

Big Data Analytics and Applications Lab Assignment 5

Task 1:

Training data

elephant

9001 9002 9003 9004 9005 9006

giraffe

7001 7002 7003 7004 7005 7006

lion

8001 8002 8003 8004 8005 8006

tiger

6001 6002 6003 6004 6005 6006

The image displays four screenshots of a Windows File Explorer window, each showing a different category of animal images used for training data. The window title is 'Training data'. The address bar shows the path: 'This PC > Documents > Course Works > Big Data Analytics and Applications > Tutorials > T4 > image_classification > Assignment_D'. The left sidebar shows 'Quick access' with links to Desktop, Downloads, Documents, and Pictures. The main area displays a grid of images, each with a numerical label below it. The categories are: elephant (images 9001-9006), giraffe (images 7001-7006), lion (images 8001-8006), and tiger (images 6001-6006). The 'Picture Tools' ribbon is visible at the top of each window, and the 'File' menu is open in the first three screenshots.

- Four image categories are taken in the source code. They are "elephant","giraffe","lion","tiger".

Image Categories






```
object IPApp {
  val featureVectorsCluster = new mutable.MutableList[String]

  val IMAGE_CATEGORIES = List("elephant", "giraffe", "lion", "tiger")
  /**
   *
   * @param sc      : SparkContext
   * @param images  : Images list from the training set
   */
}
```

- Generated data was saved under 'features','clusters','clusterCenters','histograms' and 'nbmodel' folders.

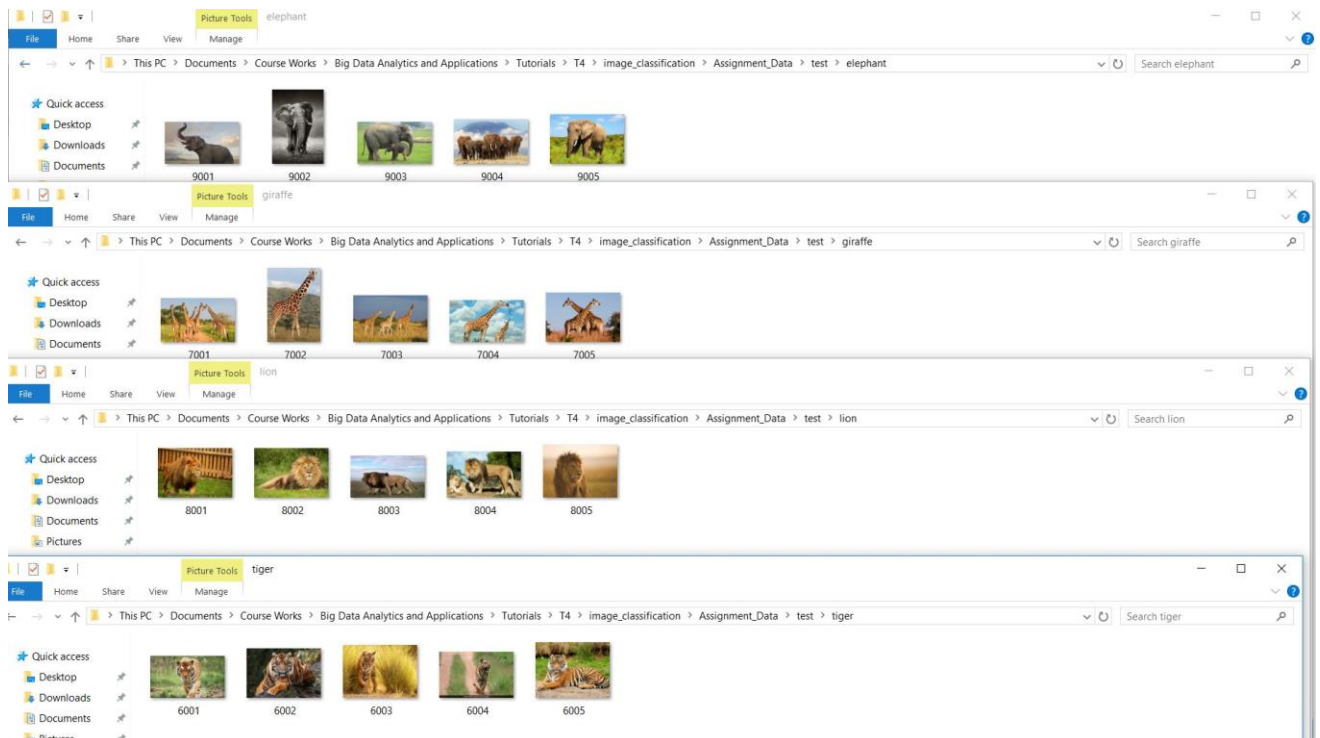
Saved models

his PC > Documents > Course Works > Big Data Analytics and Applications > Assignments > Lab 5

<input type="checkbox"/> Name	Date modified	Type	Size
 clusterCenters	2/22/2017 9:21 PM	File folder	
 clusters	2/22/2017 9:21 PM	File folder	
 features	2/22/2017 9:21 PM	File folder	
 histograms	2/22/2017 9:21 PM	File folder	
 nbmodel	2/22/2017 9:21 PM	File folder	

- Test data contains the same four classes and each class contains 5 images.

Test Data



- Following confusion matrix and an accuracy of 70% was recorded from this task.

Confusion Matrix and Accuracy

```
[Stage 4760:=====]> (1 + 1) / 2]0.7
|===== Confusion matrix =====
4.0 0.0 0.0 1.0
0.0 4.0 0.0 1.0
0.0 1.0 3.0 1.0
0.0 1.0 1.0 3.0
0.7
17/02/22 21:18:14 INFO RemoteActorRefProvider$RemotingTerminator: Shutting down remote daemon.
17/02/22 21:18:14 INFO RemoteActorRefProvider$RemotingTerminator: Remote daemon shut down; proceeding with flushing remote transports.
Process finished with exit code 0
```

Task 2:

Write a client application using the Spark API to connecting between Spark and your client. Your client can be either Web application or Android application. Refer to Tutorial 5 Spark API tutorial.

-
- To implement the client application for spark, we need to run the server initially. Following screenshot indicates the server running and waiting for the process.

Running Server

Project Packages

image_classification C:\Users\Ramgopal\...

- .idea
- data3
 - model
 - test
 - train
- project [image_classification-build] so
- src
 - main
 - java
 - resources
 - scala
 - ImageUtils
 - IPApp
 - IPSettings
 - SimpleServer.scala
 - scala-2.11
 - test
- target
- build.sbt
- image.png

IPApp.scala x SimpleServer.scala x Image...

```
19
20 object SimplePlan extends Plan
21 def intent = {
22   case req@GET(Path("/get"))
23     Ok ~> ResponseString(IPA
24 }
25
26   case req@POST(Path("/get
27     val imageByte = (new B
28     val bytes = new ByteAr
29     val image = ImageIO.re
30     ImageIO.write(image, "
31   }
32   Ok ~> ResponseString(I
33 }
34 }
35 object SimpleServer extends Ap
36 val bindingIP = SocketPortBi
37 unfiltered.jetty.Server.port
38 }
39
```

Run SimpleServer

```
"C:\Program Files\Java\jdk1.8.0_111\bin\java" ...
log4j:WARN No appenders could be found for logger (org.eclipse.)
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noc
```


- By using superstatic from the command prompt, we can run the web page on server.

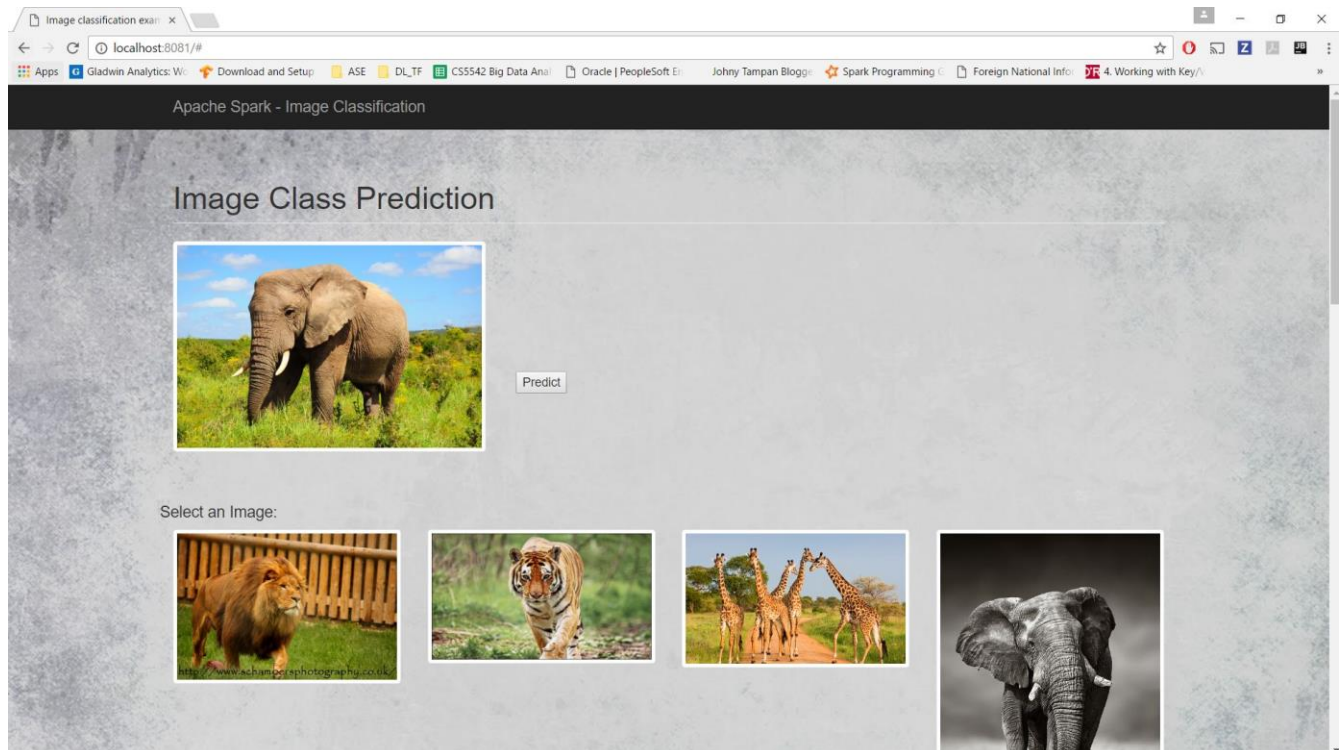
Superstatic command

```
Command Prompt - superstatic -p 8081
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Users\Kiran>superstatic -p 8081

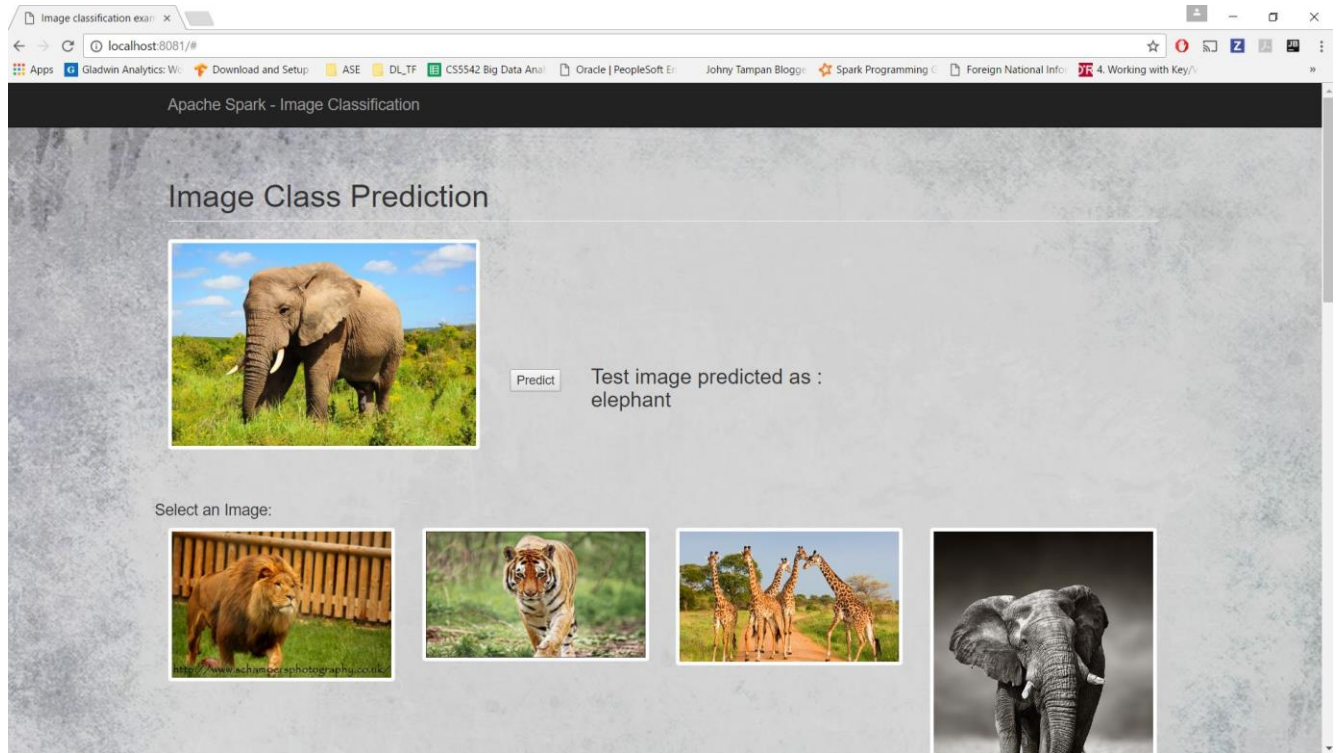
Superstatic started.
Visit http://localhost:8081 to view your app.
```

Client

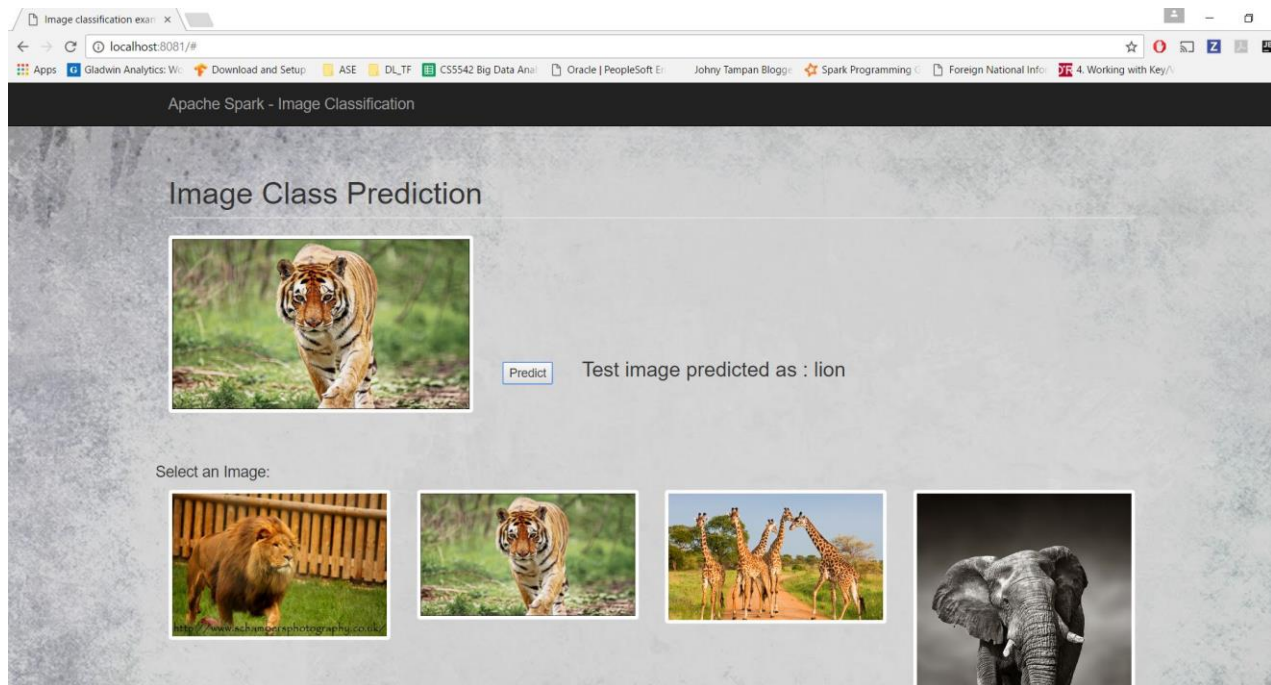


- My training model has an accuracy of 70%, so there were some wrong predictions as well. Following images indicate the predictions on the client side based on the executions on the server.

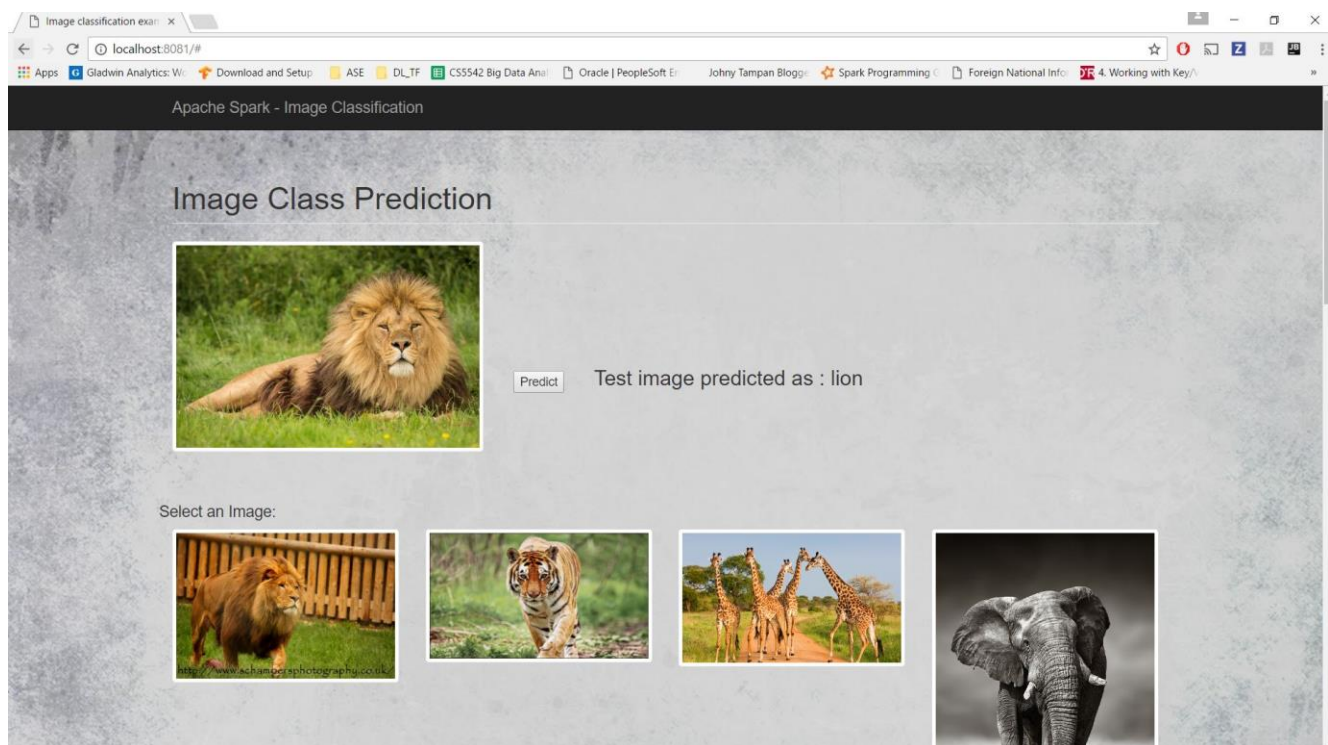
Elephant Prediction



Wrong Prediction: Tiger as Lion

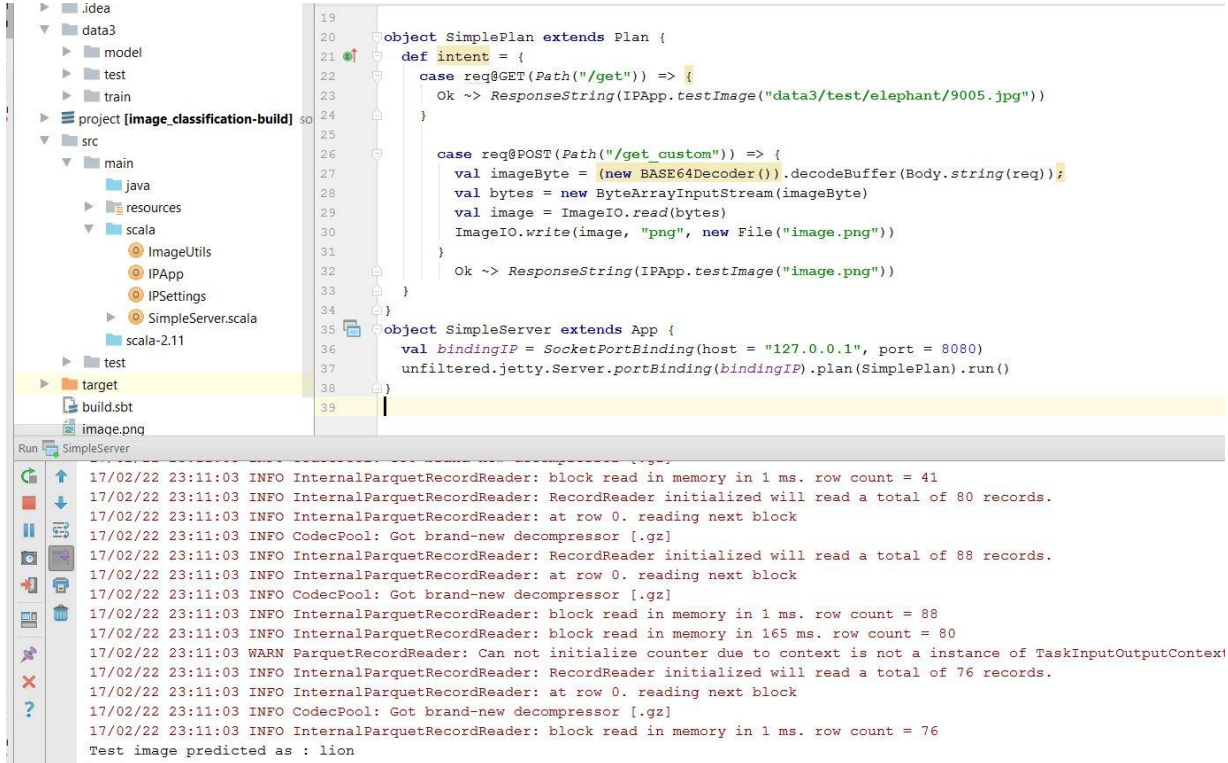


Lion Prediction



- Following image indicates the corresponding output on server console.

Server console



```
19
20 object SimplePlan extends Plan {
21   def intent = {
22     case req@GET(Path("/get")) => {
23       Ok -> ResponseString(IPApp.testImage("data3/test/elephant/9005.jpg"))
24     }
25
26     case req@POST(Path("/get_custom")) => {
27       val imageByte = (new BASE64Decoder()).decodeBuffer(Body.string(req));
28       val bytes = new ByteArrayInputStream(imageByte)
29       val image = ImageIO.read(bytes)
30       ImageIO.write(image, "png", new File("image.png"))
31     }
32     Ok -> ResponseString(IPApp.testImage("image.png"))
33   }
34 }
35 object SimpleServer extends App {
36   val bindingIP = SocketPortBinding(host = "127.0.0.1", port = 8080)
37   unfiltered.jetty.Server.portBinding(bindingIP).plan(SimplePlan).run()
38 }
39
```

Run SimpleServer

```
17/02/22 23:11:03 INFO InternalParquetRecordReader: block read in memory in 1 ms. row count = 41
17/02/22 23:11:03 INFO InternalParquetRecordReader: RecordReader initialized will read a total of 80 records.
17/02/22 23:11:03 INFO InternalParquetRecordReader: at row 0. reading next block
17/02/22 23:11:03 INFO CodecPool: Got brand-new decompressor [.gz]
17/02/22 23:11:03 INFO InternalParquetRecordReader: RecordReader initialized will read a total of 88 records.
17/02/22 23:11:03 INFO InternalParquetRecordReader: at row 0. reading next block
17/02/22 23:11:03 INFO CodecPool: Got brand-new decompressor [.gz]
17/02/22 23:11:03 INFO InternalParquetRecordReader: block read in memory in 1 ms. row count = 88
17/02/22 23:11:03 INFO InternalParquetRecordReader: block read in memory in 165 ms. row count = 80
17/02/22 23:11:03 WARN ParquetRecordReader: Can not initialize counter due to context is not a instance of TaskInputOutputContext
17/02/22 23:11:03 INFO InternalParquetRecordReader: RecordReader initialized will read a total of 76 records.
17/02/22 23:11:03 INFO InternalParquetRecordReader: at row 0. reading next block
17/02/22 23:11:03 INFO CodecPool: Got brand-new decompressor [.gz]
17/02/22 23:11:03 INFO InternalParquetRecordReader: block read in memory in 1 ms. row count = 76
Test image predicted as : lion
```

Task 3:

Build a simple application to have a conversion using Google Conversation Actions API about the summary you had generated about your video. Refer to Tutorial 5 Conversion Actions API tutorial.

- To implement the conversation actions api, we need to start by creating a agent in api.ai. Then we need to create the corresponding Intents and Entities for the agent.

Creating and Agent

api.ai

First

Intents

Entities

Domains

Training [beta]

Integrations

Fulfillment

Docs

api.ai

VideoAnalyzer

Intents

Entities

Domains

Training [beta]

Integrations

Fulfillment

Docs

Assignment-5

SAVE

AGENT TYPE

☒ Public ☐ Private

DESCRIPTION

Describe your agent...

ADD SAMPLE DATA

Select sample data to be loaded into new agent or leave unselected for empty agent

LANGUAGE

English

DEFAULT TIME ZONE

(GMT-5:00) America/New_York

Intents

CREATE INTENT

Search intents...

Default Fallback Intent

Default Welcome Intent

nature-count

summary

water-count

wordcount-results

Envisager123

Intents

Entities

Domains

Training [beta]

Integrations

Fulfillment

Docs

Forum

Search intents...

alarm.cancel

alarm.confirm

alarm.set

Deep_learning

Default Fallback Intent

Default Welcome Intent

Prerequisite

Tutorial-date

Welcome Jo

Please try a search

Entities were created to identify with different names

api.ai

Envisager123

Intents

Entities

Domains

Entities

CREATE ENTITY

Search entities...

@ask

@Project

@recurrence

User queries were added

Settings

+

+

Welcome Jo

SAVE

Contexts

User says

Events

Action


Search in user says...

Add user expression

Welcome Jo

GOOGLE_ASSISTANT_WELCOME Add event

[+ new parameter](#)

Response 



Text response



- | | |
|---|----------------------------------|
| 1 | Hi How can I help you |
| 2 | How may I help you |
| 3 | Ask me anything |
| 4 | Enter a text response variant... |

ADD MESSAGE CONTENT

Actions on Google

