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The Center for Education and Research in Information Assurance and Security

Automated Indexing of Visual Data from Network Cameras

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Network Camera Samples

Tranbjerg, Denmark

New York, New York

Las Angeles, USA

Bucerias, Mexico

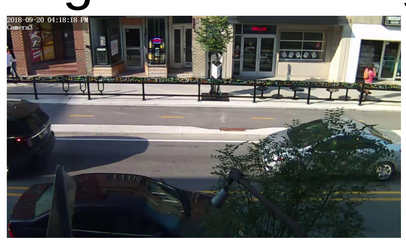
Rome, Italy

Data from Network Cameras

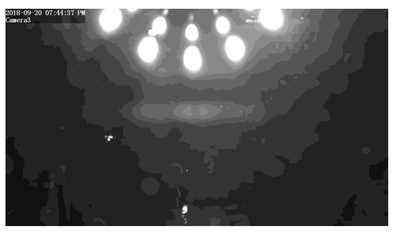
- More than 200 million network cameras deployed worldwide (IHS Markit) and stream visual data continuously
- The goal of this project is to automatically index public network camera data so it may be used for purposes beyond it's indented use.
- CAM2 currently has more than 110,000 cameras in national parks, street intersections, construction sites, tourist attractions ...

Network Camera Discovery

- We crawl the Internet and search for camera images and live video data.
- Network cameras are identified by checking for images that change over time.

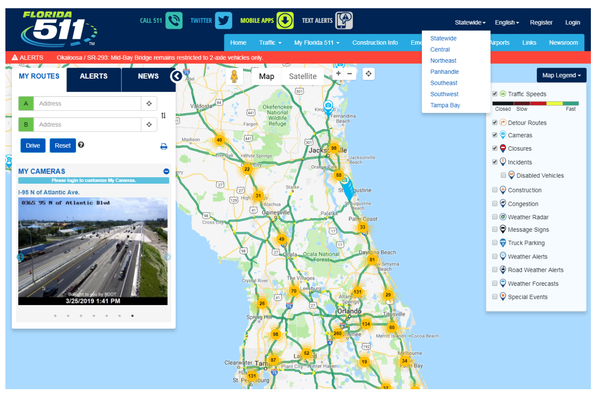


Sample at: t_1

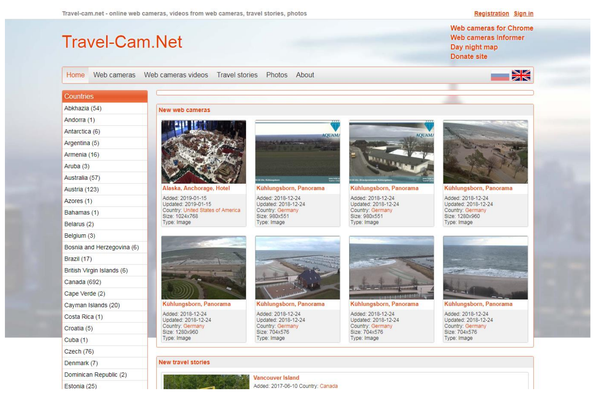


Sample at: $t_1 + \Delta t$

Analysis of Web Structure



Camera Maps

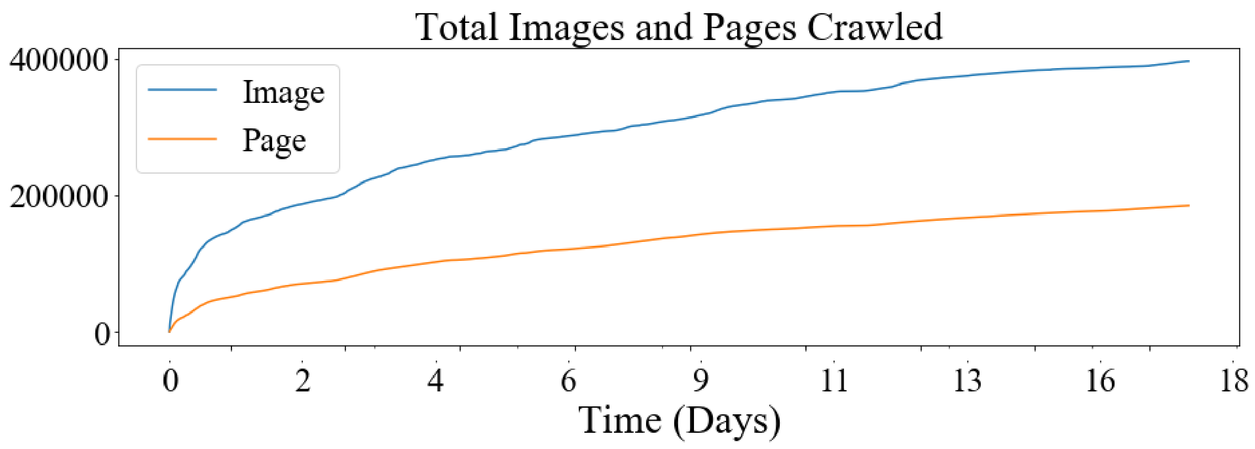


Camera Lists

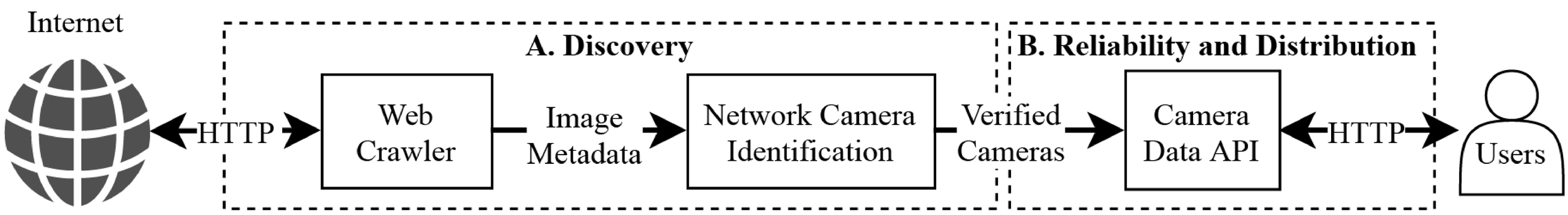
- The heterogeneous structure of camera websites makes indexing this data difficult.
- Each site has a unique structure and method for presenting the camera data.

Results

- A prototype Web Crawler ran 17 days on 85 network camera websites.
- The Web Crawler found 395,839 unique images across 184,308 pages.
- 16,000 potential network cameras identified. .



Automated Data Indexing System



PURDUE UNIVERSITY Discovery Park

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