Tutorial Report 3:

Task1: Implement to build a linear regression model for selected two parameters for chimpanzee's daily movement, activities and interaction. Define your own datasets.

For this task, I implemented a linear regression algorithm to identify the relation between Chimpanzee behavior index and 5 other parameters. The chimpanzee behavior index ranges from 0 to 10 , "0" being normal and "10" being very strange behavior. The 5 parameters are no. of frames per second for the video recorded, no. of visitors/day, hours of sleep, pounds of food, no. fights/day.

The equation used is.

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + €}$$

Where:

Y = Behavior Index

X_1 = no. of frames/sec in the video

X_2 = no. of Visitors/day

X_3 Hours of sleep had by a chimp

X_4 = pounds of food eaten by chimp/day

X_5 = no. of fights/day of a chimp

Data:

```
2.9,289 216 8 14 1
3.0,391 244 9 16 2
3.0,424 246 9 18 2
3.0,313 239 9 10 0
3.5,243 275 9 30 2
3.5,365 219 9 21 2
4.35,396 267 10 39 3
4.30,356 274 7 19 2
4.4,346 255 12 56 3
4.4,156 258 9 28 0
4.6,278 249 11 42 4
4.8,349 252 8 21 1
4.9,141 236 12 56 1
4.4,245 236 9 24 1
4.6,297 256 11 45 3
4.5,310 262 9 20 2
4.5,151 139 9 35 3
4.5,370 357 8 15 4
4.5,379 198 14 64 4
4.5,463 206 10 31 3
5.5,316 245 13 60 4
5.6,280 225 10 36 4
5.4,395 215 10 27 1
5.9,139 220 13 59 0
5.9,245 205 11 37 4
6.9,373 215 8 25 1
7.1,224 215 11 54 3
7.1,677 210 11 33 4
```

```
8.1,424 210 14 59 4
9.1,150 210 10 30 0
```

This Data is split into 80% for training the model and 20% for testing the model.

The Training error and testing error for the model is as follows.

Output:

```
training Mean Squared Error = 30.163844279749302
test Mean Squared Error = 22.03719140901755
```

2. Implement K-Means clustering for the clusters of the chimpanzee's activities. Define your own data sets.

In this task used K-means clustering algorithms to classify chimp's activities into 6 groups each group being an behavior of individual chimp. Class0 represents chimp1, class1 represents chimp2 and so on.

Various behaviors considered for the data are:

1. no. of times fought,
2. no. of times moved from one place to another,
3. no. of times communicated with other chimps,
4. no. of times ate,
5. no. hours slept and
6. no. of time groomed. Each activity is represented as one column.

Input:

```
29 289 216 8 14 1
30 391 244 9 16 2
30 424 246 9 18 2
30 313 239 9 10 0
35 243 275 9 30 2
35 365 219 9 21 2
43 396 267 10 39 3
43 356 274 7 19 2
44 346 255 12 56 3
44 156 258 9 28 0
44 278 249 11 42 4
44 349 252 8 21 1
44 141 236 12 56 1
44 245 236 9 24 1
46 297 256 11 45 3
45 310 262 9 20 2
45 151 139 9 35 3
45 370 357 8 15 4
45 379 198 14 64 4
45 463 206 10 31 3
45 316 245 13 60 4
46 280 225 10 36 4
44 395 215 10 27 1
49 139 220 13 59 0
49 245 205 11 37 4
```

```
49 373 215 8 25 1
51 224 215 11 54 3
51 677 210 11 33 4
51 424 210 14 59 4
61 150 210 10 30 0
```

Output:

```
Clustering on training data:
([29.0,289.0,216.0,8.0,14.0,1.0],5)
([30.0,391.0,244.0,9.0,16.0,2.0],2)
([30.0,424.0,246.0,9.0,18.0,2.0],2)
([30.0,313.0,239.0,9.0,10.0,0.0],0)
([35.0,243.0,275.0,9.0,30.0,2.0],5)
([35.0,365.0,219.0,9.0,21.0,2.0],0)
([43.0,396.0,267.0,10.0,39.0,3.0],2)
([43.0,356.0,274.0,7.0,19.0,2.0],0)
([44.0,346.0,255.0,12.0,56.0,3.0],0)
([44.0,156.0,258.0,9.0,28.0,0.0],1)
([44.0,278.0,249.0,11.0,42.0,4.0],5)
([44.0,349.0,252.0,8.0,21.0,1.0],0)
([44.0,141.0,236.0,12.0,56.0,1.0],1)
([44.0,245.0,236.0,9.0,24.0,1.0],5)
([46.0,297.0,256.0,11.0,45.0,3.0],5)
([45.0,310.0,262.0,9.0,20.0,2.0],0)
([45.0,151.0,139.0,9.0,35.0,3.0],1)
([45.0,370.0,357.0,8.0,15.0,4.0],4)
([45.0,379.0,198.0,14.0,64.0,4.0],2)
([45.0,463.0,206.0,10.0,31.0,3.0],2)
([45.0,316.0,245.0,13.0,60.0,4.0],0)
([46.0,280.0,225.0,10.0,36.0,4.0],5)
([44.0,395.0,215.0,10.0,27.0,1.0],2)
([49.0,139.0,220.0,13.0,59.0,0.0],1)
([49.0,245.0,205.0,11.0,37.0,4.0],5)
([49.0,373.0,215.0,8.0,25.0,1.0],2)
([51.0,224.0,215.0,11.0,54.0,3.0],5)
([51.0,677.0,210.0,11.0,33.0,4.0],3)
([51.0,424.0,210.0,14.0,59.0,4.0],2)
([61.0,150.0,210.0,10.0,30.0,0.0],1)
```

Task2: Video Annotation

Input:

For this tutorial, I took movie trailer video and extracted main key frames out of the video using xuggler . Then I generated a new summary video (short version of the main video) using generated image frames.

In addition to that annotated every frame with the help of clarify API. Below are the few screen shots of annotations.

The annotations were very meaning full in most of the pictures for example, annotations on image 1 clearly summarize that an adult person has serious facial expression and he is indoors.

Another example would be annotations on image 3 clearly summarize that a beautiful girl who is brunette inside a room and also identifies as model.

In the image 4 the annotations summarize that a soldier with a gun in the battle field and on the ground. It also annotated that image has a smoke.

Image1:

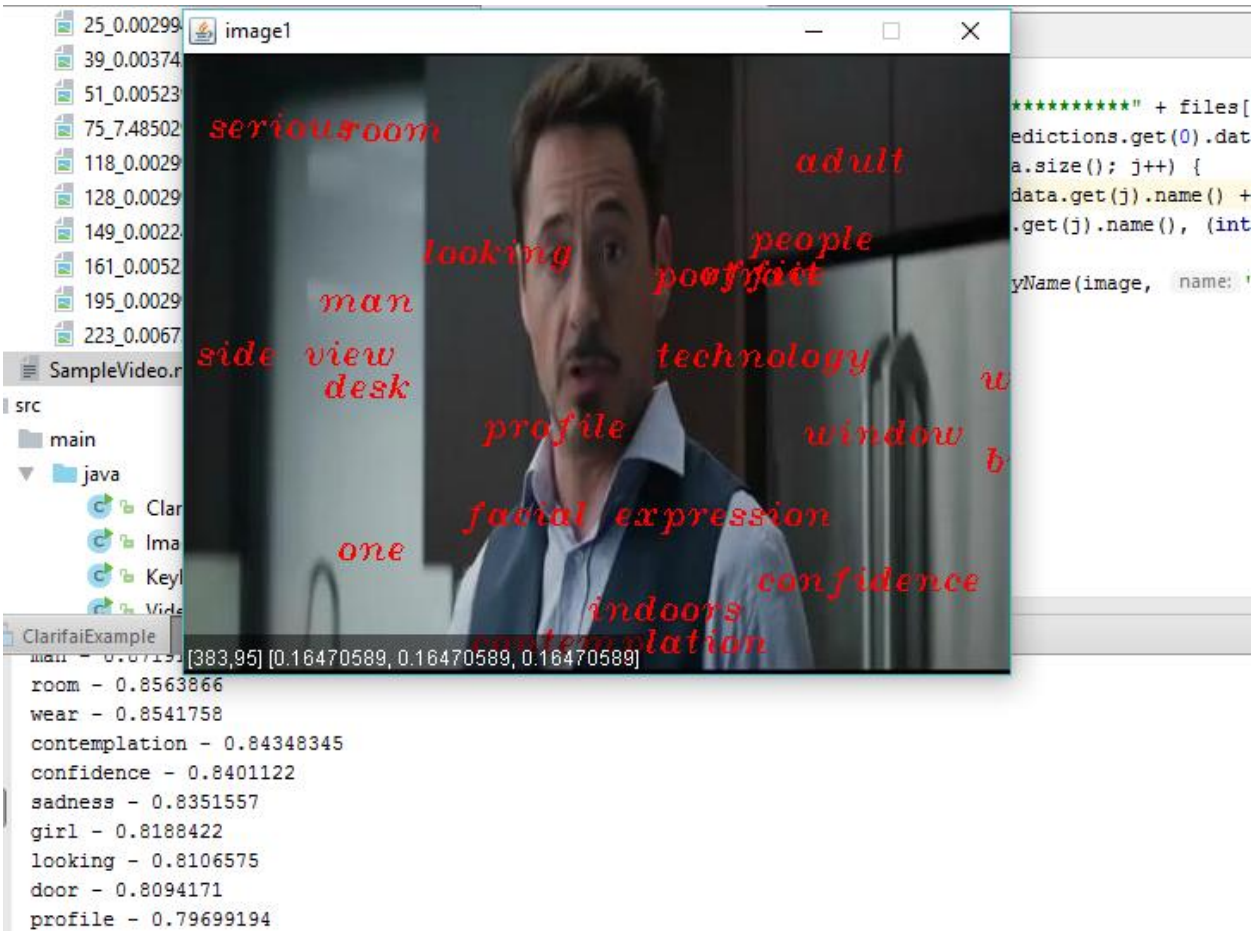

Image2:

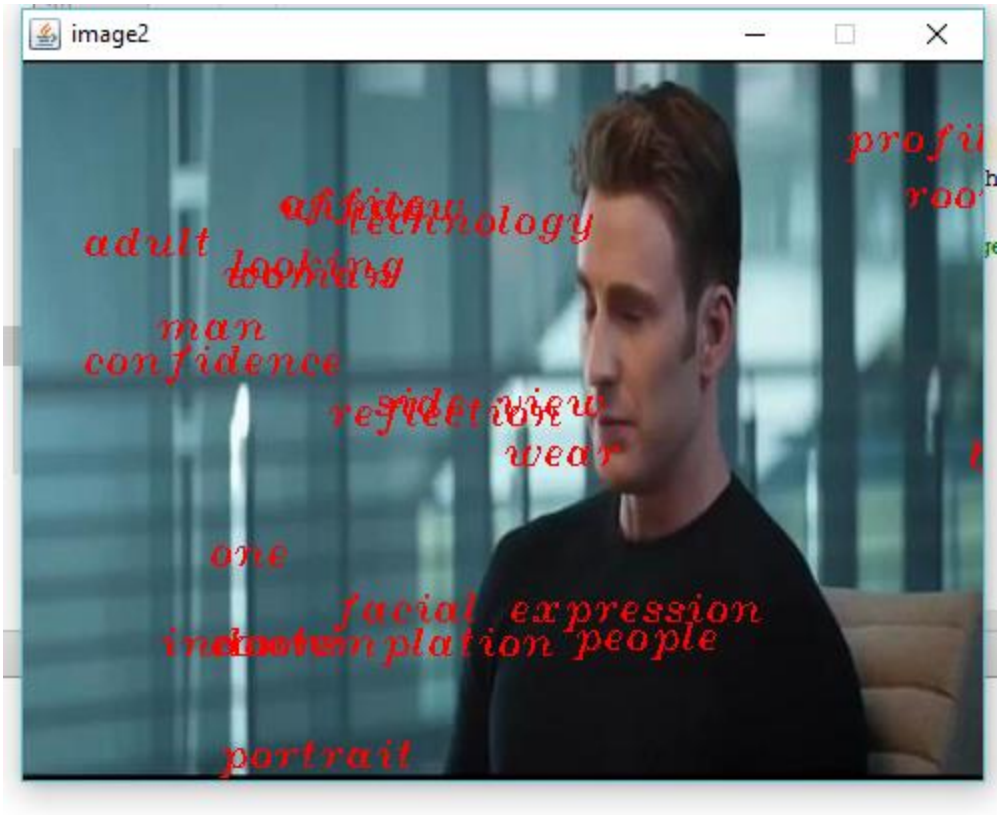

Image3:

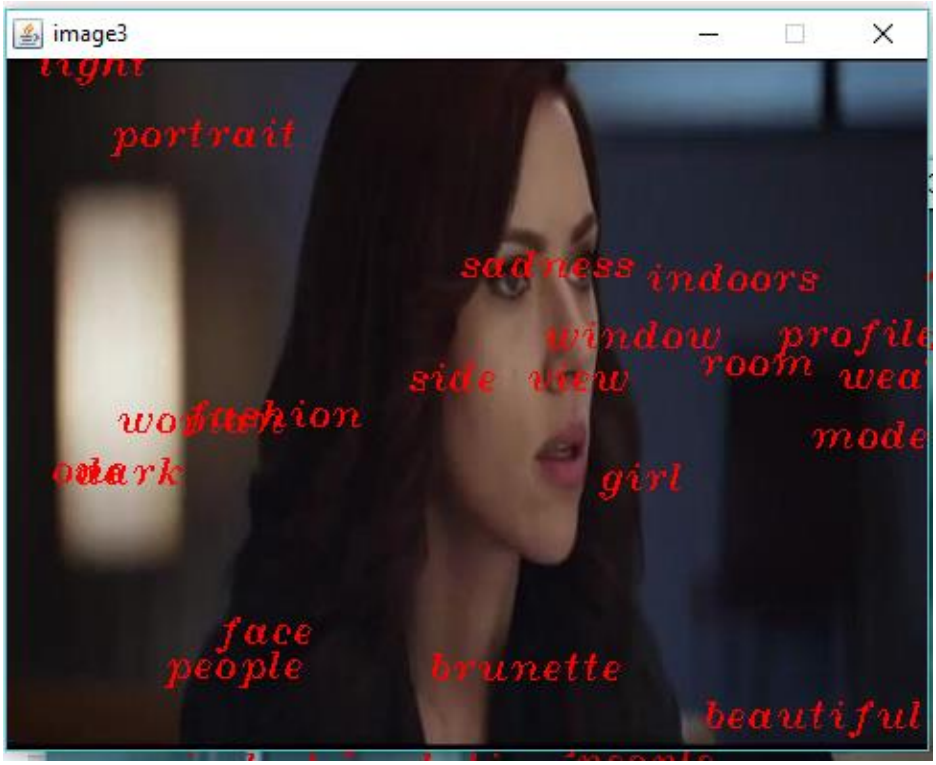

Image4:

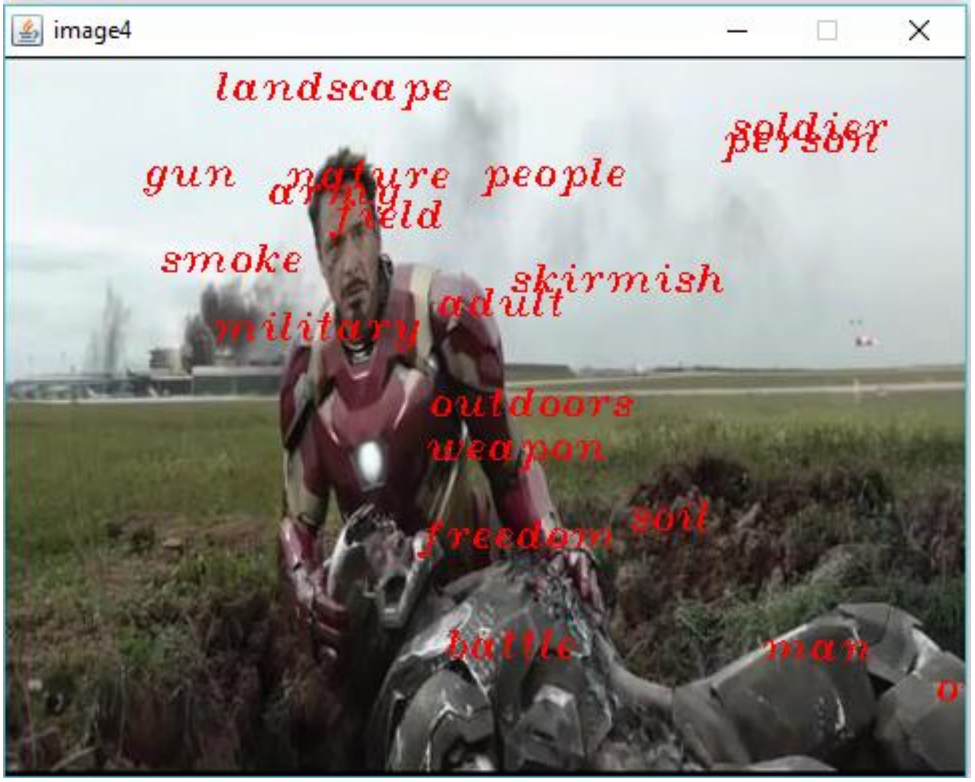
image4
landscape
soldier
person
gun
nature
people
field
smoke
skirmish
adult
military
outdoors
weapon
soil
freedom
battle
man

Image 5:

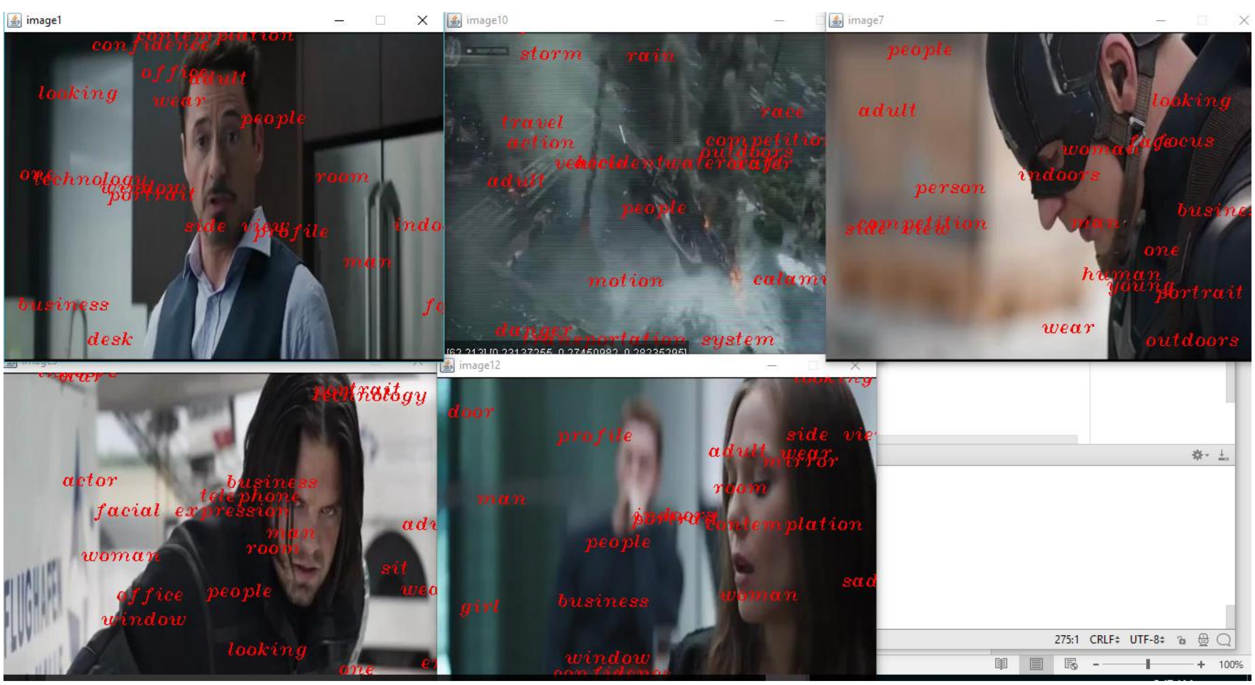
image1
looking
wear
people
room
portrait
side view
man
business
desk
image10
storm
rain
travel
action
adult
people
motion
system
image7
people
adult
looking
indoors
person
one
portrait
wear
outdoors
actor
business
telephone
facial expression
woman
room
office
window
people
looking
image12
door
profile
man
adult
room
contemplation
people
girl
business
woman
window