UNIVERSITY OF MISSOURI-KANSAS CITY

CS5542

Big Data Analytics and Applications.

Spring 2017

Project: Odd Man Out.

First Increment Report

ODD ONE OUT

INDEX

1.Introduction

In the recent time, AI has advanced to a new heights. With the invention of Machine and Deep Learning the current technology is able to achieve a lot more than possible before.

From finger print scanning to face recognition and voice recognition the process of analysis has improved significantly and has made life easy for us. Not only do these features have obvious uses but they help in many ways previously not thought of, like using the technology to let cars see the road using image recognition, searching tissues for cancer cells and watching space for unknown patterns, all of these seem like finding the **odd one out** game we used to play in our childhood.

ODD ONE OUT(OOO) is a simple strategy but has staggering usage that can benefit us in many ways. This project of ours take the inspiration from the **odd one out** and builds the foundations for a much complex application by trying to perfect the algorithm of finding the **odd one out** among various images.

2.Project Objective

2.1 Motivation:

Image Analysis is a developing field which has had many applications in the real world scenario. Be it developing a AI bot to monitor our streets to keep us safe or monitoring space feed to find anomalies or to process mages of blood cells to find cancer cells. This is how image analysis and AI combined have taken the standard of monitoring to a new level. This project is our take on this developing technology. We try to implement basic features and procedures to develop an application with Deep learning or machine learning. We also try to answer the question of which is the best of these both.

2.2 Significance:

The significance of this application is that it is based on the image or video feed that is given as an instance. We not only extract the tags or annotations but also try to find how different the objects are from each other.

This can be achieved by the API, Machine Learning or Deep learning program. In the first phase, we use the clarifai API where image/video analysis is done. Then we try to extract more information using machine learning.

Here we train the model by giving enough training sets thus, queries can be answered with more efficiency. Finally in the deep learning we add the intelligence aspect so that even slight differences can be easily identified. So, this makes the application more intelligible.

2.3 Features: Use Case/Scenario

The basic use case is as follows. An image is given as an input and the annotations for the images are generated. These annotations are stored in a file where they are later processed.

In the mean while a set of predefined labels are given for similarity and this dataset is used for comparison for of the annotations, of which a few are excluded and the resulting annotations are the one which are similar to each other.

The excluded annotations are considered as odd one out. If there are no annotations that are excluded then the objects in the images are considered to be similar.

3.Approach

3.1 Schedules

3.1.1 Data Sources

Currently we are using the following sources for our image datasets for training and test validation purposes.

1. Caltech 256 Data Set. (http://www.vision.caltech.edu/Image_Datasets/Caltech256/)

2. canstockphtoto.com (http://www.canstockphoto.com/images-photos/odd-one-out_2.html)

3. Personally captured images.

3.1.2 Analytic Tools

Microsoft Cognitive Services: Microsoft Cognitive Services lets build apps with powerful algorithms using just a few lines of code. They work across devices and platforms such as iOS, Android, and Windows, keep improving, and are easy to set up.

Cloud Vision API, Clarifi API.

3.1.3 Analytical Tasks

Image Edge Detection, K-Means variation among various attributes of datasets considered.

3.1.4 Expected Inputs/Outputs

For examples, considering the below image of Holland Soccer Supporters as input, the systems identifies and classifies the Not a soccer fan as the odd one out.

Example Input Data:

Expected Out Come: For explanation purposes, Identified Odd one out is Outlined in Red.

3.1.5 Algorithms

HOG(Histogram of Oriented Gradients) features extract algorithm: For detection of key Features in images.

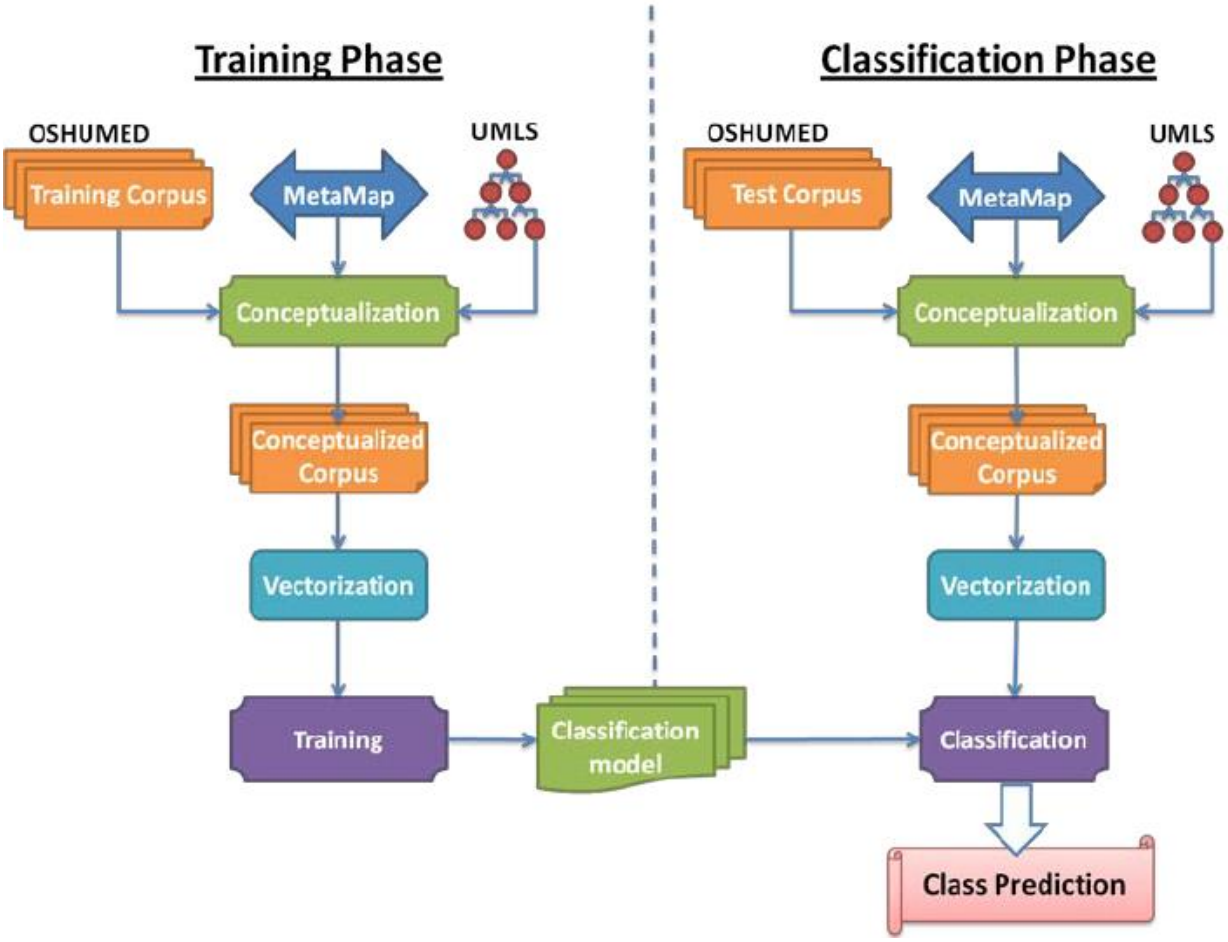
Support Vector Machine – an unsupervised machine learning Algorithm for Feature Vector generation

Clarifi API – for Image Classification Purposes.

4. Application Specification

4.1 System Specification

4.1.1 Software Architecture:

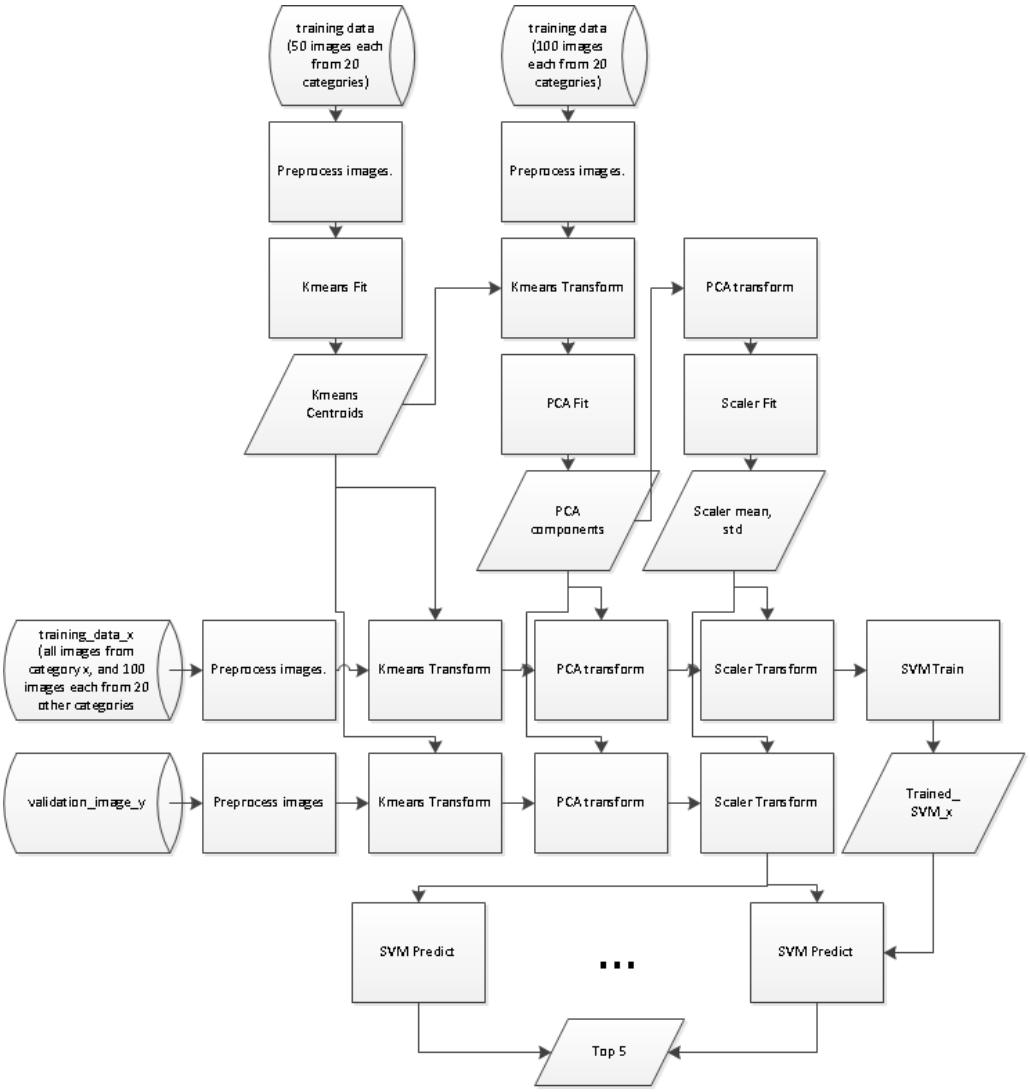


4.1.2 Features, workflow, technology

1. Activity Digaram (workflow, data, task)

The below image represents the activity Diagram of our Image Classification Application.

It represents both vertical and horizontal categorized processing techniques of both Training and Test Data Sets.



4.1.3 Existing Application/Services Used: Name, Description, URL

Intellij IDE Platform – a Java Integrated Development Environment.

Clarifi API- Image and Video Recognition API.

https://www.clarifai.com/api

5. Implementation

In the clarifi api**,** preprocessing the data: As our first challenge, we took a set of images of different sizes, hues, lighting conditions, et cetera. The algorithms we were about to use cannot tolerate such variance most of them expect a standard normalized feature input.

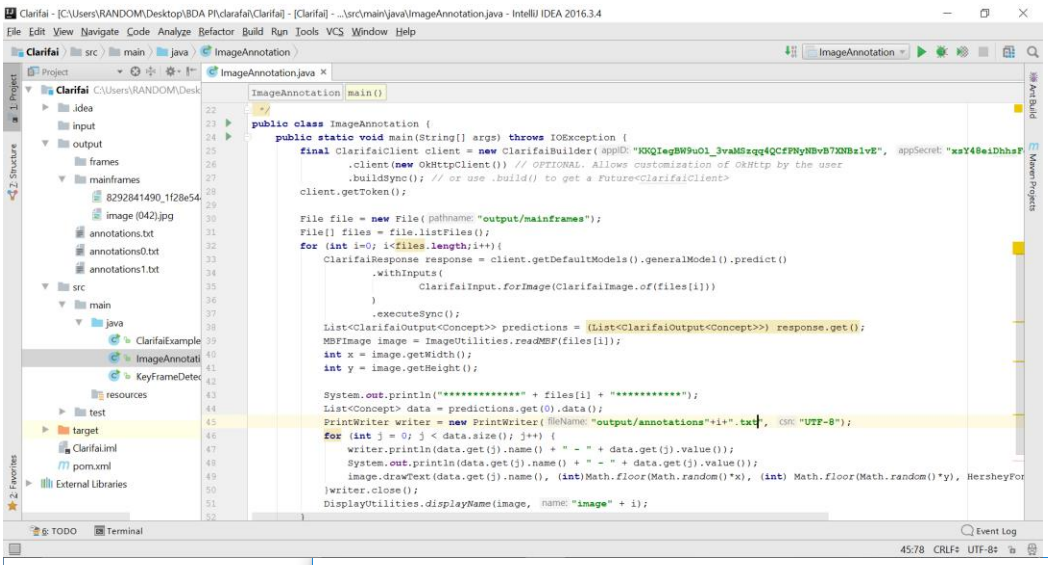
As a first stab at normalizing our data, we converted each color image to grayscale. Initially grayscale images were unchanged.

This would hopefully minimize the effect of lighting conditions (or color vs blackandwhite originals) on our downstream classifiers, as well as simplify the processing we'd have to do.

For example we'd only have to find centroids on single color values, rather than a threedimensional RGB matrix

Kmeans: we intended to run Kmeans on our collection of patches as a sort of edge detector to find N_CLUSTERS common patterns.

6. Documentation:



annotations0 - Notepad

File Edit Format View Help

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wildlife - 0.9900808
safari - 0.9878026
wild - 0.9796124
mammal - 0.9780885
animal - 0.9746088
nature - 0.97324497
reserve - 0.9655447
savanna - 0.9603504
barbaric - 0.94386697
equid - 0.93536663
game - 0.93169373
conservation - 0.9237086
Serengeti - 0.9128543
no person - 0.9124676
two - 0.9075011
park - 0.90680695
grass - 0.9061872
grassland - 0.8981205
national - 0.87025607
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annotations1 - Notepad

File Edit Format View Help

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Mara - 0.9860015
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barbaric - 0.9793756
grass - 0.9708272
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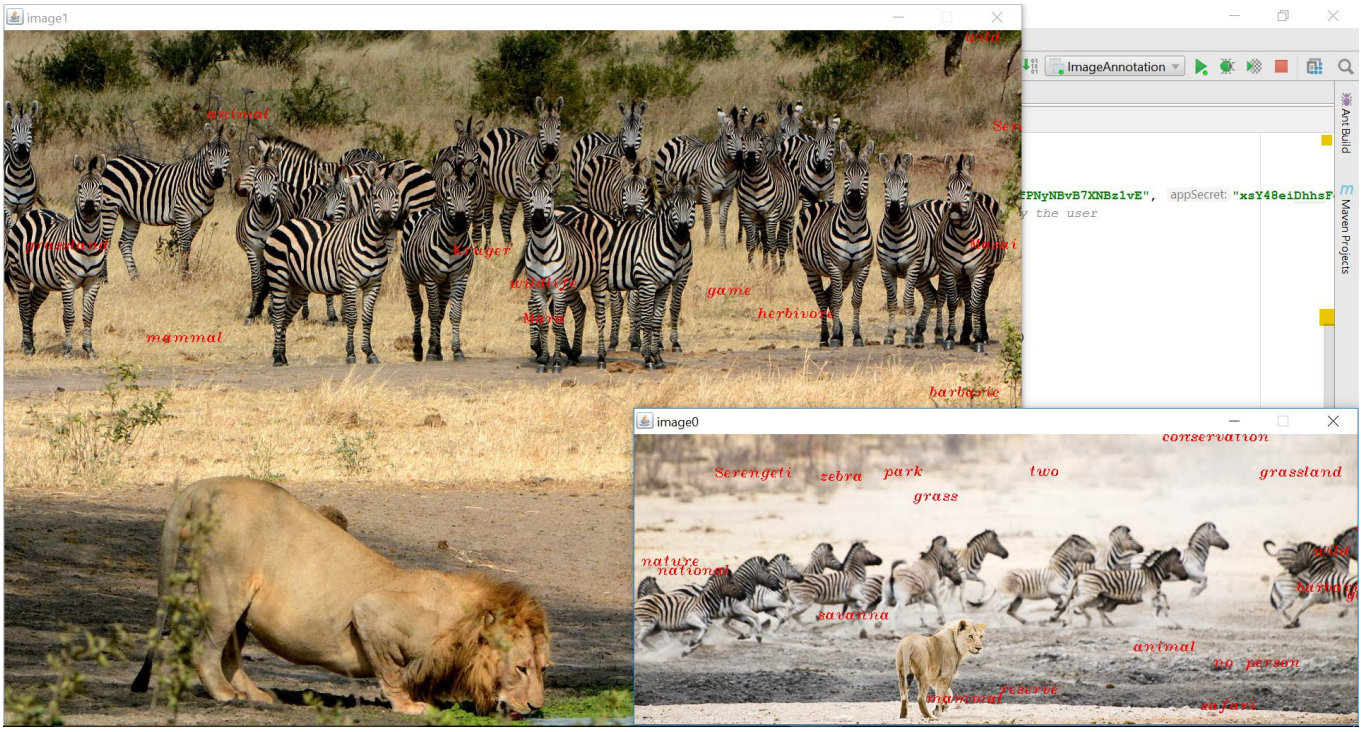


8. Project Management:

The following Screenshots represents the Project Management Zenhub Images.

UdayKiranDora / Big-Data-Analytics-Project

Watch 0 Star 0 Fork 0

Code | Issues 2 | Pull requests 0 | Boards | Reports | Projects 0 | Wiki

Filters | is:issue is:closed | Labels | Milestones | New issue

Clear current search query, filters, and sorts

2 Open ✓ 3 Closed — Author | Labels | Milestones | Assignee | Sort

- **web application** 8
  #5 by UdayKiranDora was closed 41 minutes ago — Milestone1
- **datasets and documentation** 8
  #4 by UdayKiranDora was closed 6 minutes ago — Milestone1
- **Image Dataset Collection** enhancement 3
  #1 by BorusuMeenakshi was closed 41 minutes ago — Milestone1

ProTip! Add no:assignee to see everything that's not assigned.

Milestone1

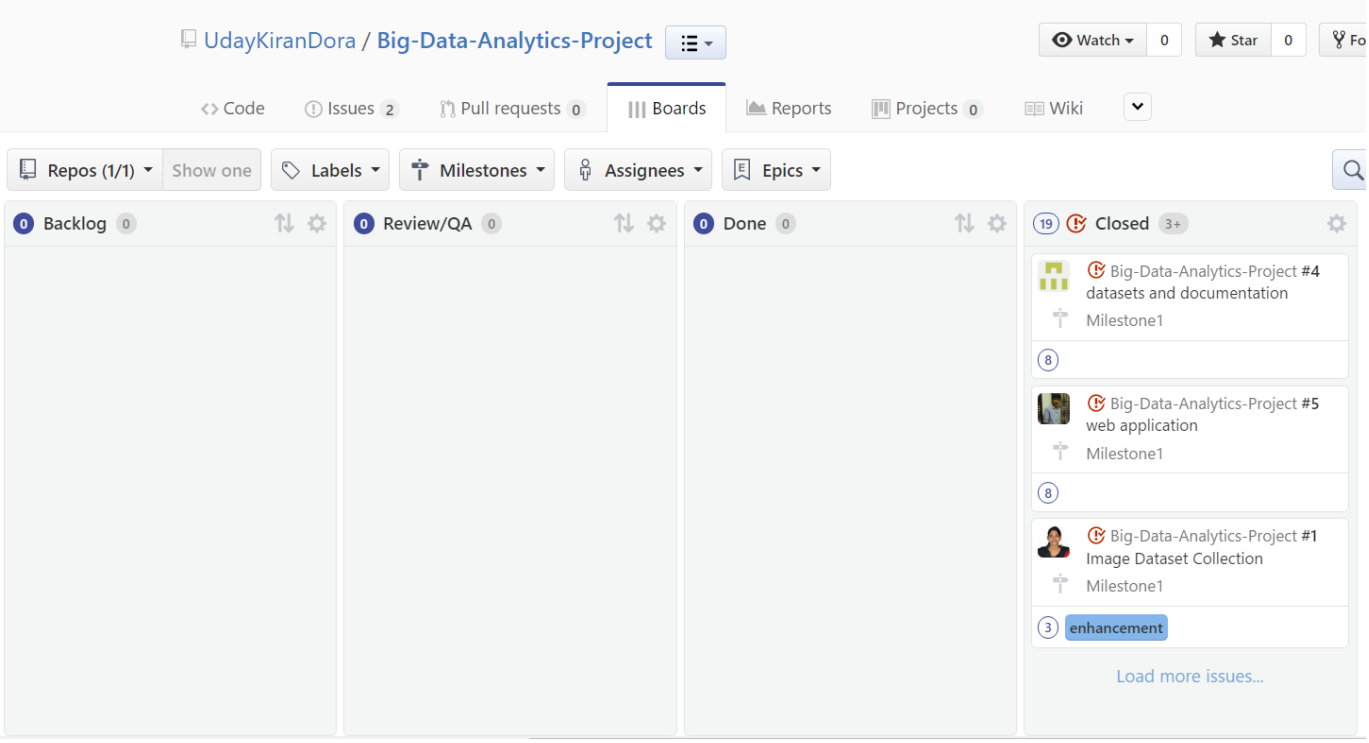
Edit Milestone | Milestones

Labels | Hide Pull Requests | Burn Pipelines

Start: **Feb 25, 2017** Edit Due: **Feb 27th, 2017** Edit

19 Total Story Points

3 Total Issues and Pull Requests



Team Members & Contibutions:

5. Vijaya Lakshmi Meenakshi Borusu. 25%

31. Rakesh Reddy Pallepati. 25%

35. Uday Kiran Dora Sevana. 25%

49. Sai Sriharsha Sudulaguntla. 25%.

Future work:

-- Image analysis and classification.

-- Mash up of Annotations Generation and Classification.