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// Imports
 import org.apache.spark.sql.functions._
 import org.joda.time.format.DateTimeFormat
// Load data - adjust the path to the location of your data
 val inputPath = "/Users/Hamster/Desktop/Air_Flight_Data/*"
val airTraffic = sqlContext.read
         .format("com.databricks.spark.csv")
         .option("header", "true") // Use first line of all files as header
         .option("delimiter", ",")
.option("inferSchema", "true") // Automatically infer data types
         .load(inputPath)
// Add extra features
 val calcDayOfYear = udf(
     (dayOfMonth: Int, month: Int, year: Int) => {
         val dateFormat = DateTimeFormat.forPattern("dd/MM/yyyy")
         dateFormat.parseDateTime(s"$dayOfMonth/$month/$year").getDayOfYear()
val calcRoute = udf(
     (origin: String, dest: String) => s"$origin - $dest"
 )
 val calcHourOfArrival = udf(
     (arrTime: String) => arrTime.slice(0,arrTime.size-2)
 val featuredTraffic = airTraffic
     .withColumn("DayOfYear", calcDayOfYear(airTraffic("DayOfMonth"), airTraffic("Month"), air<sup>-</sup>
     .withColumn("HourOfArr", calcHourOfArrival(airTraffic("ArrTime")))
     .withColumn("Route", calcRoute(airTraffic("Origin"), airTraffic("Dest")))
// Register as Spark SQL Table
featuredTraffic.registerTempTable("air_traffic")
// sqlContext.cacheTable("air_traffic")
import org.apache.spark.sql.functions._
import org.joda.time.format.DateTimeFormat
inputPath: String = /Users/Hamster/Desktop/Air_Flight_Data/*
airTraffic: org.apache.spark.sql.DataFrame = [Year: int, Month: int ... 27 more fields]
warning: Class org.joda.convert.FromString not found - continuing with a stub.
warning: Class org.joda.convert.ToString not found - continuing with a stub.
warning: Class org.joda.convert.ToString not found - continuing with a stub.
calcDayOfYear: org.apache.spark.sql.expressions.UserDefinedFunction = UserDefinedFunction(<fun
ction3>,IntegerType,Some(List(IntegerType, IntegerType, IntegerType)))
calcRoute: org.apache.spark.sql.expressions.UserDefinedFunction = UserDefinedFunction(<functio)</pre>
n2>,StringType,Some(List(StringType, StringType)))
calcHourOfArrival: org.apache.spark.sql.expressions.UserDefinedFunction = UserDefinedFunction
(<function1>,StringType,Some(List(StringType)))
featuredTraffic: org.apache.spark.sql.DataFrame = [Year: int, Month: int ... 30 more fields]
warning: there was one deprecation warning; re-run with -deprecation for details
```

Took 1 min 50 sec. Last updated by anonymous at January 21 2017, 2:17:20 PM.

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select	DayOfYear,	count(*) as	NrOfFlights,	avg(DepDelay)	as AvgDept	belay, avg	g(ArrDelay) a	s Ávgi
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DayOfYear	NrOfFlights	Avgl
148	325,680	5.98
243	334,157	6.48
31	333,830	6.77
85	336,519	7.22
137	335,712	8.402
251	334,225	4.09
65	338,508	9.01
53	336,107	11.6
255	336.123	4.81

%sql

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select HourOfArr, count(*) as NrFlights, avg(ArrDelay) as AvgArrDelay from air_traffic where I)} and Origin = "\${org=ATL,ATL|PHX|PIT}" group by HourOfArr

org

\$

day



HourOfArr	NrFlights
7	11,978
15	51,476
11	61,006
3	227
8	29,101
22	56,236

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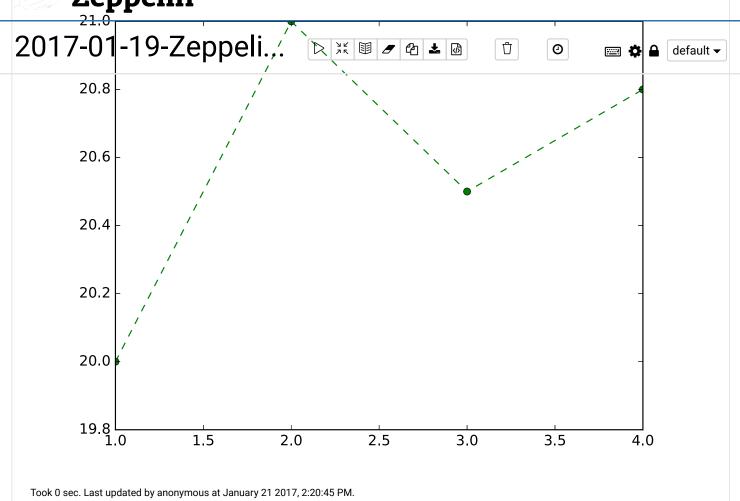
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2017-001-ast project by a popular and a popu Ů **②** default ▼ FINISHED ▷ 光 圓 �� %pyspark # helper function to display in Zeppelin import StringIO def show(p): img = StringIO.StringIO() p.savefig(img, format='svg') img.seek(0) print "%html " + img.buf Took 0 sec. Last updated by anonymous at January 21 2017, 2:20:34 PM. FINISHED ▷ 💥 🗐 🕸 %pyspark import matplotlib.pyplot as plt #define some data x = [1,2,3,4]y = [20, 21, 20.5, 20.8]#plot data plt.plot(x, y, linestyle="dashed", marker="o", color="green") [<matplotlib.lines.Line2D object at 0x1115d18d0>] Took 0 sec. Last updated by anonymous at January 21 2017, 2:20:36 PM.

%pyspark show(plt)

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     %pyspark
     import matplotlib
     import matplotlib.pyplot as plt
     import seaborn as sns
     import StringIO
     def show(p):
       img = StringIO.StringIO()
       p.savefig(img, format='svg')
       img.seek(0)
       print "%html " + img.buf
     df = sqlContext.sql("SELECT Dest, Month, count(*) as NrOfFlights, avg(ArrDelay) as AvgArrDelay
     data = df.toPandas()
     value = "AvgArrDelay"
     x = "Dest"
     grouping = ["Month"]
     heatmap_data = data.pivot_table(values=value, index=x, columns=grouping)
     heatmap_data = heatmap_data[0:100]
     a4_dims = (len(heatmap_data.columns),50)
     fig, ax = plt.subplots(figsize=a4_dims)
     ax.set_title("Avg Arrival Delay")
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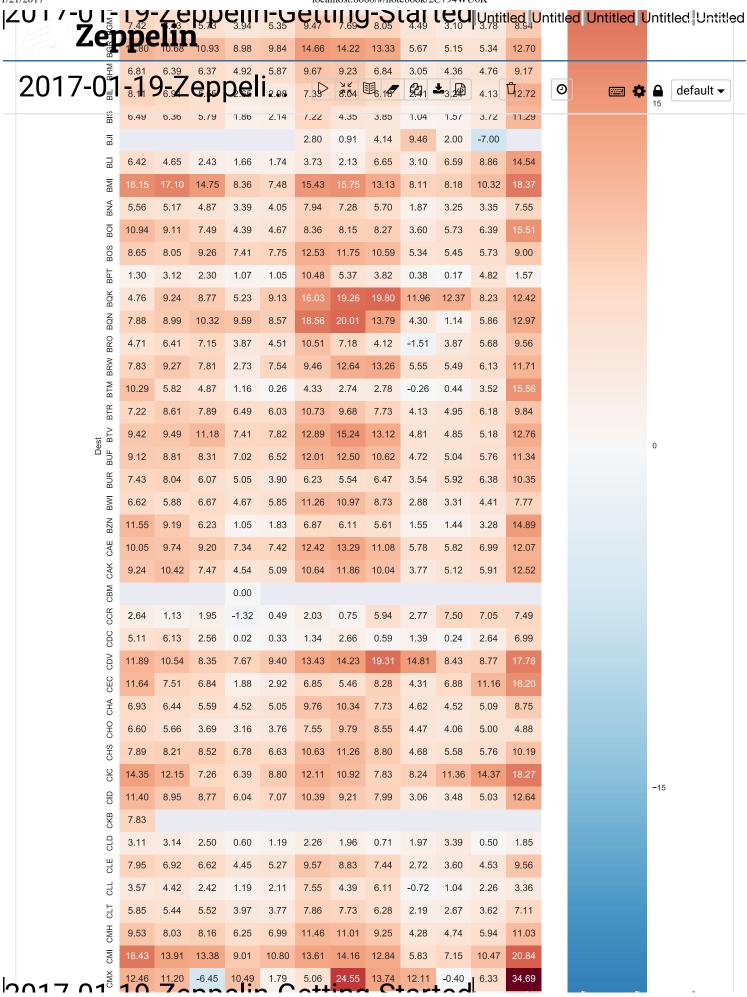


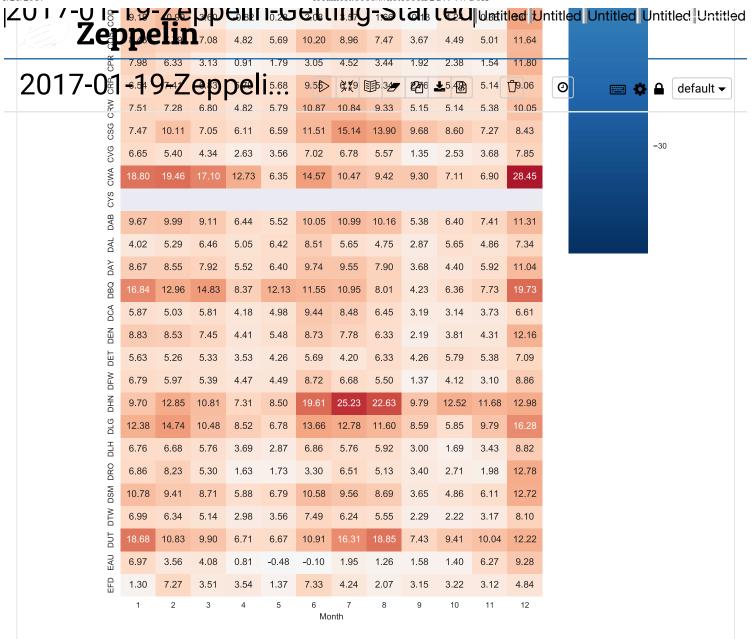






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Agy 7.58 9.99 6.02 2.48 5.28 13.46 16.20 16.44 9.90 10.17 7.63 YQ U V V V 2.68 1.22 0.69 5.90 3.68 5.63 0.67 1.48 2.26 QQ 13.16 10.96 7.55 4.22 6.53 9.83 6.88 8.69 5.78 9.28 10.05 QQ 17.55 18.28 17.55 11.41 2.21 -1.42 -0.10 9.33 11.74 18.96 8.96 QQ 12.31 8.58 7.34 3.88 4.58 9.42 9.11 9.13 7.18 6.79 8.06 AB 4.66 7.86 5.55 4.29 4.32 14.71 12.41 11.77 7.20 6.56 7.04 AB 11.55 17.78 15.10 13.59 7.56 12.74 8.44 9.99 9.66 12.31 7.90 <		6.50	7.82	7.55	5.97	6.77	14.07	11.12	10.57	3.86	4.79	6.73	12.29
Ye 3.56 27.85 25.60 20.02 10.33 Very 13.16 10.96 7.55 4.22 0.69 5.90 3.68 5.63 0.67 1.48 2.26 Very 13.16 10.96 7.55 4.22 6.53 9.83 6.88 8.69 5.78 9.28 10.05 Very 17.55 18.28 17.55 11.41 2.21 -1.42 -0.10 9.33 11.74 18.96 8.96 QF 12.31 8.58 7.34 3.88 4.58 9.42 9.11 9.13 7.18 6.79 8.06 Yer 4.66 7.86 5.55 4.29 4.32 14.71 12.41 11.77 7.20 6.56 7.04 Yer 7.64 8.17 8.01 7.91 7.15 12.44 15.24 11.71 7.20 6.56 7.04 Yer 4.59 4.08 1.38 2.96 4.20 7.27 5.55 5.94 3.33		6.96	7.05	6.68	4.92	4.81	7.96	6.82	6.09	2.48	5.18	4.80	10.53
by 2.86 3.53 2.65 1.22 0.69 5.90 3.68 5.63 0.67 1.48 2.26 QQ 13.16 10.96 7.55 4.22 6.53 9.83 6.88 8.69 5.78 9.28 10.05 Veg 2.81 3.66 2.31 1.38 3.05 9.87 12.22 10.57 4.91 3.14 2.83 QV 17.55 18.28 17.55 11.41 2.21 -1.42 -0.10 9.33 11.74 18.96 8.96 QV 4.66 7.86 5.55 4.29 4.32 14.71 12.41 11.78 4.76 6.44 6.79 EV 7.64 8.17 8.01 7.91 7.15 12.44 15.24 11.71 7.20 6.56 7.04 EV 4.59 8.41 9.02 6.61 7.43 12.24 15.49 9.66 12.31 7.90 EV 4.59 4.08		7.58	9.99	6.02	2.48	5.28	13.46	16.20	16.44	9.90	10.17	7.63	10.91
QQ 13.16 10.96 7.55 4.22 6.53 9.83 6.88 8.69 5.78 9.28 10.05 QQ 2.81 3.66 2.31 1.38 3.05 9.87 12.22 10.57 4.91 3.14 2.83 QQ 17.55 18.28 17.55 11.41 2.21 -1.42 -0.10 9.33 11.74 18.96 8.96 QQ 12.31 8.58 7.34 3.88 4.58 9.42 9.11 9.13 7.18 6.79 8.06 QQ 4.66 7.86 5.55 4.29 4.32 14.71 12.41 11.78 4.76 6.44 6.79 QQ 7.64 8.17 8.01 7.91 7.15 12.44 15.24 11.71 7.20 6.56 7.04 QQ 11.55 17.78 15.10 13.59 7.56 12.74 8.44 9.98 9.66 12.31 7.90 QQ 4.59						3.56	27.85	25.60	20.02	10.33			
Q 2.81 3.66 2.31 1.38 3.05 9.87 12.22 10.57 4.91 3.14 2.83 Q 17.55 18.28 17.55 11.41 2.21 -1.42 -0.10 9.33 11.74 18.96 8.96 Q 12.31 8.58 7.34 3.88 4.58 9.42 9.11 9.13 7.18 6.79 8.06 Q 4.66 7.86 5.55 4.29 4.32 14.71 12.41 11.78 4.76 6.44 6.79 Q 7.64 8.17 8.01 7.91 7.15 12.44 15.24 11.71 7.20 6.56 7.04 Q 11.55 17.78 15.10 13.59 7.56 12.74 8.44 9.98 9.66 12.31 7.90 Q 4.59 4.08 1.38 2.96 -4.20 7.27 5.55 5.94 -3.33 0.65 6.28 Q 12.11 9.75 8.84 3.82 6.55 9.65 10.65 12.14 7.83 <t< th=""><th></th><th>2.86</th><th>3.53</th><th>2.65</th><th>1.22</th><th>0.69</th><th>5.90</th><th>3.68</th><th>5.63</th><th>0.67</th><th>1.48</th><th>2.26</th><th>2.62</th></t<>		2.86	3.53	2.65	1.22	0.69	5.90	3.68	5.63	0.67	1.48	2.26	2.62
YOR 17.55 18.28 17.55 11.41 2.21 -1.42 -0.10 9.33 11.74 18.96 8.96 OF VAY 12.31 8.58 7.34 3.88 4.58 9.42 9.11 9.13 7.18 6.79 8.06 YAY 4.66 7.86 5.55 4.29 4.32 14.71 12.41 11.78 4.76 6.44 6.79 YAY 4.66 7.86 5.55 4.29 4.32 14.71 12.41 11.71 7.20 6.56 7.04 YAY 11.55 17.78 15.10 13.59 7.56 12.74 8.44 9.98 9.66 12.31 7.90 YAY 4.59 4.08 1.38 2.96 -4.20 7.27 5.55 5.94 -3.33 0.65 6.28 YAY 6.80 7.71 8.43 6.57 7.63 11.47 7.76 6.96 4.08 6.66 6.19 YAY 9		13.16	10.96	7.55	4.22	6.53	9.83	6.88	8.69	5.78	9.28	10.05	19.06
12.31		2.81	3.66	2.31	1.38	3.05	9.87	12.22	10.57	4.91	3.14	2.83	4.48
WEY 4.66 7.86 5.55 4.29 4.32 14.71 12.41 11.78 4.76 6.44 6.79 SWEY 7.64 8.17 8.01 7.91 7.15 12.44 15.24 11.71 7.20 6.56 7.04 WEY 11.55 17.78 15.10 13.59 7.66 12.74 8.44 9.98 9.66 12.31 7.90 WEY 8.79 8.41 9.02 6.61 7.43 12.26 12.89 11.19 4.86 5.30 5.38 OF 4.59 4.08 1.38 2.96 -4.20 7.27 5.55 5.94 -3.33 0.65 6.28 WEY 6.80 7.71 8.43 6.57 7.63 11.47 7.76 6.96 4.08 6.86 6.19 WEY 21.11 15.52 9.07 15.88 9.36 15.80 12.26 5.81 4.60 5.69 17.92 WEY 9.19 9.87 9.06 4.91 3.89 12.84 19.89 17.18 7.5		17.55	18.28	17.55	11.41	2.21	-1.42	-0.10	9.33	11.74	18.96	8.96	13.71
86	ADQ	12.31	8.58	7.34	3.88	4.58	9.42	9.11	9.13	7.18	6.79	8.06	13.79
NY 11.55 17.78 15.10 13.59 7.56 12.74 8.44 9.98 9.66 12.31 7.90 NY 8.79 8.41 9.02 6.61 7.43 12.26 12.89 11.19 4.86 5.30 5.38 NY 4.59 4.08 1.38 2.96 -4.20 7.27 5.55 5.94 -3.33 0.65 6.28 NY 6.80 7.71 8.43 6.57 7.63 11.47 7.76 6.96 4.08 6.86 6.19 NY 12.11 9.75 8.84 3.82 6.55 9.65 10.65 12.14 7.83 7.97 10.45 NY 21.11 15.52 9.07 15.88 9.36 15.80 12.26 5.81 4.60 5.69 17.92 NY 17.90 15.62 10.85 1.45 0.28 7.24 8.76 7.03 7.92 5.25 -1.43 NY 9.42 9.81 8.28 5.77 5.58 10.68 11.69 9.58 5.65		4.66	7.86	5.55	4.29	4.32	14.71	12.41	11.78	4.76	6.44	6.79	9.97
BH 8.79 8.41 9.02 6.61 7.43 12.26 12.89 11.19 4.86 5.30 5.38 OH 4.59 4.08 1.38 2.96 -4.20 7.27 5.55 5.94 -3.33 0.65 6.28 WW 6.80 7.71 8.43 6.57 7.63 11.47 7.76 6.96 4.08 6.86 6.19 DW 12.11 9.75 8.84 3.82 6.55 9.65 10.65 12.14 7.83 7.97 10.45 DW 21.11 15.52 9.07 15.88 9.36 15.80 12.26 5.81 4.60 5.69 17.92 DH 9.19 9.87 9.06 4.91 3.89 12.84 19.89 17.18 7.57 5.73 7.21 DH 17.90 15.62 10.85 1.45 0.28 7.24 8.76 7.03 7.92 5.25 -1.43 DH 12.93 13.86 9.46 7.07 5.28 11.55 11.83 10.38 6.13		7.64	8.17	8.01	7.91	7.15	12.44	15.24	11.71	7.20	6.56	7.04	8.79
QH 4.59 4.08 1.38 2.96 -4.20 7.27 5.55 5.94 -3.33 0.65 6.28 YW 6.80 7.71 8.43 6.57 7.63 11.47 7.76 6.96 4.08 6.86 6.19 DW 12.11 9.75 8.84 3.82 6.55 9.65 10.65 12.14 7.83 7.97 10.45 DW 21.11 15.52 9.07 15.88 9.36 15.80 12.26 5.81 4.60 5.69 17.92 He 9.19 9.87 9.06 4.91 3.89 12.84 19.89 17.18 7.57 5.73 7.21 He 9.19 9.87 9.06 4.91 3.89 12.84 19.89 17.18 7.57 5.73 7.21 He 9.42 9.81 8.28 5.77 5.58 10.68 11.69 9.58 5.65 6.60 6.59 He 12.93 13.86 9.46 7.07 5.28 11.55 11.83 10.38 6.13	A X	11.55	17.78	15.10	13.59	7.56	12.74	8.44	9.98	9.66	12.31	7.90	18.34
WHY BRITH B	ALB	8.79	8.41	9.02	6.61	7.43	12.26	12.89	11.19	4.86	5.30	5.38	10.19
Table Tabl	ALO	4.59	4.08	1.38	2.96	-4.20	7.27	5.55	5.94	-3.33	0.65	6.28	15.09
Name 21.11 15.52 9.07 15.88 9.36 15.80 12.26 5.81 4.60 5.69 17.92 Name 9.19 9.87 9.06 4.91 3.89 12.84 19.89 17.18 7.57 5.73 7.21 Name 17.90 15.62 10.85 1.45 0.28 7.24 8.76 7.03 7.92 5.25 -1.43 Name 12.93 13.86 9.46 7.07 5.58 10.68 11.69 9.58 5.65 6.60 6.59 Name 12.93 13.86 9.46 7.07 5.28 11.55 11.83 10.38 6.13 6.34 6.61 Name 6.72 6.62 6.70 5.04 5.47 8.76 7.56 6.28 2.19 4.74 4.72 Name 10.36 8.68 8.69 7.01 7.86 13.94 13.84 12.49 5.98 5.78 4.61 Name 10.75 9.42 7.29 4.45 4.23 7.24 6.14 5.72	AMA	6.80	7.71	8.43	6.57	7.63	11.47	7.76	6.96	4.08	6.86	6.19	11.43
Heat Name 9.19 9.87 9.06 4.91 3.89 12.84 19.89 17.18 7.57 5.73 7.21 Heat Name 17.90 15.62 10.85 1.45 0.28 7.24 8.76 7.03 7.92 5.25 -1.43 Heat Name 9.42 9.81 8.28 5.77 5.58 10.68 11.69 9.58 5.65 6.60 6.59 Heat Name 12.93 13.86 9.46 7.07 5.28 11.55 11.83 10.38 6.13 6.34 6.61 SPW 6.72 6.62 6.70 5.04 5.47 8.76 7.56 6.28 2.19 4.74 4.72 Heat Name 10.36 8.68 8.69 7.01 7.86 13.94 13.84 12.49 5.98 5.78 4.61 OW 10.75 9.42 7.29 4.45 4.23 7.24 6.14 5.72 3.15 2.99 5.11 OW 7.10 6.83 7.98 5.64 5.88 11.06 10.55 9	ANC	12.11	9.75	8.84	3.82	6.55	9.65	10.65	12.14	7.83	7.97	10.45	16.70
HW 17.90 15.62 10.85 1.45 0.28 7.24 8.76 7.03 7.92 5.25 -1.43 HW 9.42 9.81 8.28 5.77 5.58 10.68 11.69 9.58 5.65 6.60 6.59 HW 12.93 13.86 9.46 7.07 5.28 11.55 11.83 10.38 6.13 6.34 6.61 SW 6.72 6.62 6.70 5.04 5.47 8.76 7.56 6.28 2.19 4.74 4.72 HW 5.97 5.43 5.34 4.67 5.40 12.23 13.23 11.48 5.79 6.76 4.90 HW 10.36 8.68 8.69 7.01 7.86 13.94 13.84 12.49 5.98 5.78 4.61 OW 10.75 9.42 7.29 4.45 4.23 7.24 6.14 5.72 3.15 2.99 5.11 HW 10.04 9.62 7.41 4.35 5.61 8.45 9.04 14.29 6.17 <	Z	21.11	15.52	9.07	15.88	9.36	15.80	12.26	5.81	4.60	5.69	17.92	14.14
Heat Properties 9.42 9.81 8.28 5.77 5.58 10.68 11.69 9.58 5.65 6.60 6.59 Heat Properties 12.93 13.86 9.46 7.07 5.28 11.55 11.83 10.38 6.13 6.34 6.61 Properties 6.72 6.62 6.70 5.04 5.47 8.76 7.56 6.28 2.19 4.74 4.72 Heat Properties 5.97 5.43 5.34 4.67 5.40 12.23 13.23 11.48 5.79 6.76 4.90 Properties 10.36 8.68 8.69 7.01 7.86 13.94 13.84 12.49 5.98 5.78 4.61 Properties 9.42 7.29 4.45 4.23 7.24 6.14 5.72 3.15 2.99 5.11 Properties 7.10 6.83 7.98 5.64 5.88 11.06 10.55 9.00 3.36 3.51 4.06 Heat Properties 10.04 9.62 7.41 4.35 5.61 8.45 <	APF	9.19	9.87	9.06	4.91	3.89	12.84	19.89	17.18	7.57	5.73	7.21	9.63
HATE OF PART OF	ASE	17.90	15.62	10.85	1.45	0.28	7.24	8.76	7.03	7.92	5.25	-1.43	24.19
SH S	ATL	9.42	9.81	8.28	5.77	5.58	10.68	11.69	9.58	5.65	6.60	6.59	11.17
SH Color 6.72 6.62 6.70 5.04 5.47 8.76 7.56 6.28 2.19 4.74 4.72 H Color 5.97 5.43 5.34 4.67 5.40 12.23 13.23 11.48 5.79 6.76 4.90 H Color 10.36 8.68 8.69 7.01 7.86 13.94 13.84 12.49 5.98 5.78 4.61 OW TOOL 10.75 9.42 7.29 4.45 4.23 7.24 6.14 5.72 3.15 2.99 5.11 H Color 7.10 6.83 7.98 5.64 5.88 11.06 10.55 9.00 3.36 3.51 4.06 H Color 10.04 9.62 7.41 4.35 5.61 8.45 9.04 14.29 6.17 8.36 11.81	ATW	12.93	13.86	9.46	7.07	5.28	11.55	11.83	10.38	6.13	6.34	6.61	18.32
1		6.72	6.62	6.70	5.04	5.47	8.76	7.56	6.28	2.19	4.74	4.72	9.46
Q 10.75 9.42 7.29 4.45 4.23 7.24 6.14 5.72 3.15 2.99 5.11 Q 7.10 6.83 7.98 5.64 5.88 11.06 10.55 9.00 3.36 3.51 4.06 W 10.04 9.62 7.41 4.35 5.61 8.45 9.04 14.29 6.17 8.36 11.81		5.97	5.43	5.34	4.67	5.40	12.23	13.23	11.48	5.79	6.76	4.90	8.76
Q 10.75 9.42 7.29 4.45 4.23 7.24 6.14 5.72 3.15 2.99 5.11 Q 7.10 6.83 7.98 5.64 5.88 11.06 10.55 9.00 3.36 3.51 4.06 W 10.04 9.62 7.41 4.35 5.61 8.45 9.04 14.29 6.17 8.36 11.81	AVP	10.36	8.68	8.69	7.01	7.86	13.94	13.84	12.49	5.98	5.78	4.61	11.36
없 7.10 6.83 7.98 5.64 5.88 11.06 10.55 9.00 3.36 3.51 4.06 H 10.04 9.62 7.41 4.35 5.61 8.45 9.04 14.29 6.17 8.36 11.81		10.75	9.42	7.29	4.45	4.23	7.24	6.14	5.72	3.15	2.99	5.11	11.93
		7.10	6.83	7.98	5.64	5.88	11.06	10.55	9.00	3.36	3.51	4.06	8.21
	BET	10.04	9.62	7.41	4.35	5.61	8.45	9.04	14.29	6.17	8.36	11.81	14.23
	BFF												
н	BE												
0017 018 176 595 474 315 3.10 584:430 375+229+459 2.80	0017 01	76	59 5_	4.71	ر 15 د ر	3.1	5.80+	:4.30	3 2 7.	2.29	4.59	2.80	9.80





Took 1 min 17 sec. Last updated by anonymous at January 21 2017, 2:22:23 PM.

%pyspark from wordcloud import WordCloud FINISHED ▷ ♯ 圓 ��



p.savefig(img, format='svg')











Create route frequencies

routes = sqlContext.sql("SELECT Route, count(*) as Count FROM air_traffic GROUP BY Route").co route_freq = [(x[0],x[1]) for x in routes]

Generate word cloud image

image = wordcloud.to_image()

image.show()

Took 1 min 18 sec. Last updated by anonymous at January 21 2017, 2:24:25 PM.

READY ▷ 圓 ��