GLOBAL ACADEMY OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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Subject Name	**Project Work**	**Subject Code**	**17CSP78**
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Domain	**DEEP LEARNING**	**Group No:**	**11**
Project Title	**“ LANDSCAPE RECOGNITION ”**		
Under taken at	**GLOBAL ACADEMY OF TECHNOLOGY**		
Guide Name	**Mr. KAMLESHWAR KUMAR YADAV**		

Agenda

- Problem Description
- Literature Survey
- Gaps in the literature survey
- Proposed Solution
- Requirements Specifications
- Project Work plan
- Bibliography

Problem Description

- In the field of Artificial Intelligence (AI) and Computer Vision recognition of objects has become very common, feasible and realistic.

- Looking ahead, there will come a time where instance-specific recognition will become a trend and be an everyday problem.

- Identifying the instances with the help of present day techniques is still primitive as there is a huge spectrum of features.

Fig: 1 - Eiffel Tower and Tokyo Tower

Fig: 2 - India Gate and Arc De Triomphe

Literature Survey

Title of the paper and year	Methodology	Advantages	Disadvantages
Rich feature hierarchies for accurate object detection and semantic segmentation - 2014	our system • takes an input image • extracts around 2000 bottom-up region proposals • computes features for each proposal using a large convolutional neural network (CNN), and then • classifies each region using class-specific linear SVMs	• provides higher accuracy than CNNs (R-CNN achieves a mean average precision (MAP) of 53.7% on PASCAL VOC 201 for comparison, reports 35.1% MAP)	• training is multi-stage pipeline • training is expensive in time and space • object detection is slow
Fast R-CNN - 2015	• the image is processed with several convolutional and max pooling • then region of interest has been extracted from feature map • each feature vector is fed into a fully connected layers that finally branches into two outputs	• training is single-stage, using a multi-task loss • training can update all network layers • no disk storage is required for feature caching	• most of the time taken by Fast R-CNN during detection is a selective search region proposal generation algorithm. Hence, it is the bottleneck of this architecture.
Large-Scale Image Retrieval with Attentive Deep Local Features - 2017	• extract dense features from an image by applying a fully convolutional network • using RANSAC and employ the number of inliers as the score for retrieved images	• DELF clearly outperforms all other techniques significantly • DELF has higher recall • Attention helps more than fine-tuning	• pipeline requires less than 8GB memory to index 1 billion descriptors • challenges in query image with no correct match

Gaps in the literature survey

Even though all the papers try to perform image detection there are still few challenges which are not completely eradicated by those methods

- Partial occlusion
- Multiple landmarks
- Queries with no match
- Local features lack semantic information
- Patch-level annotations are expensive
- Existing datasets are small/medium

Proposed Solution

Our solution approach can be decomposed into 2 main blocks:

i. Localized feature extraction
ii. Querying and Retrieval.

- The Localized feature extraction block is formed with a CNN architecture with feature extracting layers trained with a classification loss.

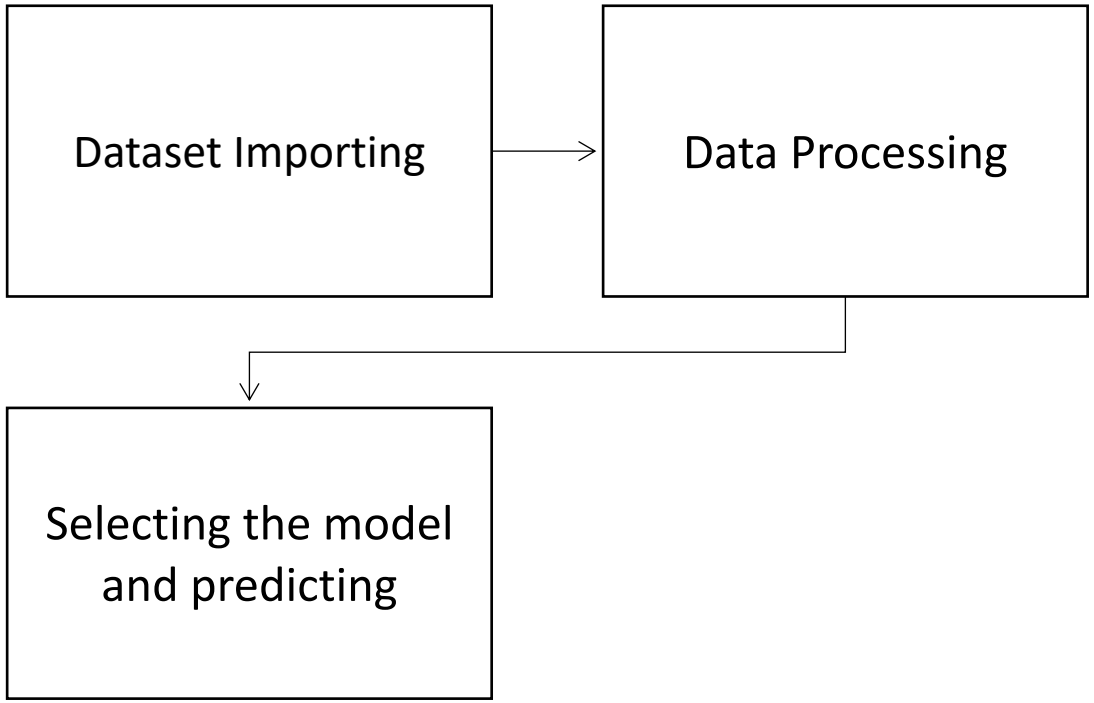
- Next, we will aggregate all the matches per database image. Finally, we perform geometric verification using RANSAC and employ the number of inliers as the score for retrieved images.

Requirements Specification

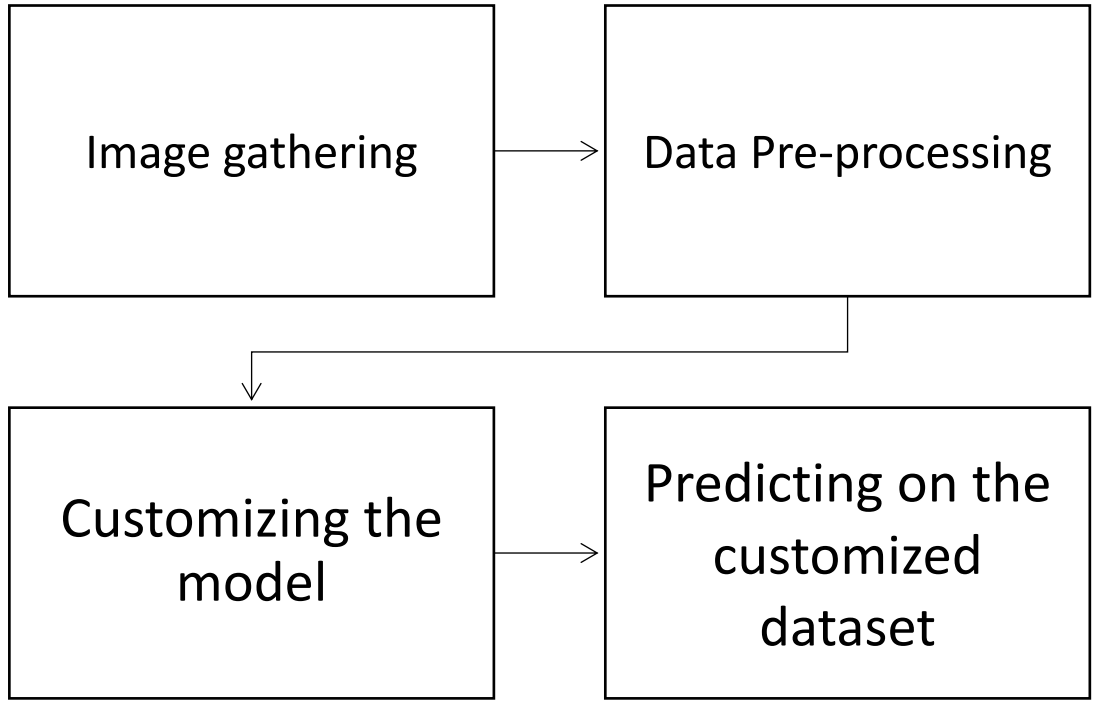
- **Hardware Requirements**
  - Intel i5 8th gen
  - 8gb ram
  - 2gb graphics card
  - 500gb HDD
- **Software Requirements**
  - *Python 3.8*
  - *TensorFlow 2.x*
  - Anaconda 3

Project Work plan

Project Phase 1



Project Phase 2



Conclusion of the presentation

- This solution can prove that instance level recognition is achievable and can be put into practical use.

- This Project can pave way for undiscovered roads in the field of Computer Vision and Object Recognition.

Bibiliography

[1] Hyeonwoo Noh, Andre Araujo, Jack Sim, Tobias Weyand, Bohyung Han. “Large-Scale Image Retrieval With Attentive Deep Local Features”. IEEE, 2017, pp. 3456-3465

[2] Ross Girshick, Jeff Donahue, Trevor Darrell, Jitendra Malik. “Rich feature hierarchies for accurate object detection and semantic segmentation tech report (v5)”. IEEE, 2014

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Q & A

Thank You