Wine Quality Prediction Tool User Guidance

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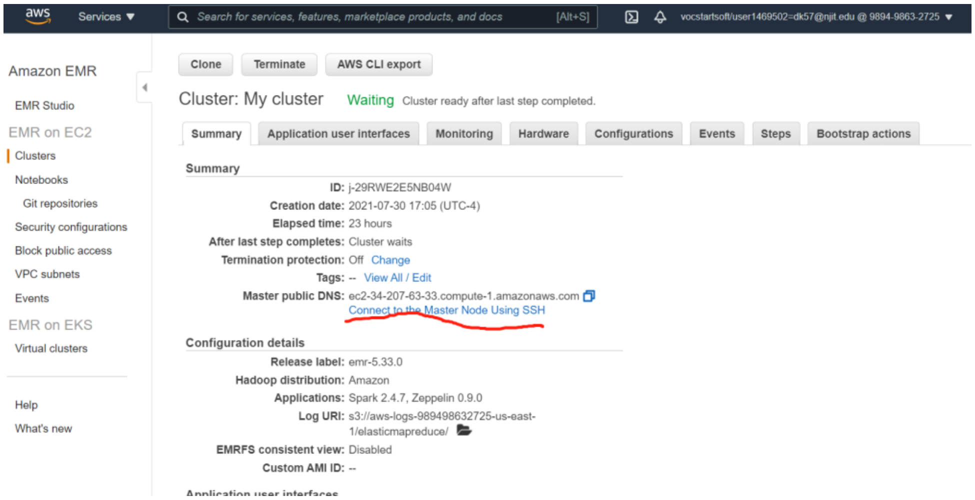
Github link for the code and dockerfile
https://github.com/konaer/WineQualityPrediction

DockerHub link for the docker image
https://hub.docker.com/repository/docker/konaer/cs643

Part1. Spark, AWS emr cluster training

1. In AWS, build EMR cluster to run spark, open ssh connection in the cluster in order to connect locally



Cluster: My cluster Waiting Cluster ready after last step completed.

Summary

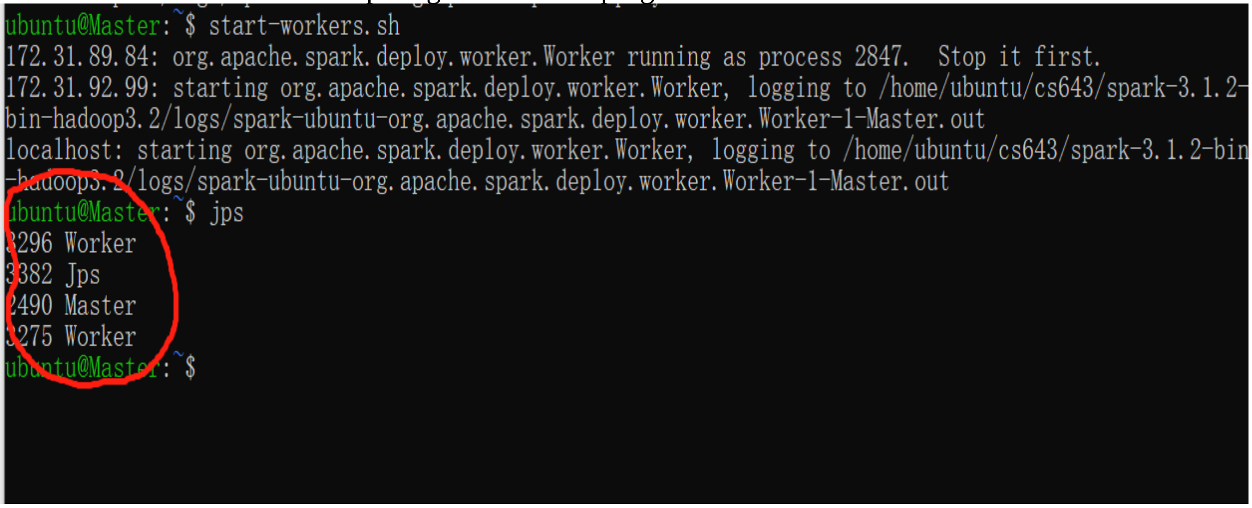
ID: j-29RWE2E5NB04W
Creation date: 2021-07-30 17:05 (UTC-4)
Elapsed time: 23 hours
After last step completes: Cluster waits
Termination protection: Off Change
Tags: -- View All / Edit
Master public DNS: ec2-34-207-63-33.compute-1.amazonaws.com
Connect to the Master Node Using SSH

Configuration details

Release label: emr-5.33.0
Hadoop distribution: Amazon
Applications: Spark 2.4.7, Zeppelin 0.9.0
Log URI: s3://aws-logs-989498632725-us-east-1/elasticmapreduce/
EMRFS consistent view: Disabled
Custom AMI ID: --

Application user interfaces

2. Use ssh connection to upload training.py and training data, from the connection, we could see that we have 3 works to do the computing work for the program.



```
ubuntu@Master:~$ start-workers.sh
172.31.89.84: org.apache.spark.deploy.worker.Worker running as process 2847.  Stop it first.
172.31.92.99: starting org.apache.spark.deploy.worker.Worker, logging to /home/ubuntu/cs643/spark-3.1.2-
bin-hadoop3.2/logs/spark-ubuntu-org.apache.spark.deploy.worker.Worker-1-Master.out
localhost: starting org.apache.spark.deploy.worker.Worker, logging to /home/ubuntu/cs643/spark-3.1.2-bin
-hadoop3.2/logs/spark-ubuntu-org.apache.spark.deploy.worker.Worker-1-Master.out
ubuntu@Master:~$ jps
3296 Worker
3382 Jps
2490 Master
3275 Worker
ubuntu@Master:~$
```

3. Run training.py, we have the trained_model file build, for us to run prediction latterly. From the running, we could also see that the F-measure for our algorithm is around 0.59.

Part2. Run predicting.py with our trained model and the data in your hands.

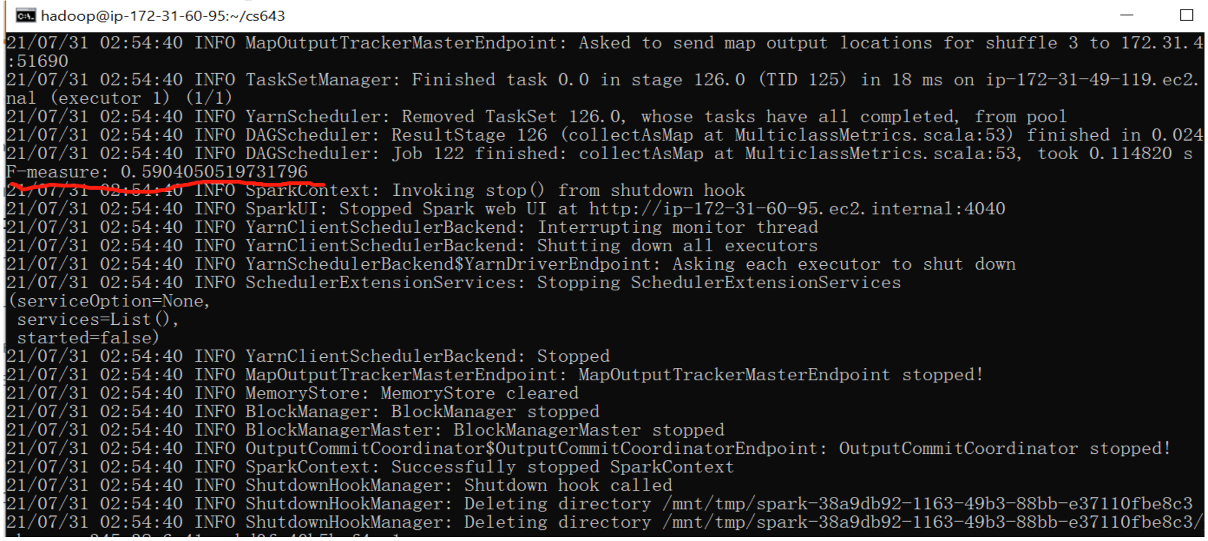
A. With docker

1. Please prepare your testdata.csv file to a specific directory that you would like to run.

2. Use following commend line to pull docker image to the same directory of your data file.
   $docker pull konaer/cs643:Dejing

3. Use the following commend line to run docker and test result.
   $docker run konaer/cs643:Dejing <yourTestFileName.csv>

4. Here's a result example, with ValidationDatas.csv as test data



```
21/07/31 02:54:40 INFO MapOutputTrackerMasterEndpoint: Asked to send map output locations for shuffle 3 to 172.31.4
:51690
21/07/31 02:54:40 INFO TaskSetManager: Finished task 0.0 in stage 126.0 (TID 125) in 18 ms on ip-172-31-49-119.ec2.
nal (executor 1) (1/1)
21/07/31 02:54:40 INFO YarnScheduler: Removed TaskSet 126.0, whose tasks have all completed, from pool
21/07/31 02:54:40 INFO DAGScheduler: ResultStage 126 (collectAsMap at MulticlassMetrics.scala:53) finished in 0.024
21/07/31 02:54:40 INFO DAGScheduler: Job 122 finished: collectAsMap at MulticlassMetrics.scala:53, took 0.114820 s
F-measure: 0.5904050519731796
21/07/31 02:54:40 INFO SparkContext: Invoking stop() from shutdown hook
21/07/31 02:54:40 INFO SparkUI: Stopped Spark web UI at http://ip-172-31-60-95.ec2.internal:4040
21/07/31 02:54:40 INFO YarnClientSchedulerBackend: Interrupting monitor thread
21/07/31 02:54:40 INFO YarnClientSchedulerBackend: Shutting down all executors
21/07/31 02:54:40 INFO YarnSchedulerBackend$YarnDriverEndpoint: Asking each executor to shut down
21/07/31 02:54:40 INFO SchedulerExtensionServices: Stopping SchedulerExtensionServices
(serviceOption=None,
 services=List(),
 started=false)
21/07/31 02:54:40 INFO YarnClientSchedulerBackend: Stopped
21/07/31 02:54:40 INFO MapOutputTrackerMasterEndpoint: MapOutputTrackerMasterEndpoint stopped!
21/07/31 02:54:40 INFO MemoryStore: MemoryStore cleared
21/07/31 02:54:40 INFO BlockManager: BlockManager stopped
21/07/31 02:54:40 INFO BlockManagerMaster: BlockManagerMaster stopped
21/07/31 02:54:40 INFO OutputCommitCoordinator$OutputCommitCoordinatorEndpoint: OutputCommitCoordinator stopped!
21/07/31 02:54:40 INFO SparkContext: Successfully stopped SparkContext
21/07/31 02:54:40 INFO ShutdownHookManager: Shutdown hook called
21/07/31 02:54:40 INFO ShutdownHookManager: Deleting directory /mnt/tmp/spark-38a9db92-1163-49b3-88bb-e37110fbe8c3
21/07/31 02:54:40 INFO ShutdownHookManager: Deleting directory /mnt/tmp/spark-38a9db92-1163-49b3-88bb-e37110fbe8c3/
```

B. Without Docker

If you would like to run without docker, you need to follow steps below.

1. Install Java 8 or later
2. Install python 3.6+
3. Install PyNumpy
4. Install Apache Spark from official web or use pip pyspark to install pyspark
5. From github, pull training.py , predicting.py, TrainingDataset.csv to a specific directory
6. Run [python training.py TrainingDataset.csv] first, so that trained_model file could generated.
7. Run [python predicting.py yourTestData.csv], so that you could see prediction result and F measure.