Diplomado en Ciencia de Datos UNAM

Modulo 13 Datos Masivos

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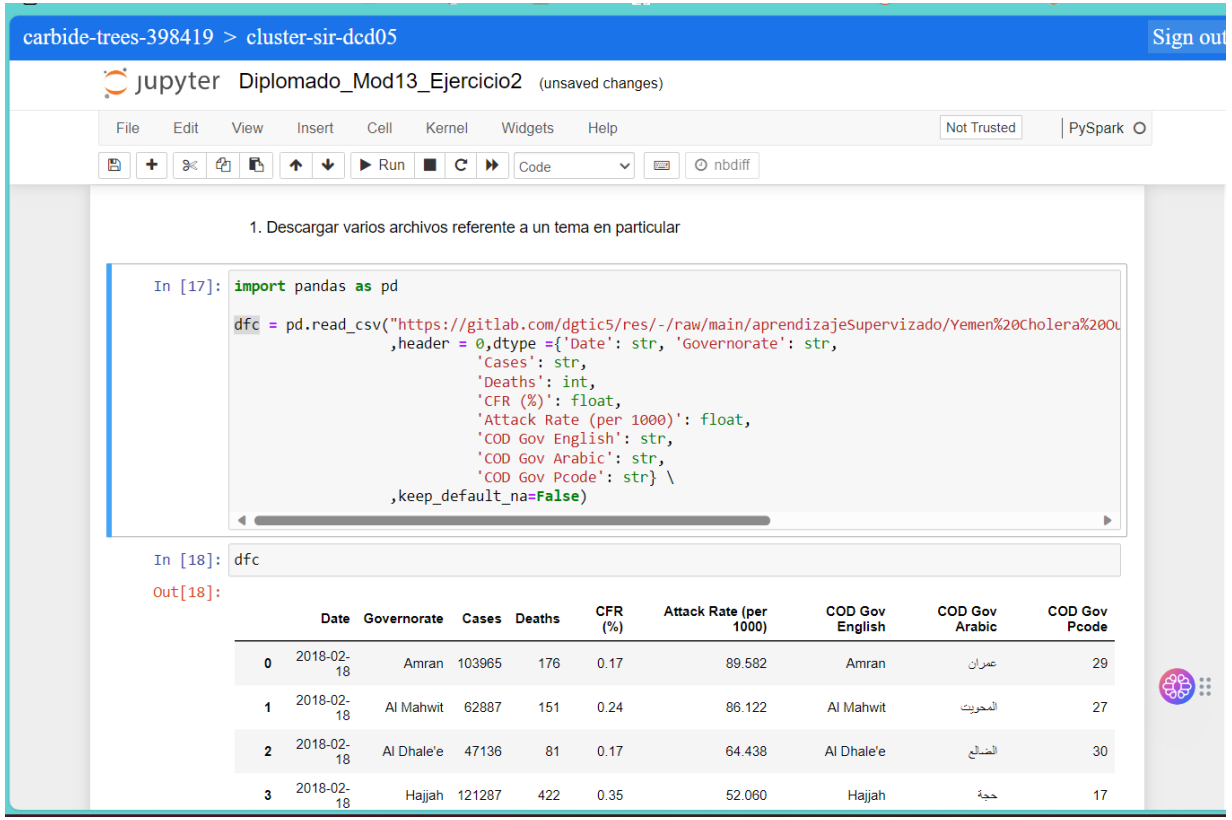
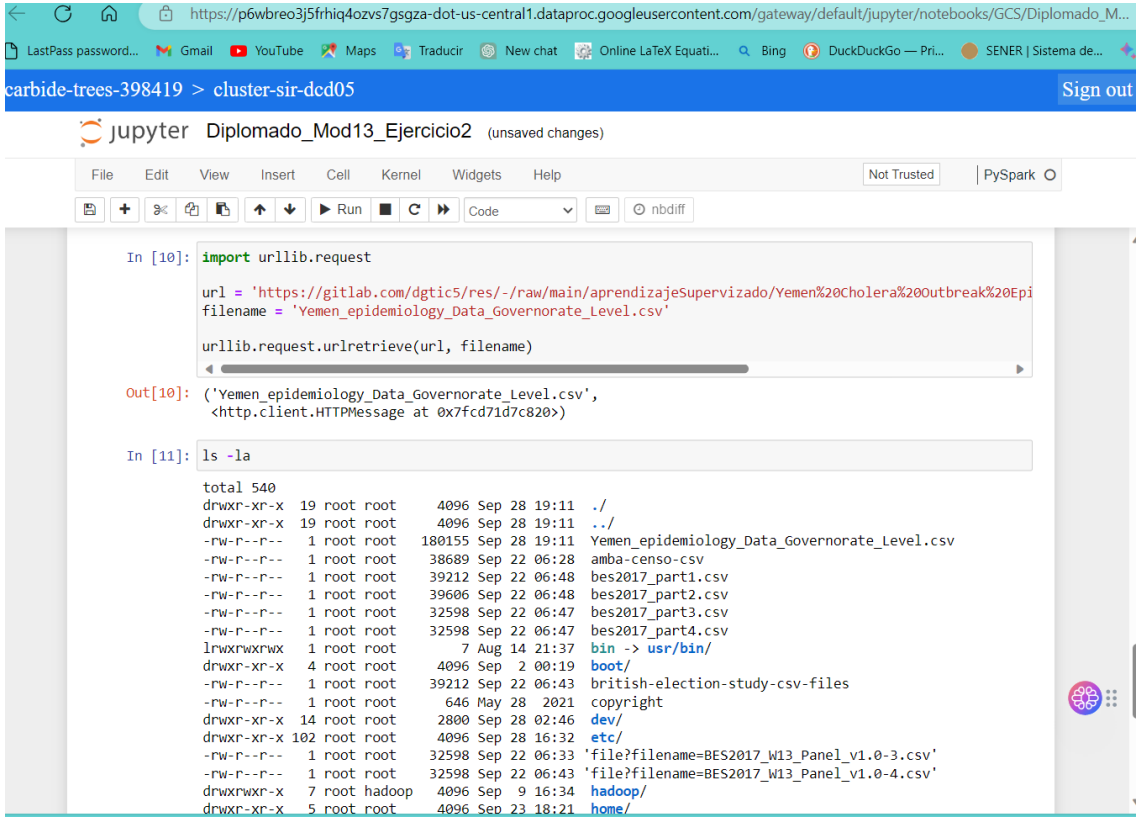
Descargar varios archivos referente a un tema en particular



	Date	Governorate	Cases	Deaths	CFR (%)	Attack Rate (per 1000)	COD Gov English	COD Gov Arabic	COD Gov Pcode
0	2018-02-18	Amran	103965	176	0.17	89.582	Amran	عمران	29
1	2018-02-18	Al Mahwit	62887	151	0.24	86.122	Al Mahwit	المحويت	27
2	2018-02-18	Al Dhale'e	47136	81	0.17	64.438	Al Dhale'e	الضالع	30
3	2018-02-18	Hajjah	121287	422	0.35	52.060	Hajjah	حجة	17



VENTAJA DESVENTAJA

Cargar los archivos al cluster de HADOOP

```
drwxr-xr-x   - root              hadoop          0 2023-09-23 15:24 /tmp/dcd/job
drwxr-xr-x   - root              hadoop          0 2023-09-23 01:14 /tmp/dcd/particion
drwxr-xr-x   - root              hadoop          0 2023-09-23 00:55 /tmp/dcd/pyspark
drwxr-xr-x   - sergio_ibarra1795 hadoop          0 2023-09-23 00:08 /tmp/dcd/sirilo
drwxr-xr-x   - sergio_ibarra1795 hadoop          0 2023-09-23 16:25 /tmp/dcd/streamdat
drwxr-xr-x   - sergio_ibarra1795 hadoop          0 2023-09-23 16:35 /tmp/dcd/streamdata
drwxr-xr-x   - sergio_ibarra1795 hadoop          0 2023-09-09 19:33 /tmp/dcd/wordcount
```

Out[15]:
```
CompletedProcess(args='hdfs dfs -ls /tmp/dcd', returncode=0)
```

In [16]:
```
import subprocess

command = 'hdfs dfs -mkdir -p /tmp/dcd/Yemen/output'
subprocess.run(command, shell=True)
```

Out[16]:
```
CompletedProcess(args='hdfs dfs -mkdir -p /tmp/dcd/Yemen/output', returncode=0)
```

In [17]:
```
import subprocess

command = 'hdfs dfs -ls /tmp/dcd/Yemen/'
subprocess.run(command, shell=True)
```

```
Found 2 items
drwxr-xr-x   - root hadoop          0 2023-09-28 19:20 /tmp/dcd/Yemen/input
drwxr-xr-x   - root hadoop          0 2023-09-28 19:23 /tmp/dcd/Yemen/output
```

Out[17]:
```
CompletedProcess(args='hdfs dfs -ls /tmp/dcd/Yemen/', returncode=0)
```

2. Cargar los archivos al cluster de HADOOP

In [22]:
```
import subprocess

command = 'hdfs dfs -put Yemen_epidemiology_Data_Governorate_Level.csv /tmp/dcd/Yemen/input/Yemen.csv'
subprocess.run(command, shell=True)
```

Out[22]:
```
CompletedProcess(args='hdfs dfs -put Yemen_epidemiology_Data_Governorate_Level.csv /tmp/dcd/Yemen/inp
ut/Yemen.csv', returncode=0)
```

In [23]:
```
import subprocess

command = 'hdfs dfs -ls /tmp/dcd/Yemen/input'
subprocess.run(command, shell=True)
```

```
Found 1 items
-rw-r--r--   2 root hadoop     180155 2023-09-28 19:30 /tmp/dcd/Yemen/input/Yemen.csv
```

Out[23]:
```
CompletedProcess(args='hdfs dfs -ls /tmp/dcd/Yemen/input', returncode=0)
```

VENTAJA DESVENTAJA

Crear un Data Frame en Spark

```
Found 1 items
-rw-r--r--   2 root hadoop     180155 2023-09-28 19:30 /tmp/dcd/Yemen/input/Yemen.csv
```

Out[23]:
```
CompletedProcess(args='hdfs dfs -ls /tmp/dcd/Yemen/input', returncode=0)
```

3. Crear un dataFrame en Spark

In [24]:
```
Yemen_df = spark.read.csv('hdfs:///tmp/dcd/Yemen/input', header=True, in
```

In [25]:
```
Yemen_df
```

Out[25]:
```
DataFrame[Date: timestamp, Governorate: string, Cases: string, Deaths: int, CFR (%): double, Attack Rate (per 1000): double, COD Gov English: string, COD Gov Arabic: string, COD Gov Pcode: string]
```

In [24]:
```
Yemen_df = spark.read.csv('hdfs:///tmp/dcd/Yemen/input', header=True, in
```

In [26]:
```
Yemen_df.show(10)
```

```
+-------------------+---------------+------+------+-------+-----------+---------------+---------------+-------------+
|               Date|     Governorate| Cases|Deaths|CFR (%)|Attack Rate (per 1000)| COD Gov English|COD Gov Arabic|COD Gov Pcode|
+-------------------+---------------+------+------+-------+-----------+---------------+---------------+-------------+
|2018-02-18 00:00:00|          Amran|103965|   176|   0.17|     89.582|          Amran|          29|          عمران|
|2018-02-18 00:00:00|       Al Mahwit| 62887|   151|   0.24|     86.122|       Al Mahwit|       27|          المحويت|
|2018-02-18 00:00:00|      Al Dhale'e| 47136|    81|   0.17|     64.438|      Al Dhale'e|       30|          الضالع|
|2018-02-18 00:00:00|         Hajjah|121287|   422|   0.35|      52.06|         Hajjah|          17|          حجة|
|2018-02-18 00:00:00|          Sana'a| 76250|   123|   0.16|     51.859|          Sana'a|          23|          صنعاء|
|2018-02-18 00:00:00|         Dhamar|103214|   161|   0.16|     51.292|         Dhamar|          20|          ذمار|
|2018-02-18 00:00:00|          Abyan| 28243|    35|   0.12|     49.477|          Abyan|          12|          أبين|
|2018-02-18 00:00:00|    Al Hudaydah|155908|   282|   0.18|     48.147|    Al Hudaydah|       18|          الحديدة|
|2018-02-18 00:00:00|       Al Bayda| 30568|    36|   0.12|
```

VENTAJA DESVENTAJA

Registrar como tabla Spak SQL

4. Registrar como tabla Spak SQL

In [27]:
```
sub_Yemen_df = Yemen_df.dropDuplicates()
sub_Yemen_df
```

Out[27]:
```
DataFrame[Date: timestamp, Governorate: string, Cases: string, Deaths:
int, CFR (%): double, Attack Rate (per 1000): double, COD Gov English:
string, COD Gov Arabic: string, COD Gov Pcode: string]
```

In [28]:
```
sub_Yemen_df.describe().show()
```

```
[Stage 5:>                                                          (0
+ 1) / 1]
```

```
+-------+-----------+------------------+-----------------+-------------
-----+---------------------+--------------+--------------+-----------
-------+
|summary|Governorate|             Cases|           Deaths|           CF
R (%)|Attack Rate (per 1000)|COD Gov English|COD Gov Arabic|     COD Go
v Pcode|
+-------+-----------+------------------+-----------------+-------------
-----+---------------------+---------------+--------------+-----------
-------+
|  count|       2914|              2914|             2914|
2914|                 2914|           2914|          2914|
2914|
|   mean|       null|23727.266852812125|87.13143445435827|0.38325326012
35424|   18.652564172958154|           null|          null|21.08698857
3534832|
| stddev|       null|26815.270334195033| 96.0375088723309|0.38070487640
15296|   17.531846411491316|           null|          null| 6.18988704
```

VENTAJA DESVENTAJA

Generar consultas

5. Generar consultas

5.1 Aquellas ciudades con mas casos y mas muertes

In [35]:
```
sub_Yemen_df.filter("Cases>100 and Deaths>200").show(10)
```

```
+-------------------+-----------+-----+------+-------+--------------------+--------------+--------------+--------------+
|               Date|Governorate|Cases|Deaths|CFR (%)|Attack Rate (per 1000)|COD Gov English|COD Gov Arabic|COD Gov Pcode|
+-------------------+-----------+-----+------+-------+--------------------+--------------+--------------+--------------+
|2017-06-27 00:00:00|     Hajjah|24580|   223|    9.0|                11.1|        Hajjah|            17|          حجة|
|2017-09-24 00:00:00|     Hajjah|80914|   398|   0.49|              34.731|        Hajjah|            17|          حجة|
|2017-07-12 00:00:00|     Hajjah|35336|   338|    1.0|                15.9|        Hajjah|            17|          حجة|
|2017-06-29 00:00:00|     Hajjah|25335|   243|    1.0|                11.4|        Hajjah|            17|          حجة|
|2017-09-05 00:00:00|     Hajjah|67770|   386|   0.57|              29.089|        Hajjah|            17|          حجة|
|2017-07-11 00:00:00|     Hajjah|35310|   338|    1.0|                15.9|        Hajjah|            17|          حجة|
|2017-09-03 00:00:00|        Ibb|42845|   262|   0.61|              14.489|           Ibb|            11|          إب|
|2017-09-20 00:00:00|        Ibb|47580|   269|   0.57|               16.09|           Ibb|            11|          إب|
|2017-08-18 00:00:00|        Ibb|37347|   252|   0.67|              12.184|           Ibb|            11|          إب|
|2017-07-05 00:00:00|     Hajjah|30271|   308|    1.0|                13.6|        Hajjah|            17|          حجة|
+-------------------+-----------+-----+------+-------+--------------------+--------------+--------------+--------------+
only showing top 10 rows
```

5.2 Aquellas ciudades con mayor 'Attack Rate'

In [36]:
```
sub_Yemen_df.orderBy(sub_Yemen_df['Attack Rate (per 1000)'].desc()).limit(10).show()
```

```
+-------------------+-----------+------+------+-------+--------------------+--------------+--------------+--------------+
|               Date|Governorate| Cases|Deaths|CFR (%)|Attack Rate (per 1000)|COD Gov English|COD Gov Arabic|COD Gov Pcode|
+-------------------+-----------+------+------+-------+--------------------+--------------+--------------+--------------+
|2018-02-18 00:00:00|      Amran|103965|   176|   0.17|              89.582|         Amran|            29|          عمران|
|2018-02-11 00:00:00|      Amran|103814|   176|   0.17|              89.452|         Amran|            29|          عمران|
|2018-02-04 00:00:00|      Amran|103556|   176|   0.17|              89.229|         Amran|            29|          عمران|
|2018-01-28 00:00:00|      Amran|103285|   176|   0.17|              88.996|         Amran|            29|          عمران|
|2018-01-21 00:00:00|      Amran|102917|   175|    0.0|              88.679|         Amran|            29|          عمران|
|2018-01-14 00:00:00|      Amran|102231|   175|   0.17|              88.088|         Amran|            29|          عمران|
|2018-01-07 00:00:00|      Amran|101793|   174|   0.17|               87.71|         Amran|            29|          عمران|
|2017-12-31 00:00:00|      Amran|100981|   174|   0.17|              87.011|         Amran|            29|          عمران|
|2018-02-18 00:00:00|  Al Mahwit| 62887|   151|   0.24|              86.122|      Al Mahwit|            27|          المحويت|
|2018-02-11 00:00:00|  Al Mahwit| 62606|   151|   0.24|              85.737|      Al Mahwit|            27|          المحويت|
+-------------------+-----------+------+------+-------+--------------------+--------------+--------------+--------------+
```

VENTAJA DESVENTAJA

Guarda el nuevo DF en HDFS y en el Bucket

6. Guarda el nuevo DF en HDFS y en el Bucket

In [41]:
```
sub_Yemen_df.filter("Cases<100 and Deaths<100").write.save("hdfs:///tmp/dcd/Yemen/output1")
```

In [ ]:
```
Escribimos en el GS bucket
```

In [42]:
```
sub_Yemen_df.filter("Cases<100 and Deaths<100").write.format("csv").save("gs://dcd05-sir-bucket/dcd/Yemen/output1")
```

In [44]:
```
import subprocess

command = 'hdfs dfs -ls -R gs://dcd05-sir-bucket/dcd/Yemen/output1'
subprocess.run(command, shell=True)
```

```
-rwx------   3 root root          0 2023-09-28 20:12 gs://dcd05-sir-bucket/dcd/Yemen/output1/_SUCCESS
-rwx------   3 root root       9086 2023-09-28 20:12 gs://dcd05-sir-bucket/dcd/Yemen/output1/part-00000-07715bba-34b5-4494-84ad
-4717d1467385-c000.csv
```

Out[44]:
```
CompletedProcess(args='hdfs dfs -ls -R gs://dcd05-sir-bucket/dcd/Yemen/output1', returncode=0)
```

In [ ]:

In [ ]:

VENTAJA DESVENTAJA