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	**“LANDMARK RECOGNITION USING CONVOLUTIONAL NEURAL NETWORKS”**		
Under taken at	**GLOBAL ACADEMY OF TECHNOLOGY**		
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Agenda

- Introduction
- Literature Survey
- Gaps in Literature Survey
- Objectives
- Problem statement
- Requirements Specification
- Architecture Diagram
- Module Split-ups and algorithms used
- Bibliography

Introduction

- 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.

- Artificial Intelligence (AI) especially Convolutional Neural Network (CNN) concept can be used to ease up the life of others.

Literature Survey

Title of the paper and year	Methodology	Advantages	Disadvantages
Rich feature hierarchies for accurate object detection and semantic segmentation - 2014	our system • extracts around 2000 bottom-up region proposals • computes features for each proposal using a large convolutional neural network (CNN), and then	• 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

Literature Survey

Title of the paper and year	Methodology	Advantages	Disadvantages
Fast R-CNN - 2015	• the image is processed with several convolutions • 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

Objectives

- To make a model which recognises landmarks from an image using different algorithms such as Visual Geometry Group (VGG) and DEep Local Feature (DELF)

- To improve our model such that it performs better than the present primitive models/ techniques.

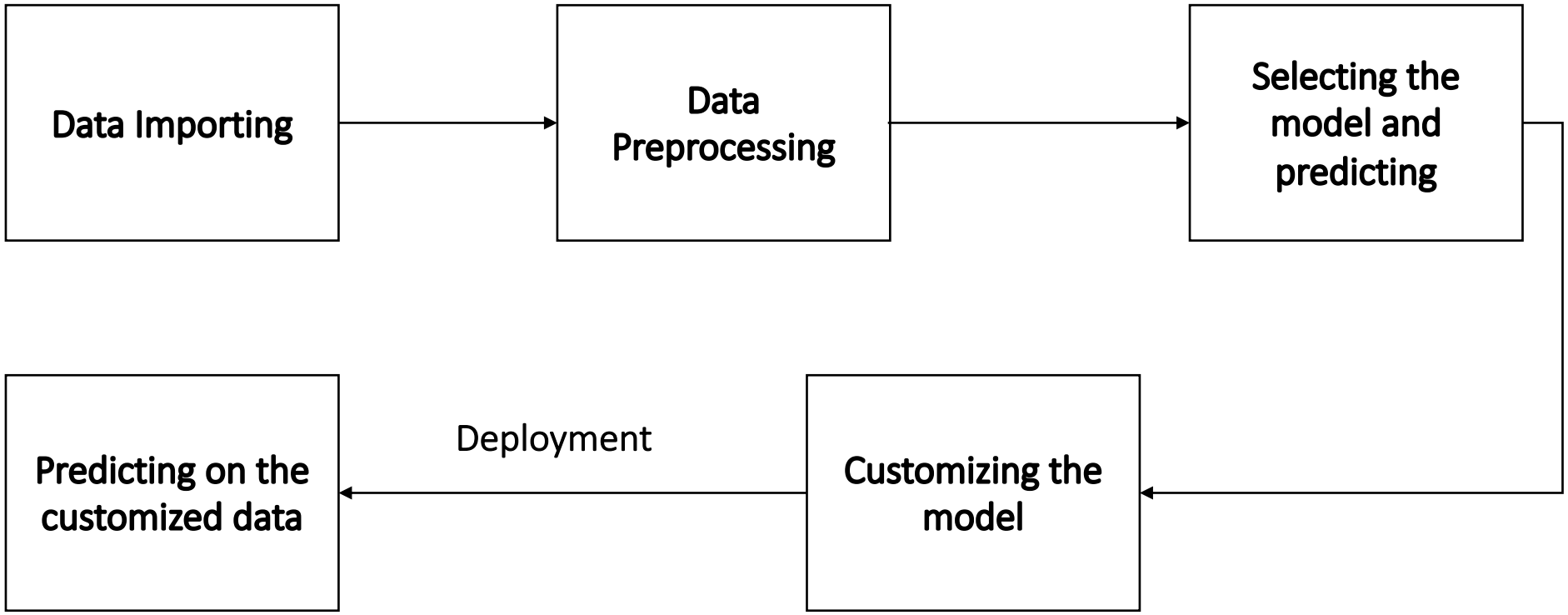
Problem Statement

- Landmark recognition on Google landmark dataset using various algorithms. The goal is to efficiently recognize objects in an image at an instance level, just not at the base level.

Requirements Specification

- **Hardware Requirements**
  - Intel i3 6th gen
  - 4gb ram
  - 2gb graphics card
  - 100gb HDD
- **Software Requirements**
  - *Python 3.x*
  - *TensorFlow 1.x*
  - Anaconda 3

Architecture Diagram of the project



Modules Split-ups

- Landmark recognition
  - Used transfer learning from VGG to detect landmarks from google landmark dataset.
  - To load DELF module and run RANSAC over the returned descriptors.

- Deployment
  - Our customized model is deployed and will be ready to use.

Bibiliography

[1] Hyeonwoo Noh, Andre Araujo, Jack Sim, Tobias Weyand, Bohyung Han. “Large-Scale Image Retrieval With Attentive Deep Local Features”. Proceedings of the IEEE International Conference on Computer Vision (ICCV), 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

[3] Ross Girshick. “Fast R-CNN”. Proceedings of the IEEE International Conference on Computer Vision (ICCV), 2015, pp. 1440 - 1448

Thank You

Q & A