An Off-Line Image Search Engine

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Overview

Although images search engines are available online, offline networks and databases (in governmental offices, banks, etc.) require an efficient and reliable image search engine.

Prof. Michal Irani and her team developed a method for Visual Inference of a collection of images, which builds upon collaboration between the images. This algorithm could implement inside offline networks without relying on external databases.

The Need

Nowadays, image searching and image classification are available to everyone online (e.g., Google images, Facebook, Instagram, etc.). These companies have invested a considerable effort in developing image processing algorithms, so using them is only allowed when uploading your images to their database. However, offline networks (in governmental offices, banks, and other high-security facilities) do not have access to those algorithms, and therefore they are forced to organize images manually.

The Solution

â€œSimilarity by compositionâ€ is a novel clustering approach in which the algorithm compares similarities between images in a way it looks only on sections of the images based on the â€œexperienceâ€ it gains. This experience allows reducing the overall search time significantly, as well as improving the search quality.

Technology's Essence

In â€œsimilarity by composition,â€ a good cluster is defined as one in which each image can be easily composed using statistically significant pieces from other images in the cluster. Thus, each image has a high affinity to other images in its cluster but low affinities to images outside its cluster. The algorithm exploits the â€œwisdom of crowdsâ€ of multiple images to improve the process further. Using a collaborative randomized search algorithm, images can be composed of each other simultaneously and efficiently. The algorithm is directed by each image where to search for similar regions within the image collection. The resulted sets of images affinities are sparse yet meaningful and reliable.

Applications and Advantages

Applications

- Image organization algorithm for offline networks
- Images search engines - can be applied for collaborative search between users
- Quality assurance
- Security industry- from counting people up to identifying suspicious acts

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Advantages

- Can operate on a local dataset with no internet access
- Can be applied to very few images, as well as benchmark datasets, and yields state-of-the-art results
- Handles large diversity in appearance
- The search is not a global search, it requires no semantic query, tagging or pre-existing knowledge
- The multi-images collaboration significantly speeds up the process, reducing the number of random samples and iterations
- Set of images are obtained in time which is nearly linear in the size of the image collection

Development Status

Complete

Market Opportunity

While the internet offers many solutions for image/video searching and labeling, it holds risks of CYBER attacks. Governmental offices, Banks, high-security facilities, and even R&D companies who wish to protect their trade secrets have an inner offline network. In these offline networks, images are being sorted, labled and searched manually in high cost of human resources and time. Automated software which will operate in offline networks could save time and money for these organizations while keeping high level of cybersecurity.

Patent Status

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