A Contact Sheet Approach to Searching Untagged Images on Smartphones

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Problem

How do we efficiently search mobile devices in near real-time?

Two key factors:

- Energy
- Bandwidth

Potential Savings?

- Older, Uploaded
- Recent, not uploaded

Solution: Contact Sheets

To save energy and bandwidth, we degrade objects being searched and pull full fidelity versions in a just-in-time search.

Android Application

- Camera
- Polling
- UI
- C2DM

Local Storage

MIST

- Mobile API
- Cloud API

Diamond Modifications

- diamonddd
- Session Server

Dataretriever

Diamond GUI

Low Fidelity Evaluation

How far can we degrade images in a search before it loses meaning?

Dataset:
- 12, 963 Flickr Scraped Images

Fidelity Reduction:
- Resolution
- JPEG Quality Factor

Benchmarked Three Computer Vision Algorithms:

- Brightness
- RGB Histogram
- Face Detection

Lessons and Contributions

Lessons

- No One-Size-Fits-All
- Significant Energy Savings
- Significant Bandwidth Savings

Contributions

- Released Android Market App
- Python Flask Web Application
- Mobile API via HTTP
- Cloud API via HTTP
- Full Fidelity Retrieval
- Push-based Google C2DM
- Polling-based HTTP
- Just-in-Time Search

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