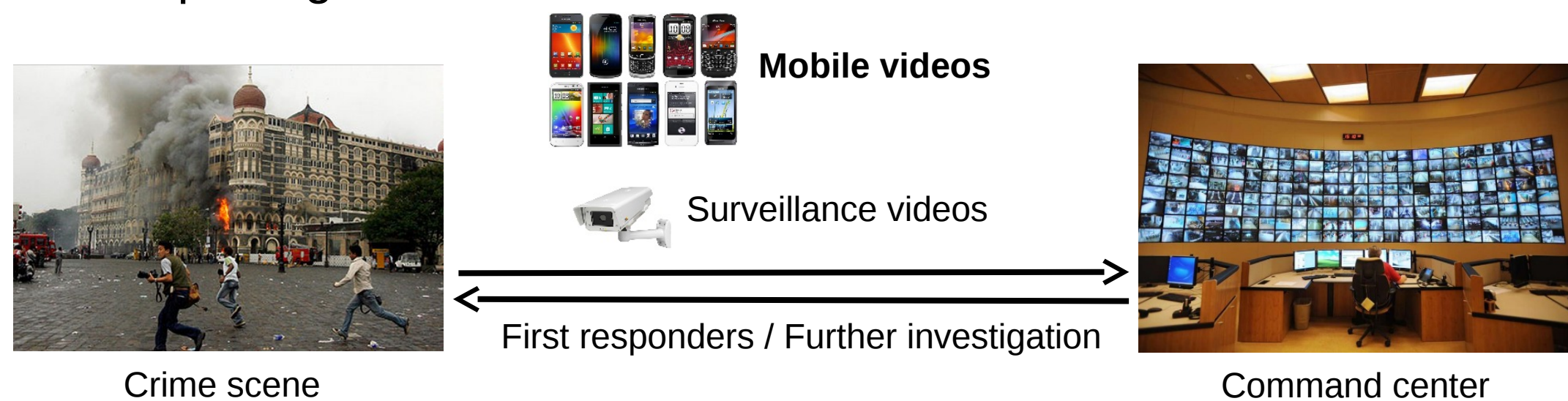


## Introduction &amp; Motivation

- Mobile crowdsourcing is a promising approach to collect information at a large scale.
- Example: using crowdsourced mobile videos for crime investigation and news reporting.

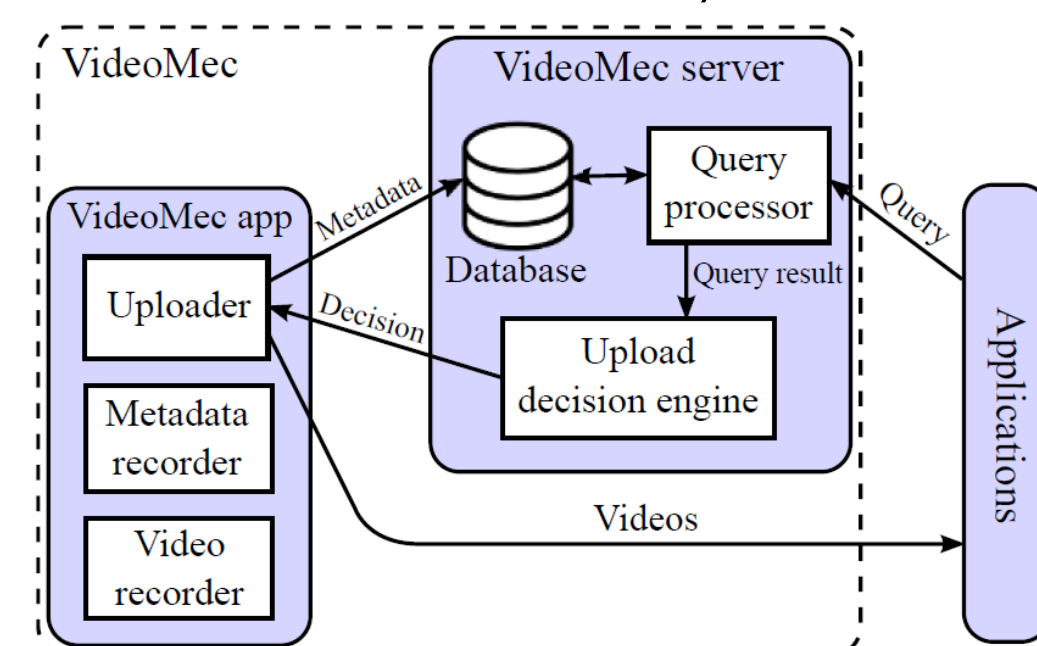


## Existing approaches

- content-based: prohibitively high resource consumption.
- keyword-based: inaccurate or miss important information, e.g., a tourist inadvertently films a suspect in travel-related videos.

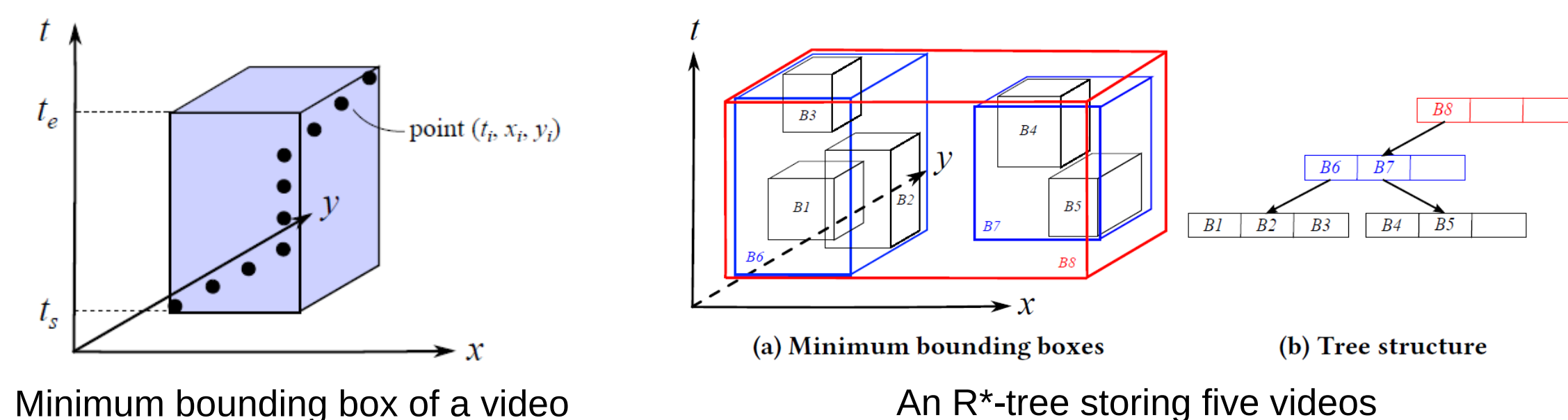
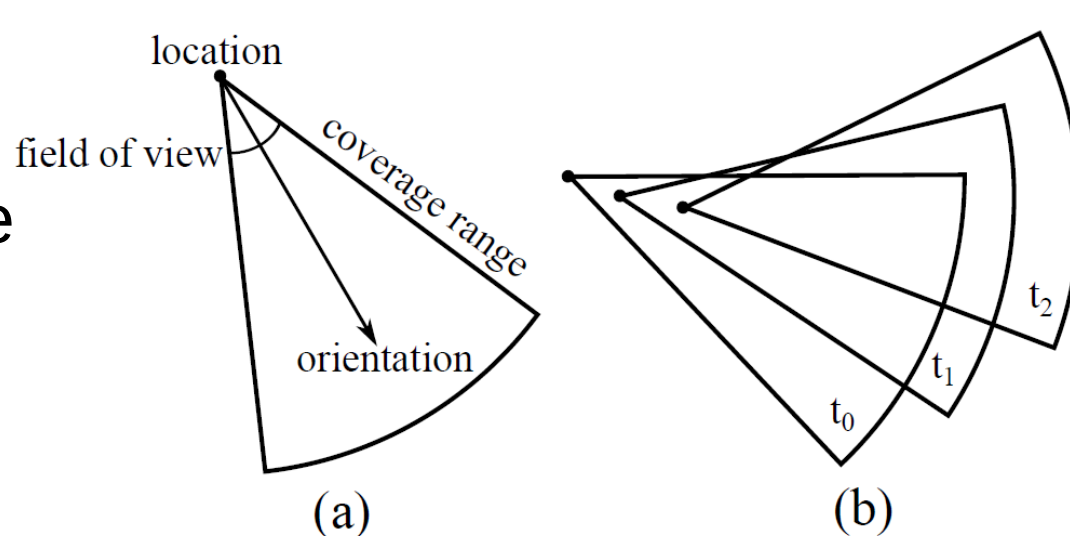
## Our approach

- metadata: time, location, camera orientation, etc.



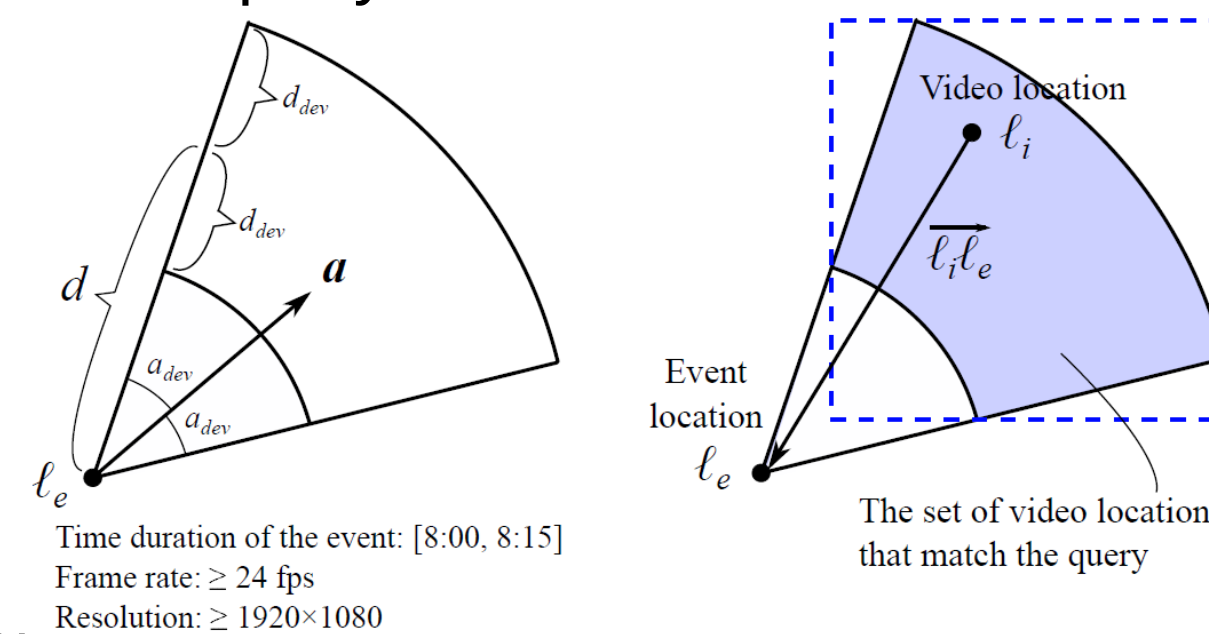
## Metadata

- For each timestamp, the location, orientation, field of view and coverage range of the camera jointly describes the area captured in the video frame.
- For a video, the above metadata is recorded periodically.
- For all videos, their metadata is uploaded to the server and stored in an R\*-tree.



## Query

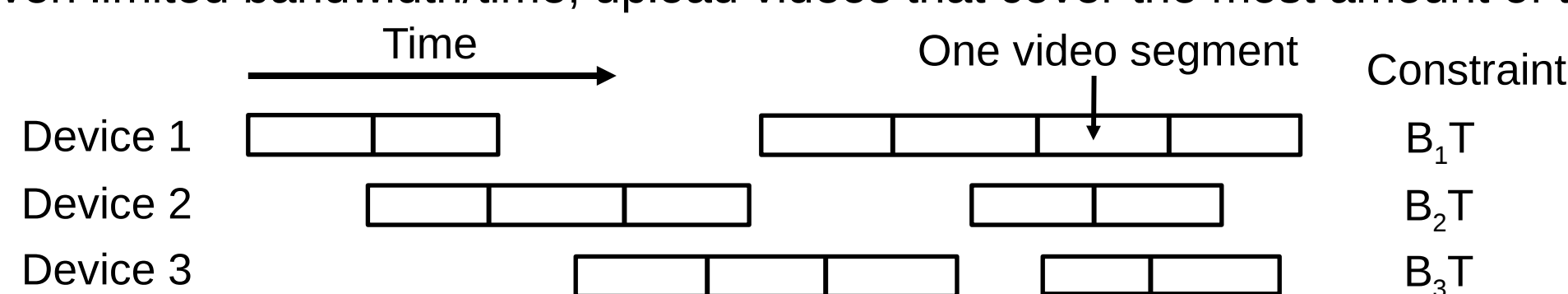
- A query contains the time and location of the queried event, the required angle/distance from which the event should be captured, and the required video quality.
- Filter step: use R\*-tree to quickly filter out most videos irrelevant to the query



- Refinement step: check detailed metadata at each timestamp
- It is possible that only a short clip matches the query and is returned.

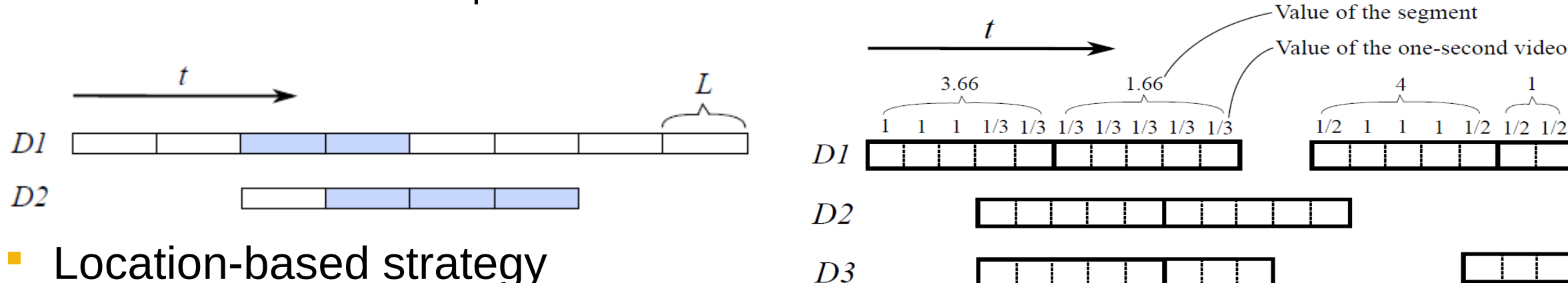
## Upload Decision Engine

- Why do we need it?
  - Videos returned from query processing should be uploaded by mobile devices.
  - It is possible that mobile devices cannot upload all requested videos due to limited bandwidth, limited time (for some applications), and large video files.
- Time-based strategy
  - Given limited bandwidth/time, upload videos that cover the most amount of time.
- NP-hard. Heuristic-based algorithm.



- While some devices are not done
- Select a device
  - Select video segments to upload for that device
  - Mark that device as done
  - Update video segments in other devices to remove overlapping parts

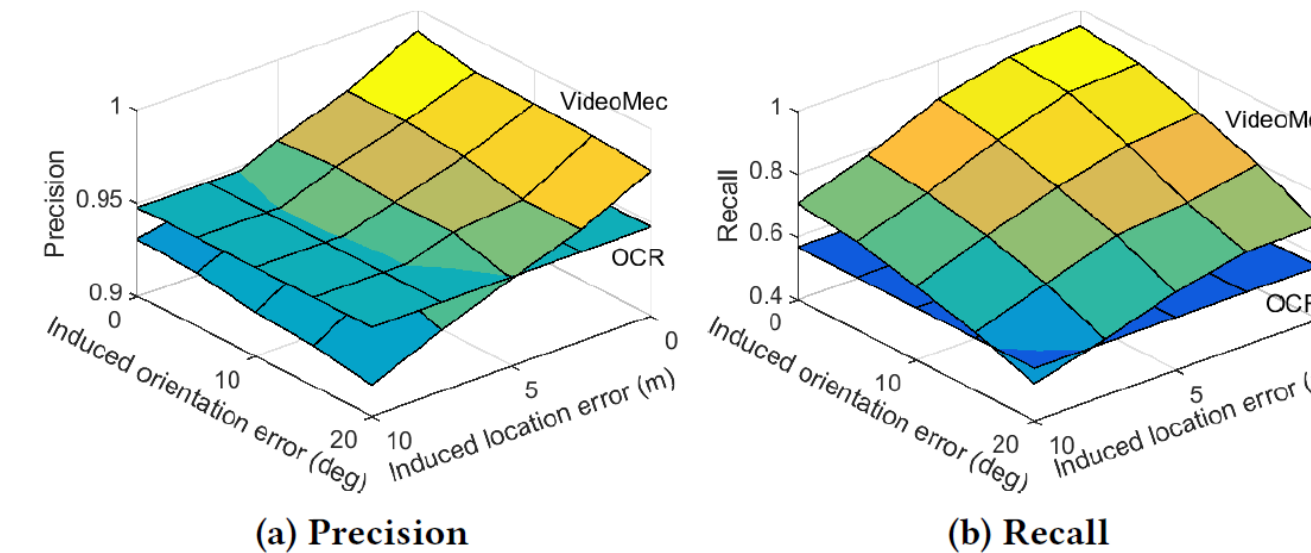
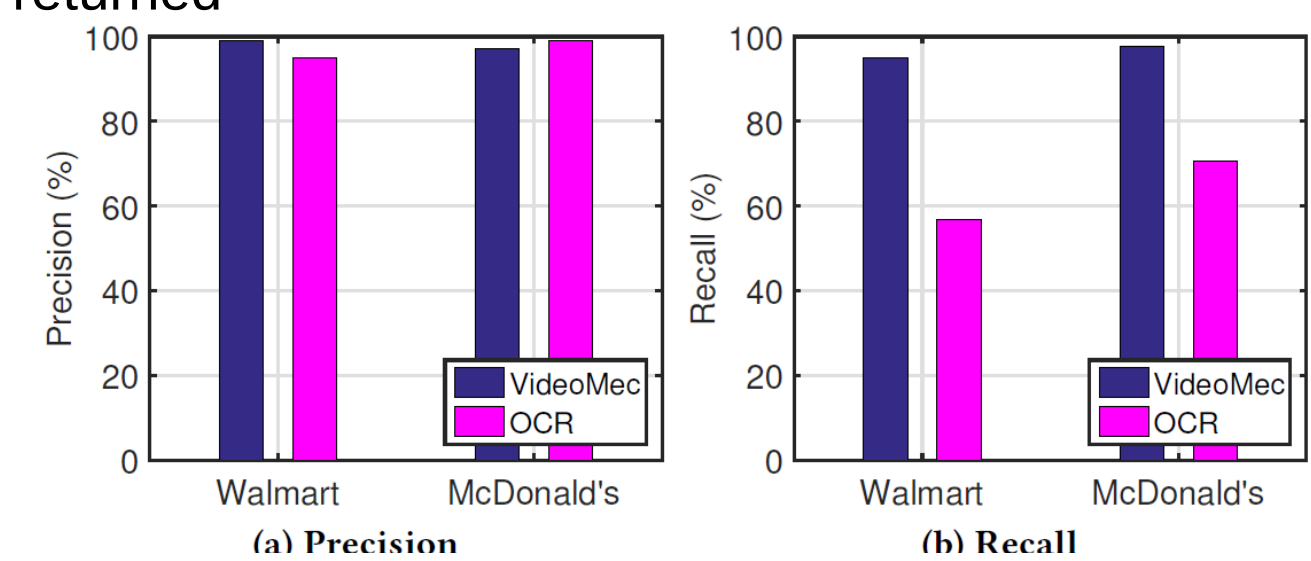
- Heuristic on selecting the next device (step 1): select the device which throws away fewer segments.
- Heuristic on selecting video segments in one device (step 2): reduce segment values based on time overlap



- Location-based strategy
  - Given limited bandwidth/time, upload videos that are closer to required angle/distance

## Evaluation

- Experimental setup
  - Data: 100 videos (10.7GB) and their metadata (150KB) taken around a shopping plaza using our system prototype
  - Queries: find Walmart or McDonald's logos
  - Query processors: VideoMec vs. OCR
- Results
  - Precision: among all returned videos, how many of them are correct
  - Recall: among all videos that should have been returned, how many are actually returned



## Related Publications