MediaQ: Mobile Multimedia Management System

Seon Ho Kim†, Ying Lu†, Giorgos Constantinou‡, Cyrus Shahabi†, Guanfeng Wang†, Roger Zimmermann‡
†Integrated Media Systems Center, University of Southern California
‡School of Computing, National University of Singapore

Introduction

● Motivations:
  - Limited storage on the mobile devices for large-scale media content;
  - Difficult for big media data search on, e.g., Dropbox, Google Drive, iCloud;
  - Rich video queries are demanding such as
    “Find images of myself captured in front of Tommy Trojan during the 2013 USC-UCLA football game day."

● MediaQ is a novel online media management system to collect, organize, share, and search mobile multimedia contents using automatically geo-tagged metadata.

● New features of the system
  1. W4-metadata per video frame:
     - When, capture time;
     - Where, region covered by the video frame
     - What, keywords auto-tagged with the video frame;
     - Who, people shown in the video frame.
  3. Flexible video search based on the W4-metadata.

Video Frame Model

● Model a video frame with W4-metadata in form of ()
  - : camera location
  - : view direction (w.r.t the North)
  - : maximum viewable distance
  - : viewable angle
  - : timestamp
  - : a set of keywords tagged with
  - : people shown in .

System Architecture

Client Side

Server Side

Architectures of Sub-modules

● Geo-Crowd Sourcing Module
  - Web App (Tasks creation);
  - Server Side
    - (Maximum Task Assignment [7]);
  - Mobile Side (Task execution)

Query Processing

● Region queries
  - Retrieve FOVs whose camera locations are in the visible area on the map interface
● Range queries
  - Find FOVs overlap with a given query circle
● Directional queries
  - Find FOVs whose directions are within a given query direction angle
● Keyword queries
  - Find FOVs that contain the query keywords
● Temporal queries
  - Find FOVs that during a given time interval
● Presenting query results
  - To combine the FOV results into video segments

Experimental Results

● Nato Summit 2012 Coverage
  - NATO Summit event that was held in Chicago in May 2012
  - > 20 students participated
  - 250 videos were recorded, uploaded and searched on real time
● PBS Inaugblog 2013
  - The Presidential Inauguration in Washington DC in January 2013
  - > 15 students participated
  - > 20 panorama generated from the video collected based on the geo-information [3]

Related Work


Conclusion and Future Work

● MediaQ provided precedent capabilities of organizing and searching media contents with W4-metadata.
● Our future direction is to extend to manage indoor videos without GPS signals.