BE CAPSTONE PROJECT

School of Computer Engineering and Technology

Image Upload Library with Object Detection
Group No.74

Project members

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INTRODUCTION

- Usage of the internet is increasing day by day
- The quality of the photos from the mobile cameras and professional cameras.
- people upload a large amount of image data on the internet in very less time
- Most users use search engines by writing text queries and consuming text results. While in general each image has specific keywords which are used to find that image and images related to it

LITERATURE SURVEY

R-CNN and SPPnet

The Region-based Convolutional Network method (RCNN) achieves excellent object detection accuracy by using a deep ConvNet to classify object proposals.

But R-CNN has notable drawbacks:

1. Training is a multi-stage pipeline. R-CNN first finetunes a ConvNet on object proposals using log loss. Then, it fits SVMs to ConvNet features. These SVMs act as object detectors, replacing the softmax classifier learnt by fine-tuning. In the third training stage, bounding-box regressors are learned.

2. Training is expensive in space and time. For SVM and bounding-box regressor training, features are extracted from each object proposal in each image and written to disk. With very deep networks, such as VGG16, this process takes 2.5 GPU-days for the 5k images of the VOC07 trainval set. These features require hundreds of gigabytes of storage.

3. Object detection is slow. At test-time, features are extracted from each object proposal in each test image. Detection with VGG16 takes 47s / image (on a GPU)

Search by image to reveal copies of a known image

A more recent type of searching, which deals also mainly with images, is search by image or “reverse image search”

Evaluation of the automatic classifications in Albums

For each Album with corresponding simple name / annotation / tag, that has been automatically created by Google, each image that has been classified in that category / class was inspected; then it was evaluated if the classification made sense

Object Detection:

The goal of object detection is to replicate this intelligence using a computer

Organization and annotation of images:

Automatic annotation-is an important area of computer vision is playing an important part in the pictures, the description of the picture Image annotation.

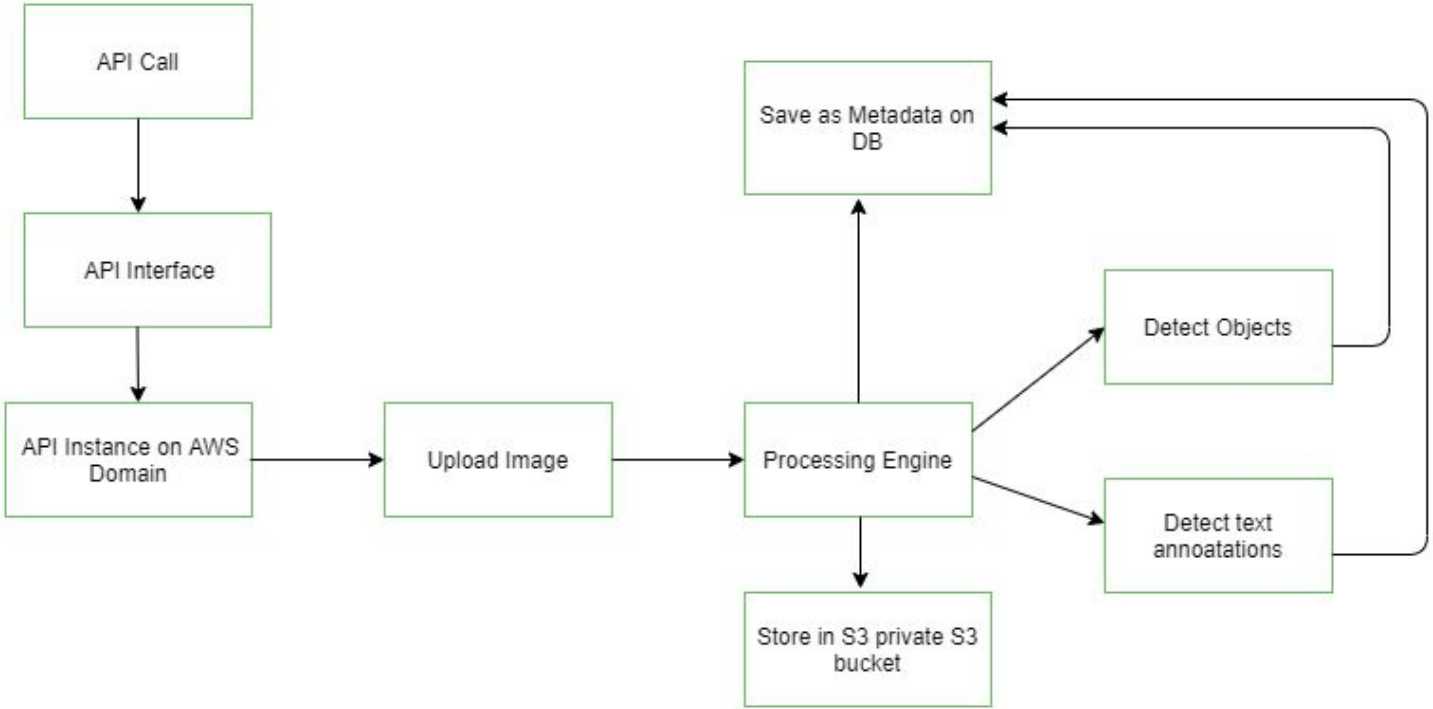
PROBLEM STATEMENT

- Image upload library is a photo sharing and object detection and classification and storage service.
- The service named Snaphub will be free and unlimited. The service automatically analyzes photos, identifying various visual features and classes of objects.
- Users can search for a photo, with the service returning results from 3 major categories. People, Animals and Things.
- The computer vision of photos recognizes classes of objects, grouping similar one together and subject matters including buildings, animals, person and more. If there's a text on the image it is also classified and stores an annotated metadata.
- A powerful search engine finds the image using a keyword or a phrase.

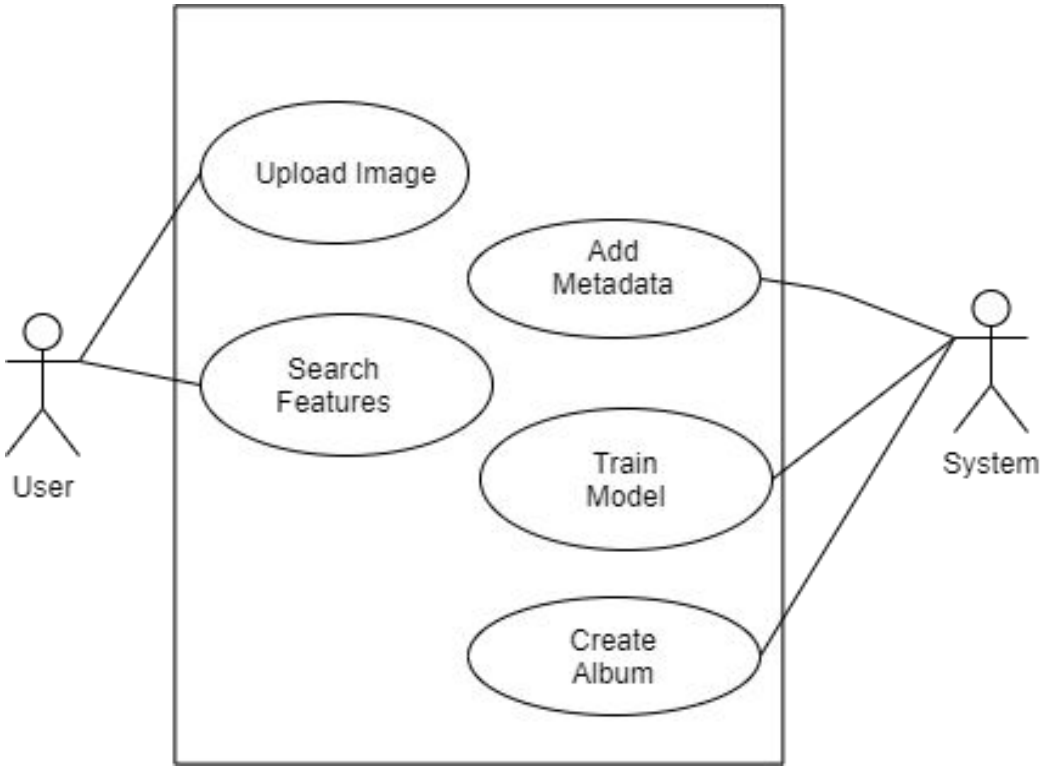
APPLICATIONS

- Snaphub is an open-source system and can give the users a sense of privacy with complete control of their data.
- ML Model for very fast classification of image
- Smart search engine for image classification based on features
- Organization and annotation of images

SYSTEM ARCHITECTURE



SYSTEM ARCHITECTURE



WORKING OF SYSTEM

- The systems used are

  API Interface - The API inference gives access all the APIs being used the Web App which includes authentication, Uploading image, Albums, Search etc.

- Processing Engine -
  1. Storage - When an image is uploaded it is stores in an S3 bucket
  2. Database - Stores image information and Metadata
  3. Object detection - The image is processed and returns the count of identifies classes which is based on our trained Faster RCNN model
  4. OCR Detection - Detects the text annotations present the image
- The results from the Processing Engine are stored in the Database.

- The system automatically classifies the images into albums and are stored in the database.
- The user can use the search API to find the a certain feature.
- For eg. If the user searches by cat then all the images of cat will be returned and if the search by a phase then the images containing that phrase will be returned.

TEST CASE

S.No	Test Case	Input	Expected Output	Actual Output	Remarks
1	Login	Correct username password	Successful login	Successful login	PASS
2	Login	Incorrect credentials	Error with 401	Error with 401	PASS
3	Upload Image	Image with one dog	Detect classes as 1 dog	Detected classes as 1 dog	PASS
4	Upload Image	Image with 2 birds	Detect classes as 2 birds	Detected classes as 2 birds	PASS
5	Upload Image	Image with 4 boats, 2 half boats	Detect 4 boats	Detected 2 boats	FAIL
6	Upload Image	Image with some text	Detect all text	Detected all text	PASS
7	Upload Image	Low resolution image with 3 birds	Detect 3 bird	Detected 1 bird	FAIL

PERFORMANCE ANALYSIS

S.No	API Name	API Description	Avg. Time taken	CPU consumption	Memory Consumption
1	{{url}}/login	Login	50ms	Negligible	Negligible
2	{{url}}/users/logout	Logout	15ms	Negligible	Negligible
3	{{url}}/users/signup	User Signup	20ms	Negligible	Negligible
4	{{url}}/upload	Upload Image	10s	~ 40% on 1v	~ 300 MB
5	{{url}}/images/view/{image_id}	View an image	1s	~ 5%	~ 10 MB
6	{{url}}/search?q={search_query}	Search Image	20ms	Negligible	Negligible

RESULT

Snaphub / Images / View an image

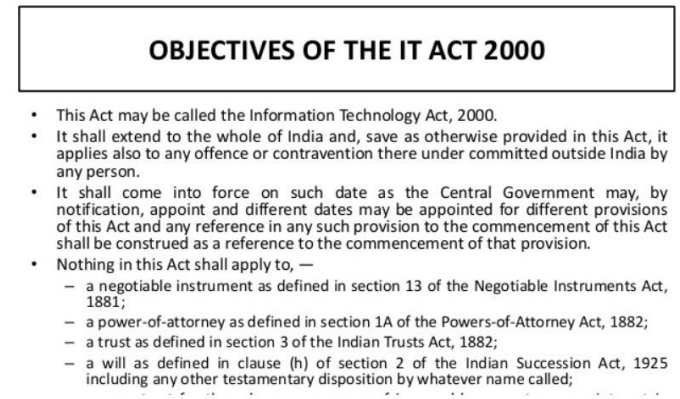
GET {{url}}/images/view/48

Params Authorization Headers (7) Body Pre-request Script Tests Settings

none form-data x-www-form-urlencoded raw binary GraphQL

This request does not have a body

Body Cookies (1) Headers (5) Test Results



OBJECTIVES OF THE IT ACT 2000

- This Act may be called the Information Technology Act, 2000.
- It shall extend to the whole of India and, save as otherwise provided in this Act, it applies also to any offence or contravention there under committed outside India by any person.
- It shall come into force on such date as the Central Government may, by notification, appoint and different dates may be appointed for different provisions of this Act and any reference in any such provision to the commencement of this Act shall be construed as a reference to the commencement of that provision.
- Nothing in this Act shall apply to, —
  - a negotiable instrument as defined in section 13 of the Negotiable Instruments Act, 1881;
  - a power-of-attorney as defined in section 1A of the Powers-of-Attorney Act, 1882;
  - a trust as defined in section 3 of the Indian Trusts Act, 1882;
  - a will as defined in clause (h) of section 2 of the Indian Succession Act, 1925 including any other testamentary disposition by whatever name called;

[Uploaded Image]

Snaphub / Images / Search Image

GET {{url}}/search?q=objectives of the

Params Authorization Headers (7) Body Pre-request Script Tests Settings

Query Params

KEY	VALUE
q	objectives of the
Key	Value

Body Cookies (1) Headers (7) Test Results

Pretty Raw Preview Visualize JSON


```
[
    {
        "image_id": 48,
        "user_id": 2,
        "name": "4.jpg",
        "upload_name": "2ea9e56f-abc7-47b0-a7f6-dfe58ee4ebaf.jpg",
        "mime_type": "image/jpeg",
        "created_on": "2021-06-30T09:09:51.174Z"
    }
]
```


[Search result when searched by ‘Objectives of the’]

Snaphub / Images / View an image

GET {{url}}/images/view/41

Params Authorization Headers (7) Body Pre-request

none form-data x-www-form-urlencoded raw

Body Cookies (1) Headers (5) Test Results

[Uploaded Image]

Snaphub / Images / Search Image

GET {{url}}/search?q=boats

Params Authorization Headers (7) Body Pre-request Script Tests Settings

Query Params

KEY	VALUE
q	boats
Key	Value

Body Cookies (1) Headers (7) Test Results

Pretty Raw Preview Visualize JSON


```
[
    {
        "image_id": 41,
        "user_id": 2,
        "name": "3.jpg",
        "upload_name": "78e8b5b4-0c51-4ccc-98c1-da3a5a054ac7.jpg",
        "mime_type": "image/jpeg",
        "created_on": "2021-06-30T07:04:35.009Z"
    }
]
```


[Searching Image by feature ‘Boats’]

PUBLICATION

Name of the organizing society/Journal -
IAENG International Journal of Computer Science

IAENG International Journal of Computer Science ijcs@iaeng.org via sql.uhom.net
to me

Dear Mr. Mr.Satyajeet Salunkhe,

Thanks for your interest in IAENG International Journal of Computer Science.

Paper Title: Image Object Detection & Annotation Techniques

Your online submission of the above paper has been received. We will notify you by email after checking. If you have not got any email by 04 Jul 2021, you are welcome to contact us with the reference number (IJCS_210627AdT) after double-checking your given email account(satyajeetsalunkhe007@gmail.com), including the junk box.

Best regards,

Joan Mok
Assistant Secretary
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