Ingeniería en sistemas computaciones

Datos masivos

TIJUANA, BAJA CALIFORNIA

ITT

Practica 2 - Linear regression

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Developement

The first thing is import all librarys to need in these case was

```
import org.apache.spark.ml.regression.LinearRegression
```

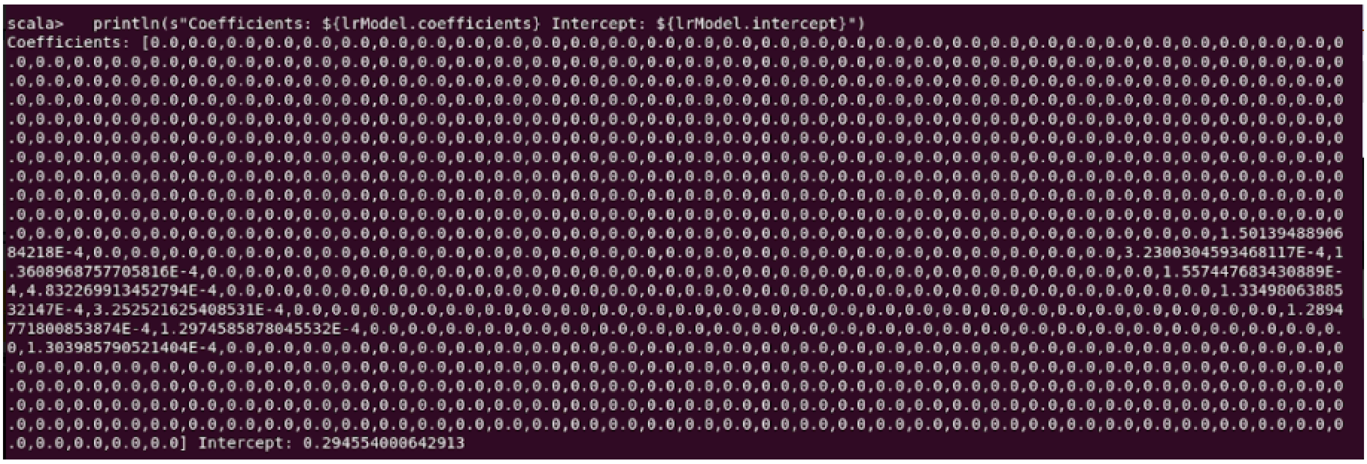
Load training data

```
val training = spark.read.format("libsvm").load("SampleLivs.txt")
val lr = new
LinearRegression().setMaxIter(10).setRegParam(0.3).setElasticNetParam(0.8)
```

Fit the model

~~~
val lrModel = lr.fit(training)
``


Print the coefficients and intercept for linear regression
```scala
println(s"Coefficients: ${lrModel.coefficients} Intercept: ${lrModel.intercept}")
~~~



```
scala>   println(s"Coefficients: ${lrModel.coefficients} Intercept: ${lrModel.intercept}")
Coefficients: [0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0
.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0
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84218E-4,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,3.2300304593468117E-4,1
.3608968757705816E-4,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,1.557447683430889E-
4,4.832269913452794E-4,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,1.33498063885
32147E-4,3.252521625408531E-4,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,1.2894
771800853874E-4,1.2974585878045532E-4,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.
0,1.303985790521404E-4,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0
.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0
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.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0
.0,0.0,0.0,0.0,0.0] Intercept: 0.294554000642913
```
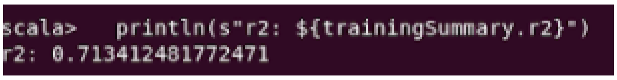
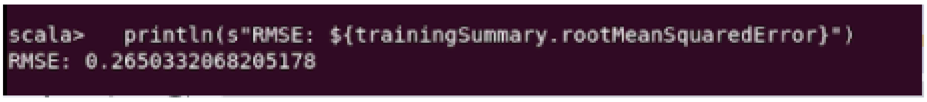

Summarize the model over the training set and print out some metrics

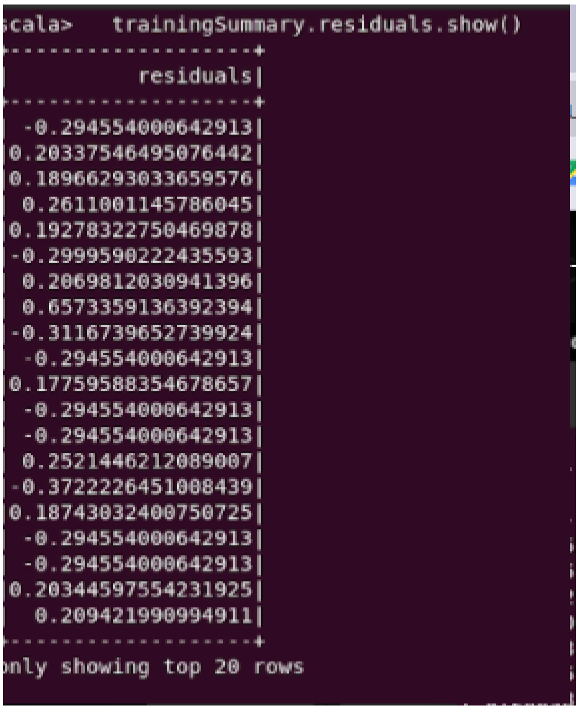
```
val trainingSummary = lrModel.summary
println(s"numIterations: ${trainingSummary.totalIterations}")
println(s"objectiveHistory: [${trainingSummary.objectiveHistory.mkString(",")}]")
trainingSummary.residuals.show()
println(s"RMSE: ${trainingSummary.rootMeanSquaredError}")
println(s"r2: ${trainingSummary.r2}")
```



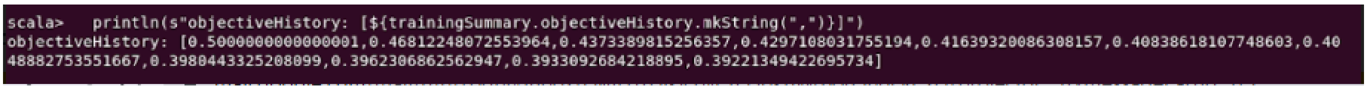
```
scala>   println(s"r2: ${trainingSummary.r2}")
r2: 0.713412481772471
```



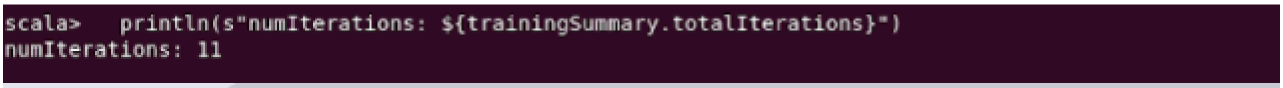
```
scala>   println(s"RMSE: ${trainingSummary.rootMeanSquaredError}")
RMSE: 0.2650332068205178
```



```
scala>   trainingSummary.residuals.show()
+-------------------+
|          residuals|
+-------------------+
|  -0.294554000642913|
|0.20337546495076442|
|0.18966293033659576|
| 0.2611001145786045|
|0.19278322750469878|
|-0.2999590222435593|
| 0.2069812030941396|
| 0.6573359136392394|
|-0.3116739652739924|
|  -0.294554000642913|
|0.17759588354678657|
|  -0.294554000642913|
|  -0.294554000642913|
| 0.2521446212089007|
|-0.3722226451008439|
|0.18743032400750725|
|  -0.294554000642913|
|  -0.294554000642913|
|0.20344597554231925|
|  0.209421990994911|
+-------------------+
only showing top 20 rows
```



```
scala>   println(s"objectiveHistory: [${trainingSummary.objectiveHistory.mkString(",")}]")
objectiveHistory: [0.5000000000000001,0.46812248072553964,0.4373389815256357,0.4297108031755194,0.41639320086308157,0.40838618107748603,0.40
48882753551667,0.3980443325208099,0.3962306862562947,0.3933092684218895,0.39221349422695734]
```



```
scala>   println(s"numIterations: ${trainingSummary.totalIterations}")
numIterations: 11
```