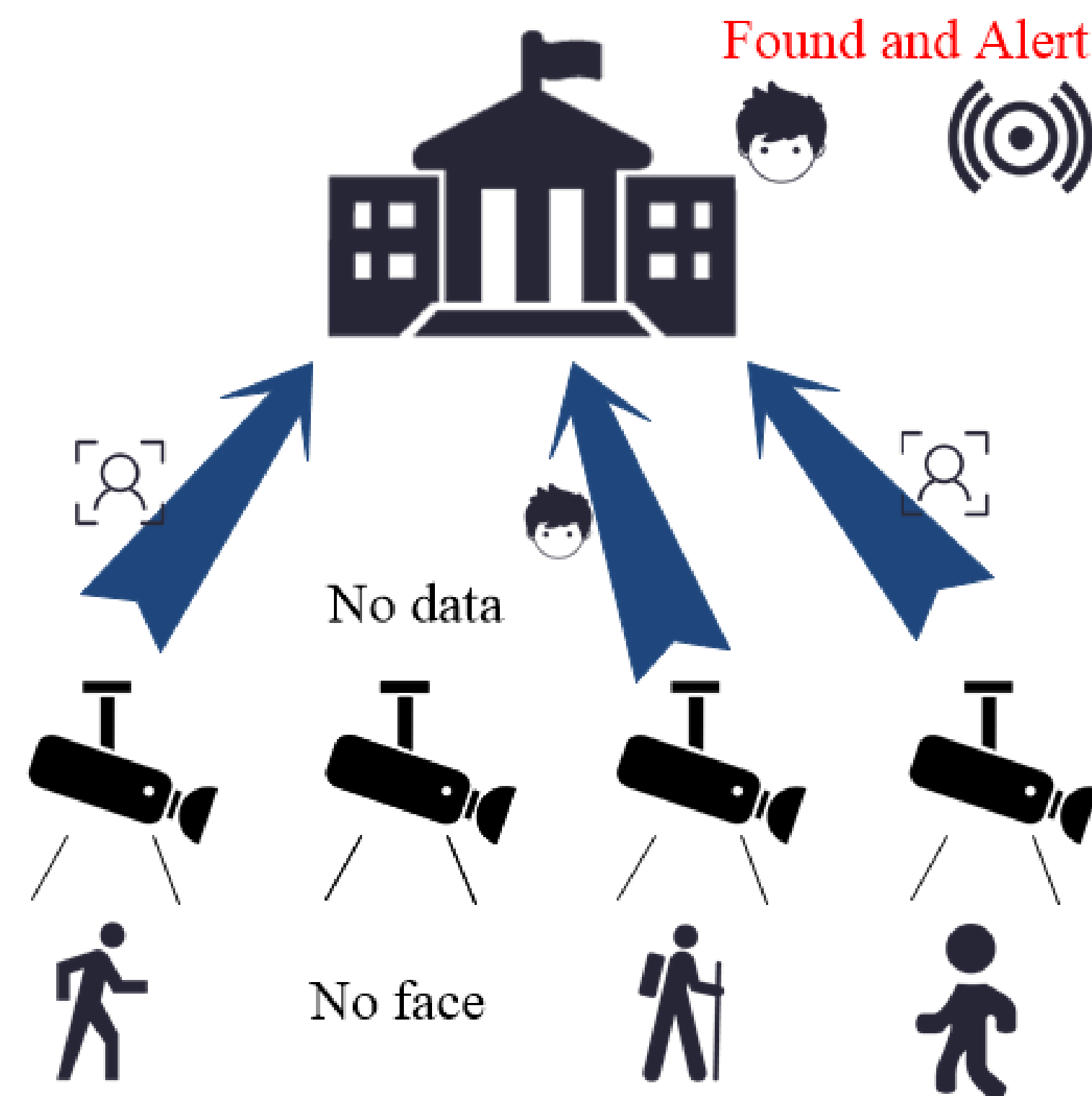
- ❖ **Bandwidth:**  
Large transmission of real-time video.
- ❖ **Latency**  
High latency for transmission and analysis.
- ❖ **Power Consumption**  
Not practical for energy-constrained devices (e.g., body-worn cameras)
- ❖ **Unstable Network**  
Packet loss and low speed

## What is Edge Video Analysis?



Video analysis will happen at the proximity of origin data sources.

## 1<sup>st</sup> demo: Criminal Alert



### Scenario

The police can be alerted in a real-time manner when he encounters a dangerous person, e.g. criminal.

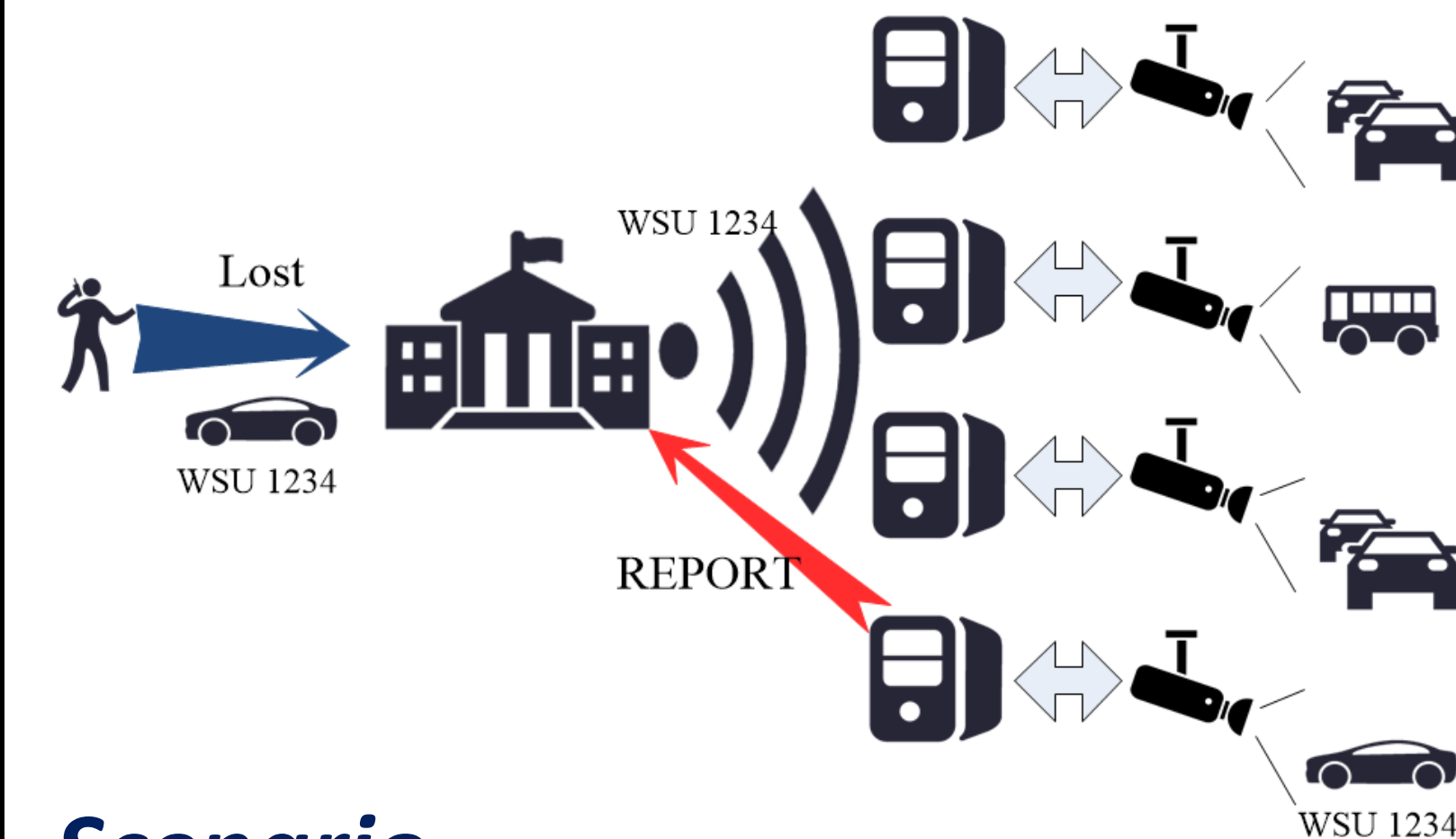
### How it works?

- ❖ Face detection in Edge
- ❖ Face recognition in Cloud
- ❖ Alert to Edge node if found

### Experiments

	Edge Comp.	Cloud Comp.
Bandwidth	7 kB / image	65 kB / s
Latency	255 ms	663 ms
Power	569 mW	1352 mW

## 2<sup>nd</sup> demo: AMBER Alert Assistant



### Scenario

In AMBER Alert system, the control center broadcasts the kidnapper's vehicle license plate number to some cameras, which start recognizing the license plate in captured video. If found, the related images will be sent to the control center.

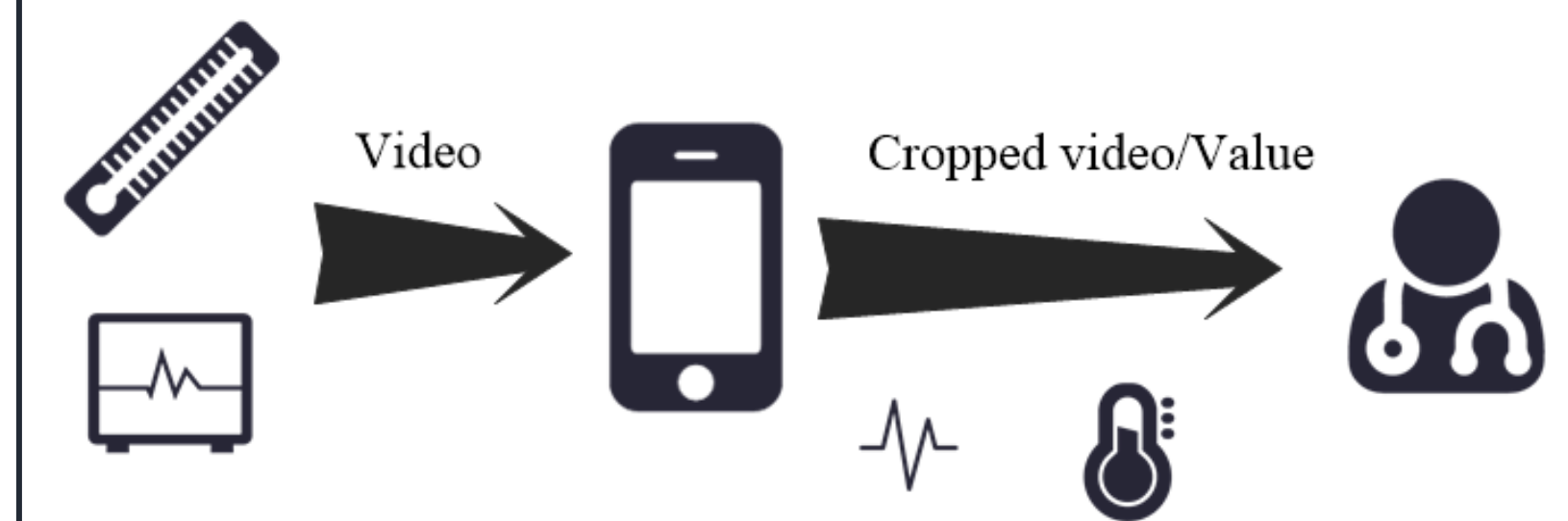
### Workload decomposition

- ❖ **Edge:**  
License plate detection  
License plate character recognition
- ❖ **Cloud:**  
Task announcement

### Experiments

	Edge Comp.	Cloud Comp.
Bandwidth	60 kB / image	65 kB / s
Latency	4.3 s	0.624 ms
Power	891 mW	1352 mW

## 3<sup>rd</sup> demo: EKG Focusing



### Scenario

A real-time video stream of the EKG in an ambulance can be pushed to a doctor in hospital. Only cropping out the EKG area in the video can reduce the network bandwidth requirement.

### Key technology

- ❖ Object (EKG) detect in Edge
- ❖ Area of interest cropped
- ❖ Real-time video transfer

### Experiments

	Edge Comp.	Cloud Comp.
Bandwidth	52 kB / s	65 kB / s
Latency	674 ms	602 ms
Power	506 mW	1352 mW

### Conclusion

- ❖ **Flexible:** triggering on demand
- ❖ **Energy-efficient**
- ❖ **Low bandwidth**
- ❖ **Latency:** depending on processing