



Image Search and Analysis Hackpions 3.0 by EY GDS

Team: d2meow

Team name and member details

Team name : d2meow

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Theme : Image search and Analysis

Objective : AI assistant for image and text based searching and tagging



Problem statement

It takes a lot of effort to organise images and label them based on their content, location, etc. The image metadata is still not mature enough to handle and store these kinds of specific details. Also arranging a large set of images with very specific file names each mentioning if that picture was from family gathering, marriage ceremony or birthdays is literally impossible. No one does that except the AI itself, humans love chaos in data storage, specially their emails. We hardly keep our data structured for a long period of time.

In order to organize data, we are leveraging AI (neural networks) along with some manual intervention to create one of the best softwares that can help one arrange their images in a way that makes sense. This will ensure searching similar images from the entire database or based on specific keywords.



Solution

- Explain, in brief, how you intend to solve the problem at hand.
- Please include the following:
 - How it helps to solve the problem?

Labeling images with keywords to make it searchable providing enough meta information to classify into various groups. On adding any image, the image will be tagged with an AI based feature tagging using neural network along with a text description
 - What are the impact metrics that one can use to analyze the effect of the solution?

We will test the performance of our software on MSCOCO dataset. Accuracy would be the best metric for evaluation if we ensure balanced representation of images across multiple categories
 - Frameworks, tools and technologies stacks to be used

We will mostly leverage python libraries for the software like keras, django or streamlit
 - Assumptions, constraints and solution decision points (reasons behind choosing a technology)

Feature extraction is the best method for image-image comparison for which we are using neural network based AI models. Django/ Streamlit allows the software to have a good interface
 - How easily can your solution be implemented and how effective will it be?

The solution however complex can easily be implemented into production. Similar but lower grade softwares are already implemented in many softwares which are available in market.



Solution

- Extent of scalability and usability

Scalability is not an issue since the entire software tries to decrease the entire size of data stored for faster search and labelling purpose. The software however requires high computing power and storage for extreme fast processing or search and storage processes. The idea finds a range of usability in terms of arranging data and keeping similar data in one place, such projects are also being experimented upon by DRDO since 2018



Checklist

We are planning to implement the following as a part of our app. We will ensure a modular approach to make the main part of our app first to ensure the base of the idea and later implement the UI part. We will be implementing the following modules in order :

- Module to extract image and description features
- Module to search an image using an image
- Module to search an image using text/ description
- Database to store the image feature and text metadata
- Integration of above modules with an interface



Methodology

- **Feature Extraction**

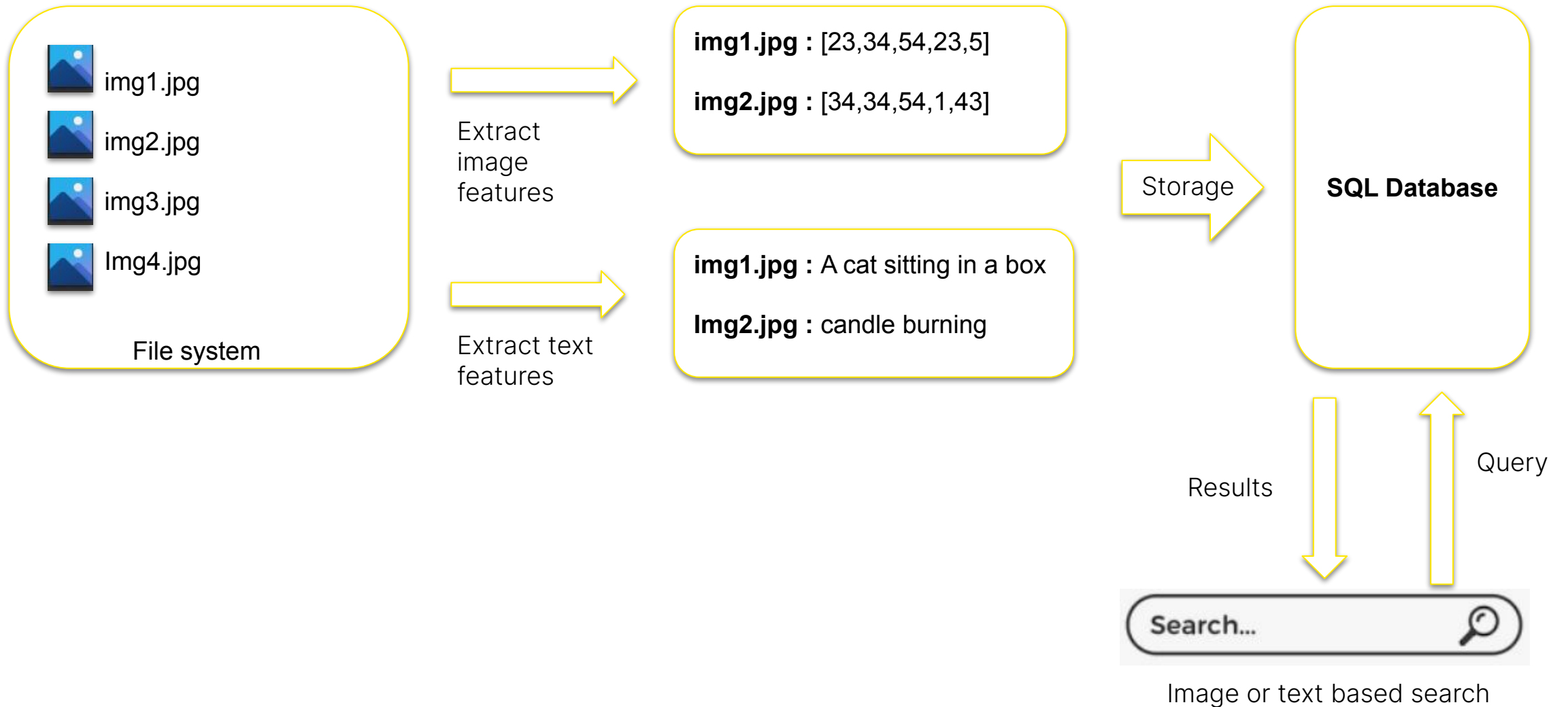
Features are the information within an image that is the minimum required information to identify the information stored in the image. For a cat image, its features are its shape of ears, whiskers, tail, shape of face, etc. These can be extracted from a neural network trained to learn these features and can be leveraged to understand the image based on small amount of information.

- **Description Extraction**

The description of an image is a text based explanation of what the image tries to convey, like “a cat sitting on a mat”, “people playing basketball”, etc. These features can be generated from image to text neural network model. By feeding an image to such a model gives us a text based description of the image from which information about the image can be extracted and can be used to tag the image or stored in its metadata.



System architecture proposal



Working prototype

GitHub : <https://github.com/d2Anubis/EY-GDS-Hackpions-3.0>



Thank You
Hackpions
GDS ES Hackathon
(edition 3)

