Resume Analysis System

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CONTENTS

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- Extract Data
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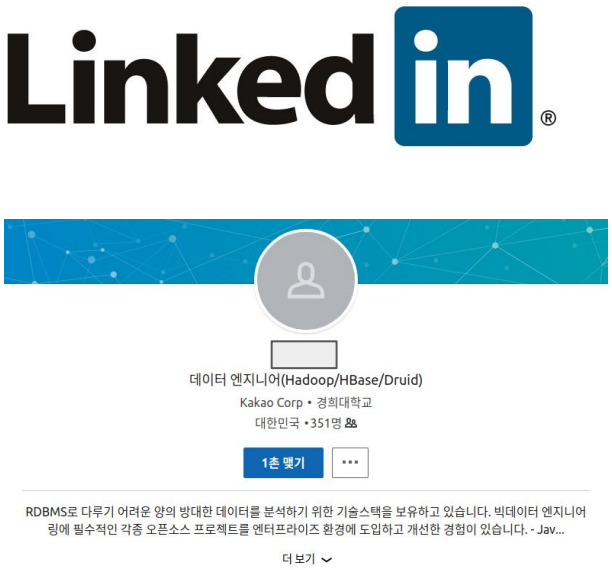
Previous Topic



보유 기술

빅데이터

Hadoop

Druid

업계 지식

소프트웨어 개발

도구 & 테크놀로지

Java

C++

자바

AWS

기타 기술

HBase

Solr

Mahout

Lucene

Tajo

OLAP

Oracle Cloud

2 프로젝트

Apache Tajo

Contributor
- Report bug
- Apply bugfix
- Code migration
- Improve tsql(tajo-cli)

프로젝트 보기

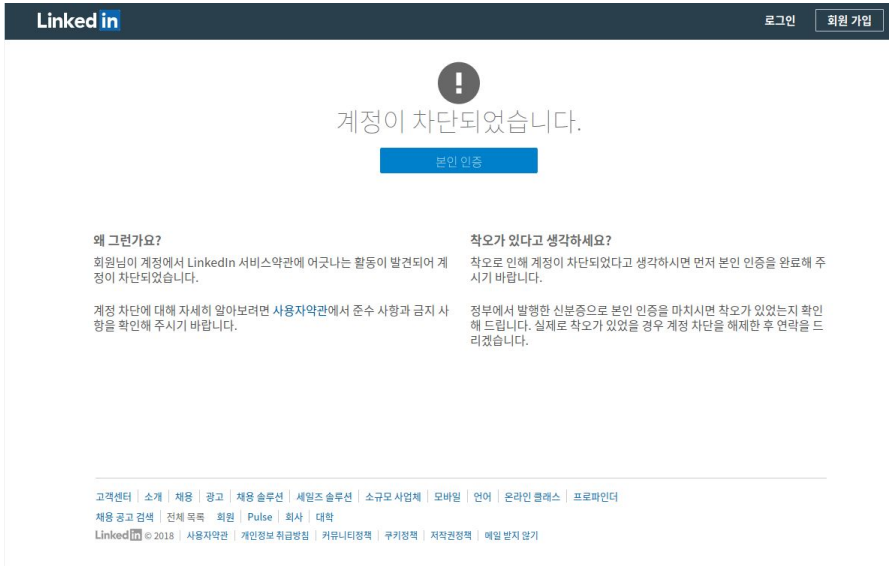
Initialroot Analyzer

Overall Architect Design
Develop log Analyzing process with Apache Hadoop, Apache Mahout, mongoDB.

다른 리더(명)

Previous Topic

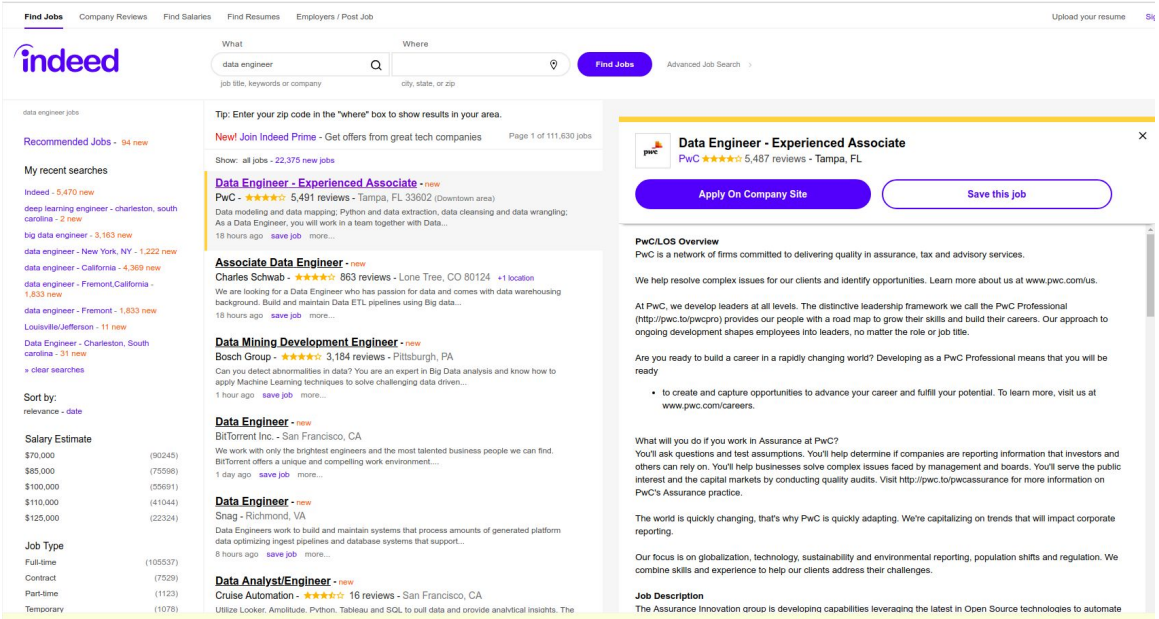
- cjswotl6274@khu.ac.kr
- cjswotl6274@naver.com
- 1500sheep@gmail.com
- jin35kkk@naver.com
- desppencile1@gmail.com
- desppencile2@gmail.com
- desppencile3@gmail.com
- desppencile4@gmail.com
- desppencile5@gmail.com
- desppencile6@gmail.com
- desppencile7@gmail.com
- desppencile8@gmail.com
- itsforxls@gmail.com
- temporary317@naver.com
- tgwlsr6@gmail.com
- fhrslaaj@naver.com
- fhrslaaj@daum.net
- 2012104110@khu.ac.kr
- ...



only crawl about 1,200 users << 512,000 users

Topic in progress

Analysis Resume in Indeed



- by Job
- by City
- by State
- by Company

Extract Data - code

Hadoop Overview Datanodes Snapshot Startup Progress Utilities

Browse Directory

/project_lastest/code Go!

Permission	Owner	Group	Size	Last Modified	Replication	Block Size	Name
-rw-r--r--	project	supergroup	7.99 KB	2018. 6. 13. 오후 8:20:45	2	128 MB	Analyze_word_v2.py
-rw-r--r--	project	supergroup	3.32 KB	2018. 6. 13. 오후 8:20:45	2	128 MB	Indeed.py
-rw-r--r--	project	supergroup	1.95 KB	2018. 6. 13. 오후 8:20:45	2	128 MB	column_count.py
-rw-r--r--	project	supergroup	4.32 KB	2018. 6. 13. 오후 8:23:24	2	128 MB	find_word_v2.py
-rw-r--r--	project	supergroup	11.17 KB	2018. 6. 13. 오후 8:20:45	2	128 MB	indeedcrawling.py
-rw-r--r--	project	supergroup	4.94 KB	2018. 6. 13. 오후 8:20:45	2	128 MB	indeedcrawling_last.py

Extract Data - crawling URL

crawling url using selenium

```
mysql> select * from jobs;
+----+--------------------------------+
| id | name                           |
+----+--------------------------------+
|  1 | data engineer                  |
|  2 | big data engineer              |
|  3 | machine learning engineer      |
|  4 | deep learning engineer         |
|  5 | data warehouse engineer        |
|  6 | data analyst                   |
|  7 | data architect                 |
|  8 | database administrator         |
|  9 | database developer             |
| 10 | software engineer              |
| 11 | software embedded engineer     |
| 12 | software developer             |
| 13 | application developer          |
| 14 | ios developer                  |
| 15 | android developer              |
| 16 | application engineer           |
| 17 | web developer                  |
| 18 | full stack developer           |
| 19 | web front end developer        |
| 20 | ui developer                   |
| 21 | ux developer                   |
| 22 | web back end developer         |
| 23 | system administrator           |
| 24 | system analyst                 |
| 25 | server developer               |
| 26 | server administrator           |
| 27 | windows administrator          |
| 28 | linux administrator            |
| 29 | unix administrator             |
| 30 | wireless network engineer      |
| 31 | network engineer               |
| 32 | network administrator          |
| 33 | network architect              |
| 34 | security analyst               |
| 35 | security engineer              |
| 36 | cloud architect                |
| 37 | scrum master                   |
| 38 | information technology manager |
| 39 | it project manager             |
+----+--------------------------------+
39 rows in set (0.00 sec)
```

<Jobs - 39>

+

```
| 145 | Vancouver          | Washington           |  167405 |
| 146 | Cape Coral         | Florida              |  165831 |
| 147 | Sioux Falls        | South Dakota         |  164676 |
| 148 | Springfield        | Missouri             |  164122 |
| 149 | Peoria             | Arizona              |  162592 |
| 150 | Pembroke Pines     | Florida              |  162329 |
| 151 | Elk Grove          | California           |  161007 |
| 152 | Salem              | Oregon               |  160614 |
| 153 | Lancaster          | California           |  159523 |
| 154 | Corona             | California           |  159503 |
| 155 | Eugene             | Oregon               |  159190 |
| 156 | Palmdale           | California           |  157161 |
| 157 | Salinas            | California           |  155662 |
| 158 | Springfield        | Massachusetts        |  153703 |
| 159 | Pasadena           | Texas                |  152735 |
| 160 | Fort Collins       | Colorado             |  152061 |
| 161 | Hayward            | California           |  151574 |
| 162 | Pomona             | California           |  151348 |
| 163 | Cary               | North Carolina       |  151088 |
| 164 | Rockford           | Illinois             |  150251 |
| 165 | Alexandria         | Virginia             |  148892 |
| 166 | Escondido          | California           |  148738 |
| 167 | McKinney           | Texas                |  148559 |
| 168 | Kansas City        | Kansas               |  148483 |
| 169 | Joliet             | Illinois             |  147806 |
| 170 | Sunnyvale          | California           |  147559 |
| 171 | Torrance           | California           |  147478 |
| 172 | Bridgeport         | Connecticut          |  147216 |
| 173 | Lakewood           | Colorado             |  147214 |
| 174 | Hollywood          | Florida              |  146526 |
| 175 | Paterson           | New Jersey           |  145948 |
| 176 | Naperville         | Illinois             |  144864 |
| 177 | Syracuse           | New York             |  144669 |
| 178 | Mesquite           | Texas                |  143484 |
| 179 | Dayton             | Ohio                 |  143355 |
| 180 | Savannah           | Georgia              |  142772 |
| 181 | Clarksville        | Tennessee            |  142357 |
| 182 | Orange             | California           |  139969 |
| 183 | Pasadena           | California           |  139731 |
| 184 | Fullerton          | California           |  138981 |
| 185 | Killeen            | Texas                |  137147 |
| 186 | Frisco             | Texas                |  136791 |
| 187 | Hampton            | Virginia             |  136699 |
| 188 | McAllen            | Texas                |  136639 |
| 189 | Warren             | Michigan             |  134873 |
| 190 | Bellevue           | Washington           |  133992 |
| 191 | West Valley City   | Utah                 |  133579 |
| 192 | Columbia           | South Carolina       |  133358 |
| 193 | Olathe             | Kansas               |  131885 |
| 194 | Sterling Heights   | Michigan             |  131224 |
| 195 | New Haven          | Connecticut          |  130660 |
| 196 | Miramar            | Florida              |  130288 |
| 197 | Waco               | Texas                |  129030 |
| 198 | Thousand Oaks      | California           |  128731 |
| 199 | Cedar Rapids       | Iowa                 |  128429 |
| 200 | Charleston         | South Carolina       |  127999 |
+-----+--------------------+----------------------+---------+
200 rows in set (0.02 sec)
```

<Cities and States - 39>

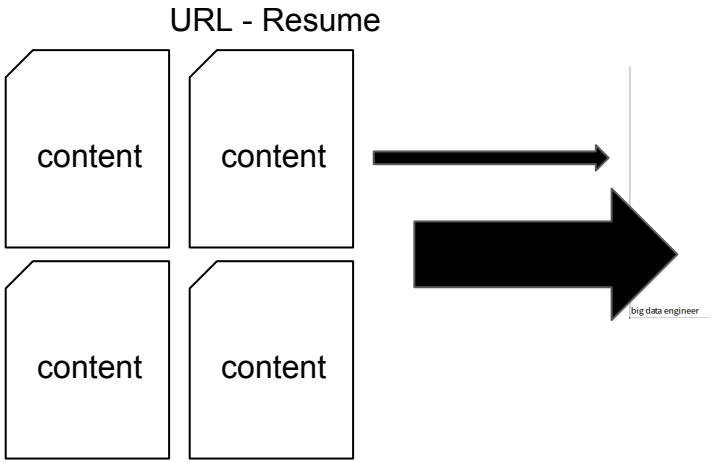
=

```
id=e857d2bd71c27d4e&vjs=3
                    |
| 832610 | application developer | Phoenix          | Arizona        | https://www.indeed.com/rc/clk?jk=2132e9ce03835210&fcc
id=2e25f3358ccba1cf&vjs=3
                    |
| 832611 | application developer | Phoenix          | Arizona        | https://www.indeed.com/rc/clk?jk=556aaa37088c7142&fcc
id=2e25f3358ccba1cf&vjs=3
                    |
| 832612 | application developer | Phoenix          | Arizona        | https://www.indeed.com/rc/clk?jk=cc88a5862cab9bd7&fcc
id=a9bcb06f557177e2&vjs=3
                    |
| 832613 | application developer | Phoenix          | Arizona        | https://www.indeed.com/rc/clk?jk=98bd2e680373ef8f&fcc
id=2e25f3358ccba1cf&vjs=3
                    |
| 832614 | application developer | Phoenix          | Arizona        | https://www.indeed.com/rc/clk?jk=f55724bd453d28ac&fcc
id=2e25f3358ccba1cf&vjs=3
                    |
| 832615 | application developer | Phoenix          | Arizona        | https://www.indeed.com/rc/clk?jk=3747a9edc53b9289&fcc
id=2e25f3358ccba1cf&vjs=3
                    |
+--------+-----------------------+------------------+----------------+-----------------------------------------------------
-----------------------------------------------------------------------------------------------------------------------
---------------------+
12615 rows in set (0.01 sec)

mysql> select count(*) from url_crawling;
+----------+
| count(*) |
+----------+
|   828215 |
+----------+
1 row in set (0.16 sec)
```

<URL output - 828,215>

Extract Data - crawling Resume

crawling resume using BeautifulSoup



Browse Directory

/project_lastest/output Go!

Permission	Owner	Group	Size	Last Modified	Replication	Block Size	Name
-rw-r--r--	project	supergroup	95.12 KB	2018. 6. 13. 오후 8:30:48	2	128 MB	ability_words_city.csv
-rw-r--r--	project	supergroup	313.96 KB	2018. 6. 13. 오후 8:30:48	2	128 MB	city_result.csv
-rw-r--r--	project	supergroup	2.1 MB	2018. 6. 13. 오후 8:30:48	2	128 MB	company_result.csv
-rw-r--r--	project	supergroup	866.93 MB	2018. 6. 13. 오후 8:30:55	2	128 MB	result_all.csv
-rw-r--r--	project	supergroup	11.55 MB	2018. 6. 13. 오후 8:30:55	2	128 MB	result_all_no_content.csv
-rw-r--r--	project	supergroup	193.41 MB	2018. 6. 13. 오후 8:30:56	2	128 MB	result_content_dataanalyst.csv
-rw-r--r--	project	supergroup	104 MB	2018. 6. 13. 오후 8:30:57	2	128 MB	result_content_dataarchitect.csv
-rw-r--r--	project	supergroup	80.29 MB	2018. 6. 13. 오후 8:30:57	2	128 MB	result_content_databaseadministrator_databasedeveloper.csv
-rw-r--r--	project	supergroup	237.47 MB	2018. 6. 13. 오후 8:31:03	2	128 MB	result_content_dataengineer_bigdataengineer.csv
-rw-r--r--	project	supergroup	70.44 MB	2018. 6. 13. 오후 8:31:04	2	128 MB	result_content_machinelearning_deeplearning_datawarehouse.csv
-rw-r--r--	project	supergroup	63.58 MB	2018. 6. 13. 오후 8:31:04	2	128 MB	result_content_softwareembedded_softwaredeveloper.csv
-rw-r--r--	project	supergroup	117.74 MB	2018. 6. 13. 오후 8:31:05	2	128 MB	result_content_softwareengineer.csv
-rw-r--r--	project	supergroup	14.01 MB	2018. 6. 13. 오후 8:31:05	2	128 MB	select_all.csv
-rw-r--r--	project	supergroup	117.5 KB	2018. 6. 13. 오후 8:31:05	2	128 MB	state_result.csv

Hadoop, 2017.

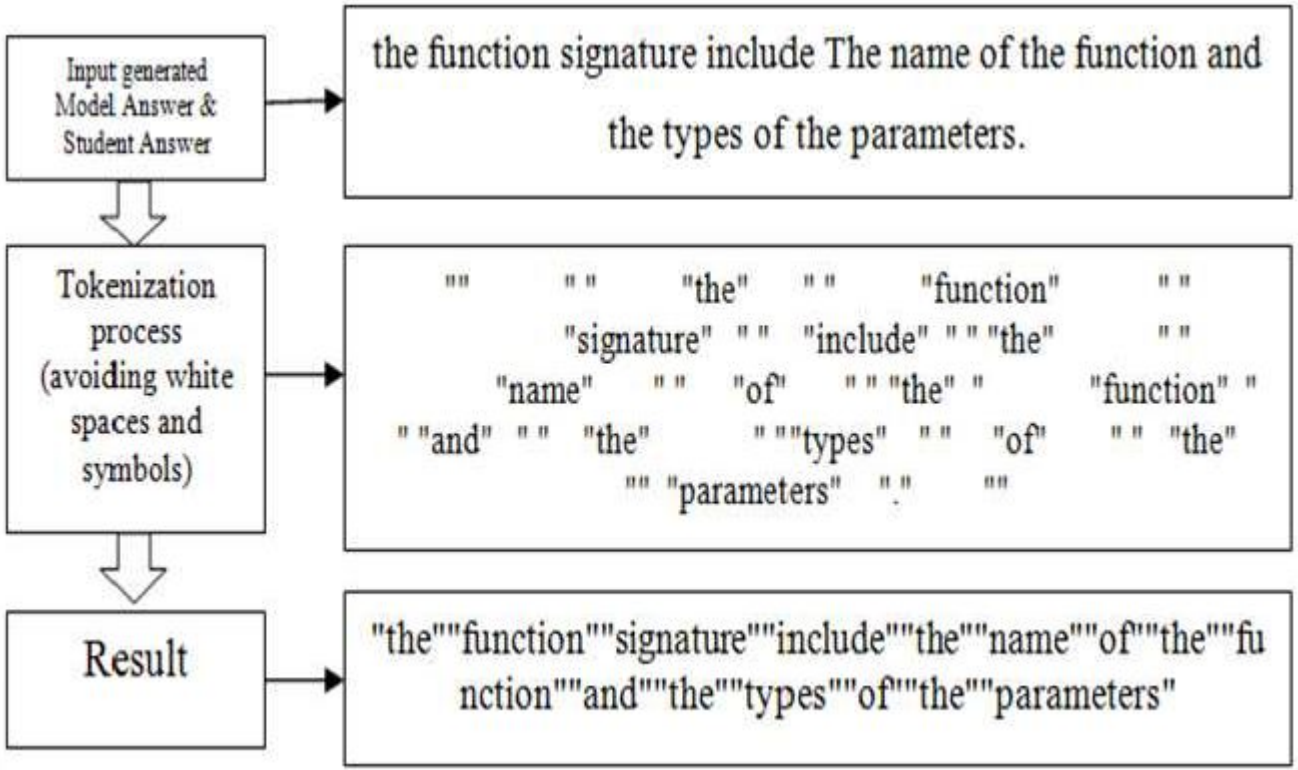
Transform - wordcount(job,city,state)

```
project@master:~⇒ ./spark/bin/spark-submit --mast
```

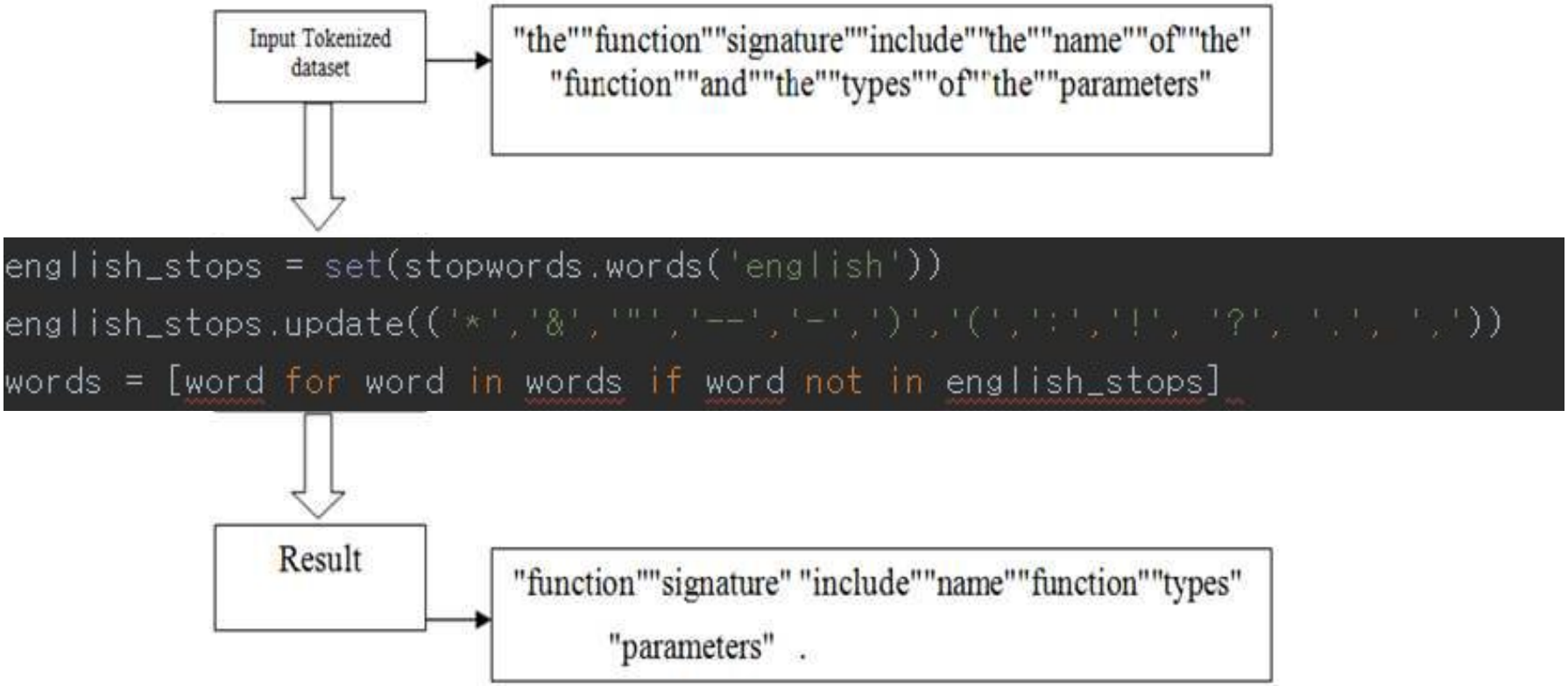
```
basic_folder ="/project_lastest/output/"
basic_folder_spark ="hdfs://master:9000/project_lastest/"
input_name=basic_folder+"result_all_no_content.csv"
output_name_company = basic_folder_spark+"company_result"
output_name_city = basic_folder_spark+"city_result"
output_name_state =basic_folder_spark+"state_result"

# rdd_city = rdd.map(lambda x=>(x[2],x[0])).groupByKey()
# rdd_state = rdd.map(lambda x=>(x[3],x[0])).groupByKey()
column_company = ["company","job","frequency"]
column_city = ["city","job","frequency"]
column_state = ["state","job","frequency"]

rdd = sc.textFile(input_name).map(lambda line:line.replace('\"','')).map(lambda line:line.split(","))

# In[3]:


rdd_company =rdd.map(lambda x:(x[2].strip(),x[1]))
wordcount_company = rdd_company.map(lambda x: (x,1)).reduceByKey(lambda x,y:x+y).map(lambda x:[x[0][0],x[0][1],x[1]])
df_company = sqlc.createDataFrame(wordcount_company)

rdd_city =rdd.map(lambda x:(x[3].strip(),x[1]))
wordcount_city = rdd_city.map(lambda x: (x,1)).reduceByKey(lambda x,y:x+y).map(lambda x:[x[0][0],x[0][1],x[1]])
df_city = sqlc.createDataFrame(wordcount_city)

rdd_state =rdd.map(lambda x:(x[4].strip(),x[1]))
wordcount_state = rdd_state.map(lambda x: (x,1)).reduceByKey(lambda x,y:x+y).map(lambda x:[x[0][0],x[0][1],x[1]])
df_state = sqlc.createDataFrame(wordcount_state)


df_company.write.format("com.databricks.spark.csv").save(output_name_company)
df_city.write.format("com.databricks.spark.csv").save(output_name_city)
df_state.write.format("com.databricks.spark.csv").save(output_name_state)
```

```
company,job,frequency
GS5,data analyst,3
Riccione Resources,machine learning engineer,2
IFA North America,data engineer,2
CVirtual,database administrator,1
Orbis,database administrator,3
Indiana Farm Bureau Insurance,software developer,2
TEKREQS,software embedded engineer,1
Mount Carmel Health,data analyst,1
Evonik,data engineer,3
Tk-Chain,software engineer,1
ssitsol,database administrator,2
VyStar Credit Union,big data engineer,1
Synectic Solutions,data engineer,3
Sharonview Federal Credit Union,data engineer,1
ReviewTrackers,software engineer,4
PLEXSYS Interface Products,software engineer,2
Merit Medical Systems Inc.,data engineer,9
ICES,big data engineer,1
IPG Photonics Corporation,software embedded engineer,2
NFI Industries,software developer,1
SENTEL Corporation,software engineer,1
Williams-Sonoma,software developer,3
"company_result.csv" 60180L, 2204720C
```

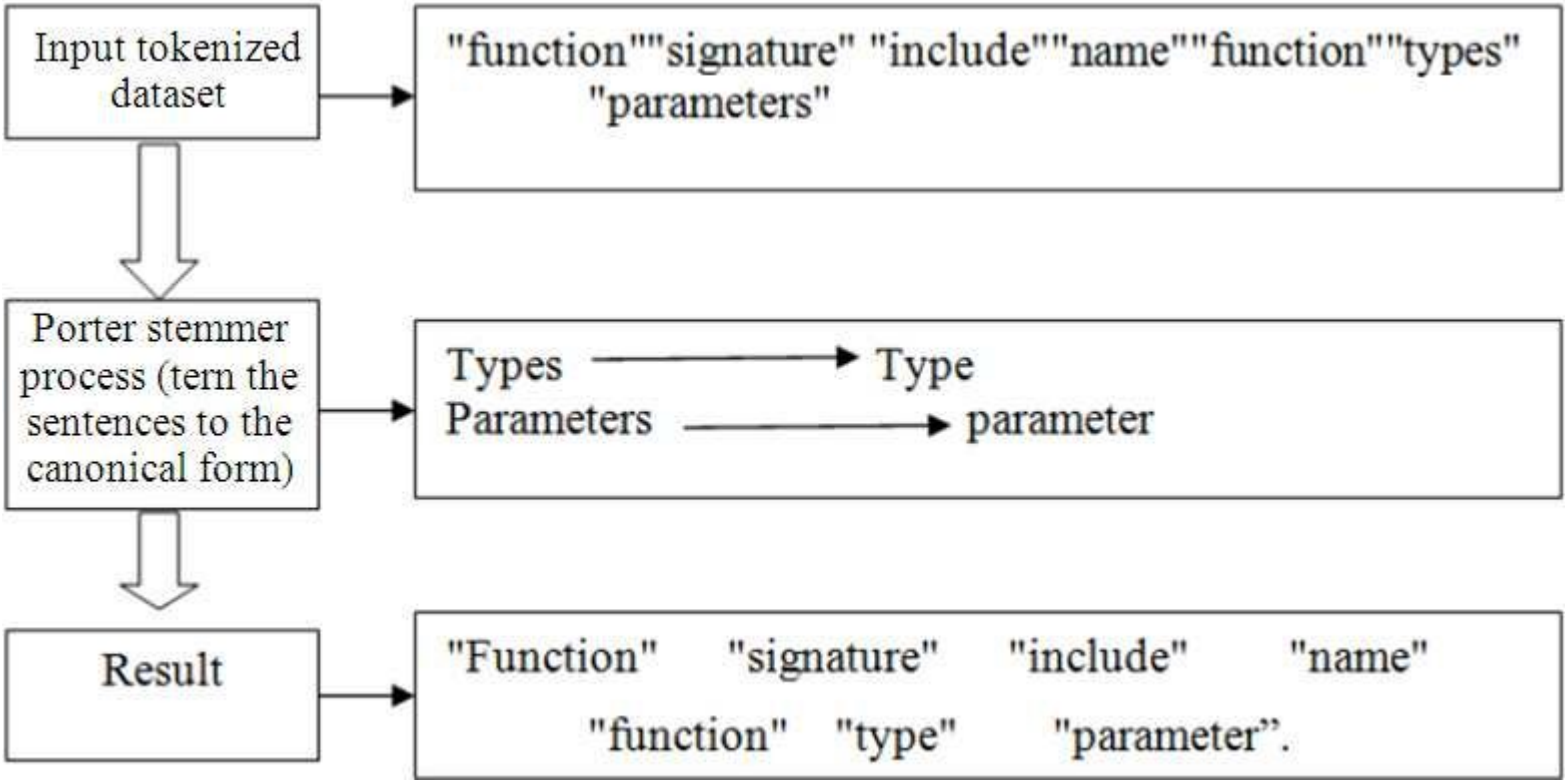
Transform - NLTK_wordtokenize



Transform - NLTK_stopword



Transform - NLTK_stemming



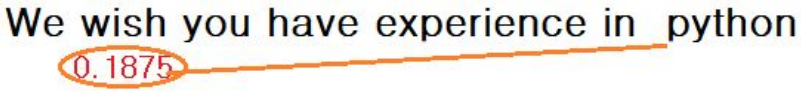
Transform - NLTK_sentiword

```
##################################
<bad.a.01: PosScore=0.0 NegScore=0.625>
<bad.s.02: PosScore=0.25 NegScore=0.25>
<bad.s.03: PosScore=0.0 NegScore=0.75>
<bad.s.04: PosScore=0.0 NegScore=0.75>
<regretful.a.01: PosScore=0.0 NegScore=0.625>
<bad.s.06: PosScore=0.0 NegScore=0.75>
<bad.s.07: PosScore=0.0 NegScore=0.625>
<bad.s.08: PosScore=0.0 NegScore=0.5>
<bad.s.09: PosScore=0.0 NegScore=0.75>
<bad.s.10: PosScore=0.0 NegScore=1.0>
<bad.s.11: PosScore=0.0 NegScore=0.375>
<bad.s.12: PosScore=0.0 NegScore=0.75>
<bad.s.13: PosScore=0.0 NegScore=0.75>
<bad.s.14: PosScore=0.0 NegScore=0.75>
-0.6428571428571429
##################################
```

```
    if count_N != 0:
        return (posscore - negscore) / count_N
    return 0
##########################################################################
```

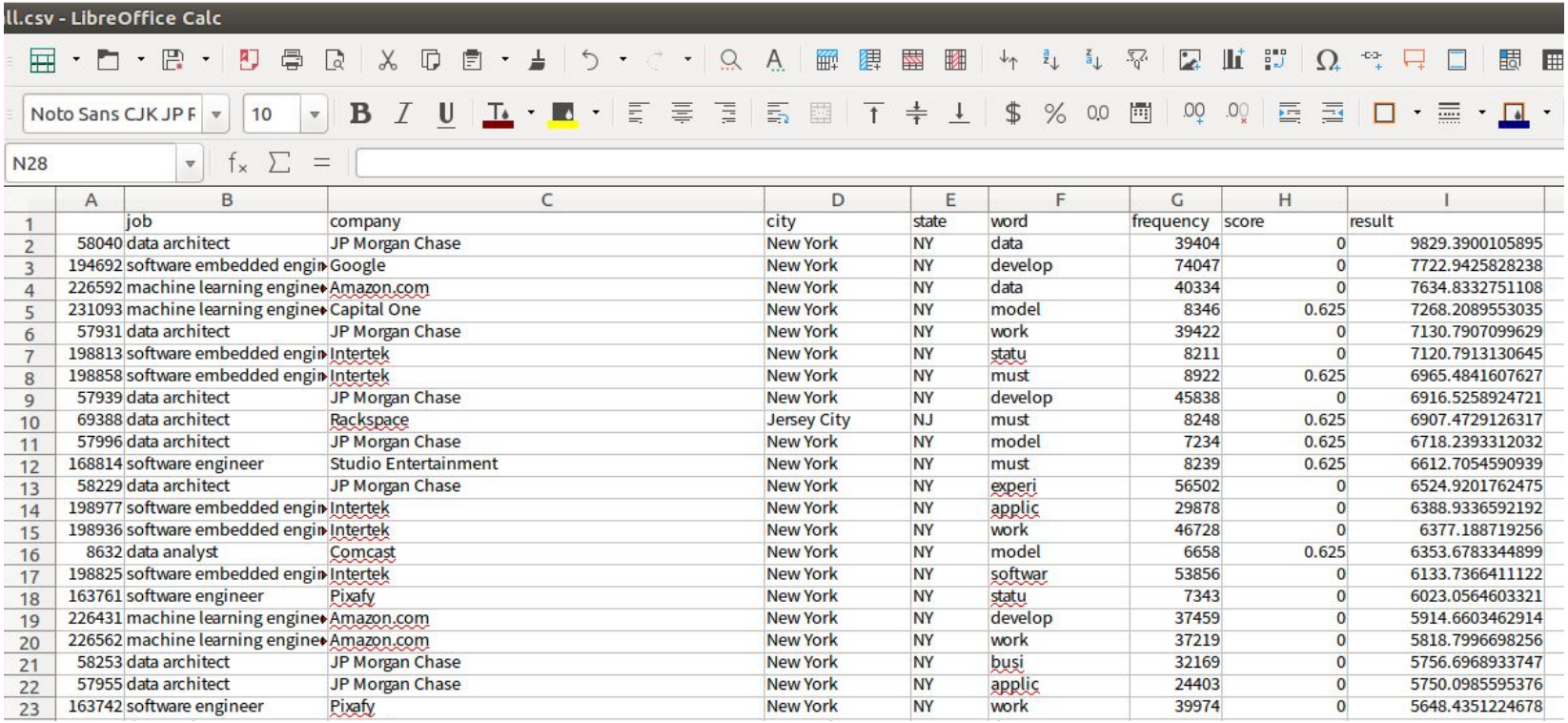
```
##################################
<good.a.01: PosScore=0.75 NegScore=0.0>
<full.s.06: PosScore=0.0 NegScore=0.0>
<good.a.03: PosScore=1.0 NegScore=0.0>
<estimable.s.02: PosScore=1.0 NegScore=0.0>
<beneficial.s.01: PosScore=0.625 NegScore=0.0>
<good.s.06: PosScore=1.0 NegScore=0.0>
<good.s.07: PosScore=0.75 NegScore=0.0>
<adept.s.01: PosScore=0.625 NegScore=0.0>
<good.s.09: PosScore=0.625 NegScore=0.0>
<dear.s.02: PosScore=0.5 NegScore=0.0>
<dependable.s.04: PosScore=0.5 NegScore=0.0>
<good.s.12: PosScore=0.375 NegScore=0.0>
<good.s.13: PosScore=0.625 NegScore=0.0>
<effective.s.04: PosScore=0.0 NegScore=0.0>
<good.s.15: PosScore=0.625 NegScore=0.0>
<good.s.16: PosScore=0.75 NegScore=0.0>
<good.s.17: PosScore=0.75 NegScore=0.0>
<good.s.18: PosScore=0.875 NegScore=0.0>
<good.s.19: PosScore=0.5 NegScore=0.0>
<good.s.20: PosScore=0.375 NegScore=0.125>
<good.s.21: PosScore=0.75 NegScore=0.0>
0.6130952380952381
##################################
```

Transform - set adj’sentiscore to target word



- tokenize by sentence
  - tokenize by word
  - get senti score each word
  - add all senti score
  - set senti score in current sentence’s word

Transform - all(job, company, city, state, word, score, result)

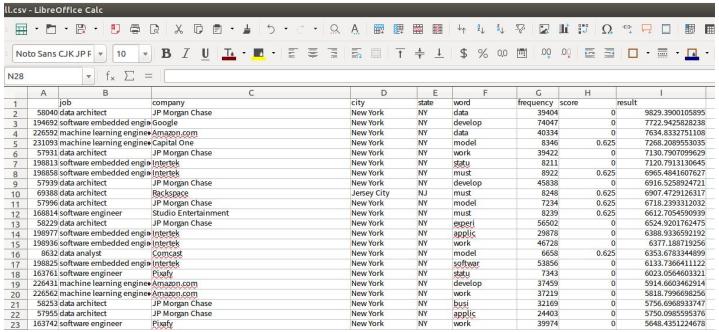

ll.csv - LibreOffice Calc

Noto Sans CJK JP F | 10

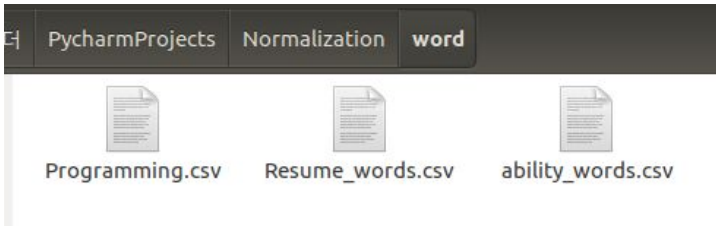
N28

	A	B	C	D	E	F	G	H	I
1		job	company	city	state	word	frequency	score	result
2	58040	data architect	JP Morgan Chase	New York	NY	data	39404	0	9829.3900105895
3	194692	software embedded engin	Google	New York	NY	develop	74047	0	7722.9425828238
4	226592	machine learning engine	Amazon.com	New York	NY	data	40334	0	7634.8332751108
5	231093	machine learning engine	Capital One	New York	NY	model	8346	0.625	7268.2089553035
6	57931	data architect	JP Morgan Chase	New York	NY	work	39422	0	7130.7907099629
7	198813	software embedded engin	Intertek	New York	NY	statu	8211	0	7120.7913130645
8	198858	software embedded engin	Intertek	New York	NY	must	8922	0.625	6965.4841607627
9	57939	data architect	JP Morgan Chase	New York	NY	develop	45838	0	6916.5258924721
10	69388	data architect	Rackspace	Jersey City	NJ	must	8248	0.625	6907.4729126317
11	57996	data architect	JP Morgan Chase	New York	NY	model	7234	0.625	6718.2393312032
12	168814	software engineer	Studio Entertainment	New York	NY	must	8239	0.625	6612.7054590939
13	58229	data architect	JP Morgan Chase	New York	NY	experi	56502	0	6524.9201762475
14	198977	software embedded engin	Intertek	New York	NY	applic	29878	0	6388.9336592192
15	198936	software embedded engin	Intertek	New York	NY	work	46728	0	6377.188719256
16	8632	data analyst	Comcast	New York	NY	model	6658	0.625	6353.6783344899
17	198825	software embedded engin	Intertek	New York	NY	softwar	53856	0	6133.7366411122
18	163761	software engineer	Pixafy	New York	NY	statu	7343	0	6023.0564603321
19	226431	machine learning engine	Amazon.com	New York	NY	develop	37459	0	5914.6603462914
20	226562	machine learning engine	Amazon.com	New York	NY	work	37219	0	5818.7996698256
21	58253	data architect	JP Morgan Chase	New York	NY	busi	32169	0	5756.6968933747
22	57955	data architect	JP Morgan Chase	New York	NY	applic	24403	0	5750.0985595376
23	163742	software engineer	Pixafy	New York	NY	work	39974	0	5648.4351224678

Transform - words_'col_index'(col_index, word, frequency, score, result)



+



=

ming_job.csv - LibreOffice Calc

	A	B	C	D	E
1	col_index	word	frequency	score	result
2	machine learning engineer	python	126	0	40.6453712562
3	data architect	application	67	0	33.2525126679
4	software embedded engineer	embedded	154	0	32.6879548409
5	software embedded engineer	java	102	0	31.9209722222
6	machine learning engineer	java	88	0	31.8343553114
7	software developer	java	94	0	30.1060363248
8	machine learning engineer	modeling	45	0	27.6715537723
9	data analyst	modeling	43	0	25.709029433
10	data architect	database	41	0	22.4450542419
11	data architect	sql	93	0	20.7148489011
12	software engineer	experience	141	0	20.3358601391
13	data architect	scala	19	0	19.9213733211
14	software embedded engineer	matlab	27	0	18.6150575397
15	software engineer	application	58	0	17.9254090354
16	machine learning engineer	sql	58	0	17.5772097311
17	data architect	deep	20	0	16.9976254579
18	machine learning engineer	deep	50	0	15.3043711844
19	software embedded engineer	python	42	0	14.8931071429
20	machine learning engineer	spark	27	0	13.5772550366
21	data analyst	python	16	0	12.8740842491
22	software embedded engineer	application	54	0	12.7509559746
23	machine learning engineer	application	30	0	11.8482174908
24	software embedded engineer	c++	85	0	11.5014166908
25	data analyst	scala	7	0	11.1212359944
26	software engineer	java	56	0	9.6563095238
27	software developer	database	20	0	9.4198333333
28	machine learning engineer	matlab	12	0	8.3214285714

- Make csv as 4 way

Load - cluster mode

Summary

Security is off.

Safemode is off.

411 files and directories, 378 blocks = 789 total filesystem object(s).

Heap Memory used 28.31 MB of 208.5 MB Heap Memory. Max Heap Memory is 889 MB.

Non Heap Memory used 47.34 MB of 48.35 MB Commited Non Heap Memory. Max Non Heap Memory is -1 B.

Configured Capacity:	94.52 GB
DFS Used:	3.47 GB (3.68%)
Non DFS Used:	17.34 GB
DFS Remaining:	69.47 GB (73.5%)
Block Pool Used:	3.47 GB (3.68%)
DataNodes usages% (Min/Median/Max/stdDev):	3.68% / 3.68% / 3.68% / 0.00%
Live Nodes	2 (Decommissioned: 0)
Dead Nodes	0 (Decommissioned: 0)
Decommissioning Nodes	0
Total Datanode Volume Failures	0 (0 B)
Number of Under-Replicated Blocks	0
Number of Blocks Pending Deletion	0
Block Deletion Start Time	2018. 6. 13. 오후 8:19:07

NameNode Journal Status

Current transaction ID: 3407

Journal Manager	State

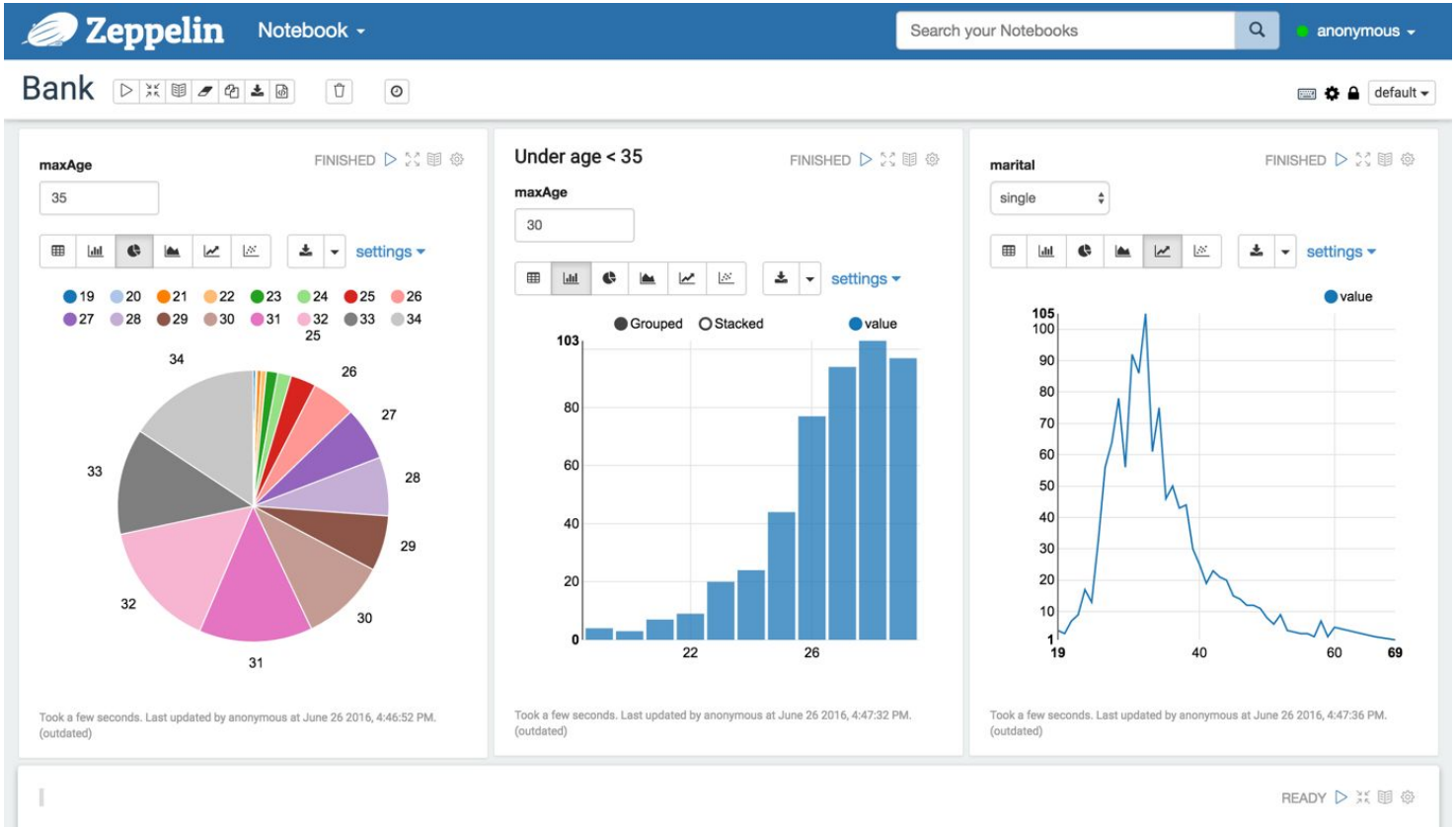
Browse Directory

/project_lastest Go!

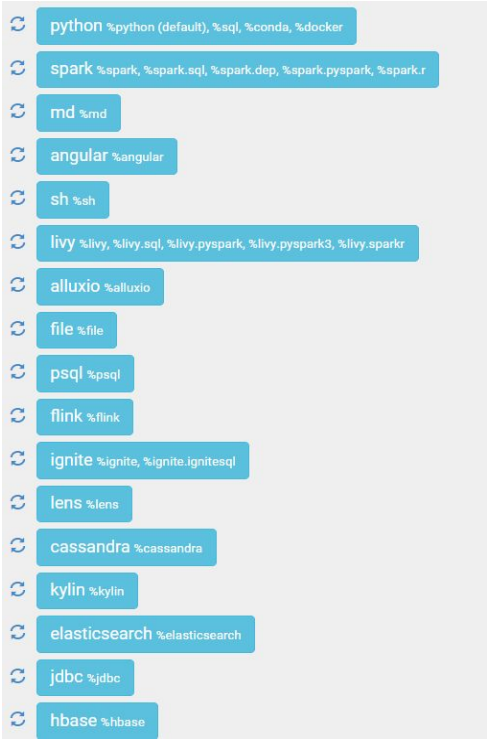
Permission	Owner	Group	Size	Last Modified	Replication	Block Size	Name
drwxr-xr-x	project	supergroup	0 B	2018. 6. 14. 오후 1:25:19	0	0 B	city_result
drwxr-xr-x	project	supergroup	0 B	2018. 6. 13. 오후 8:23:24	0	0 B	code
drwxr-xr-x	project	supergroup	0 B	2018. 6. 14. 오후 1:25:19	0	0 B	company_result
drwxr-xr-x	project	supergroup	0 B	2018. 6. 13. 오후 8:29:09	0	0 B	join_data
drwxr-xr-x	project	supergroup	0 B	2018. 6. 13. 오후 8:31:05	0	0 B	output
drwxr-xr-x	project	supergroup	0 B	2018. 6. 14. 오후 1:25:19	0	0 B	state_result

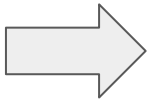
Hadoop, 2017.

Visualization(with Zeppelin)



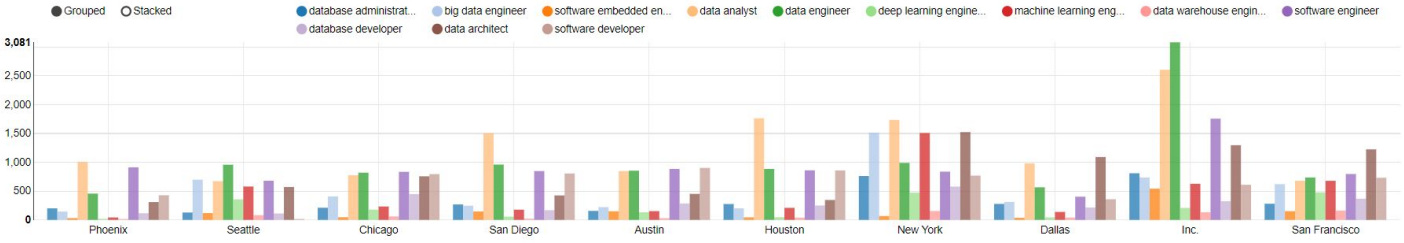
Visualization(with Zeppelin)



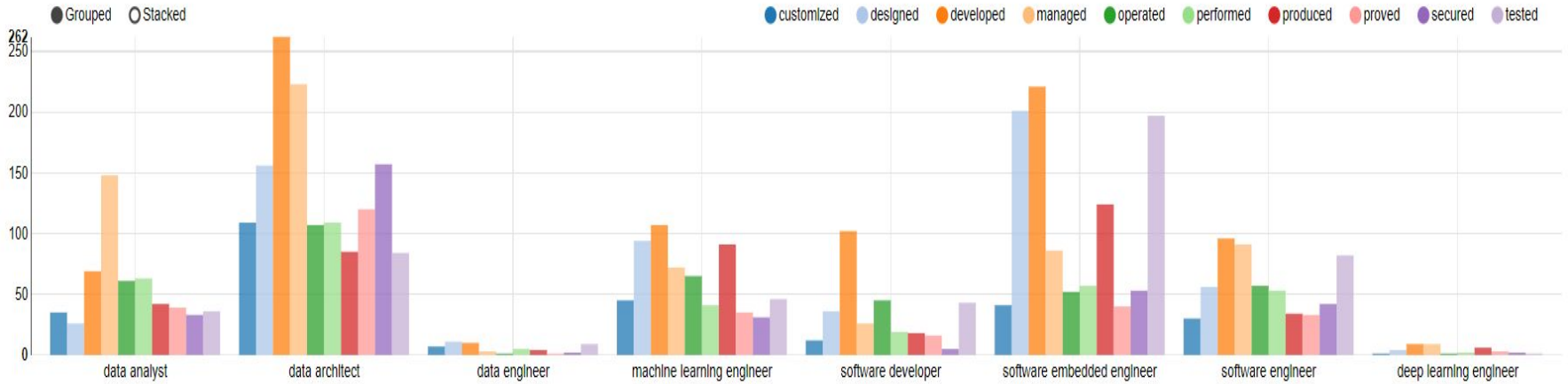


Visualization(data preparation)

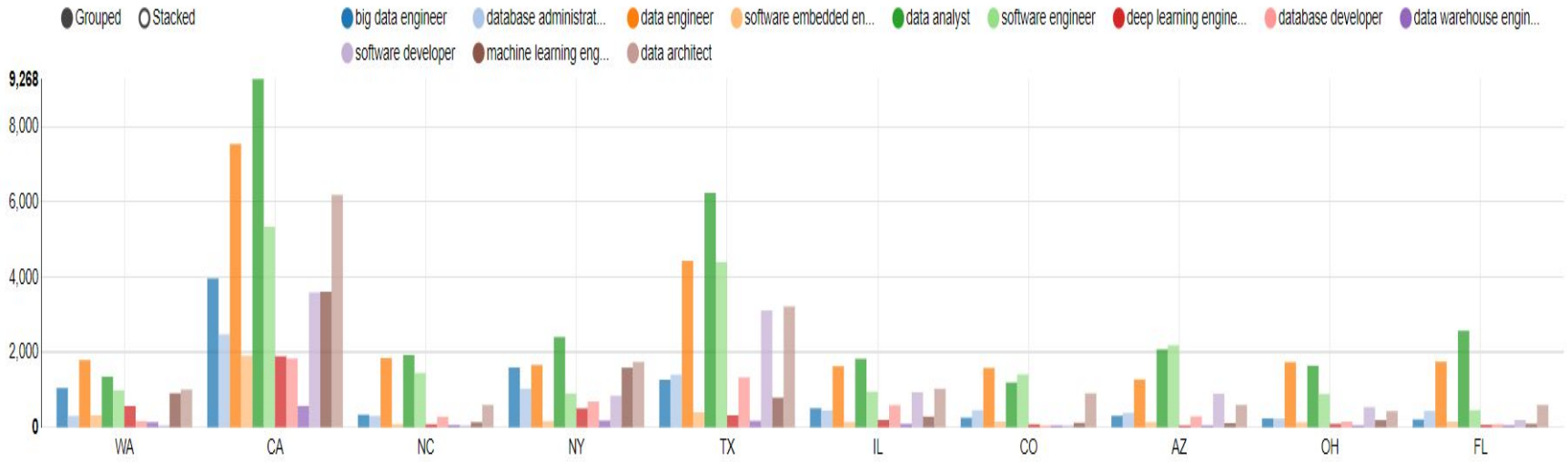

```
%python
city_2 = pd.DataFrame(city, columns = ['city','frequency'])
city_2 = city_2.sort_values('frequency',ascending=False)
city_2['frequency'] = city_2.groupby('city')['frequency'].transform('sum')
city_2 = city_2.drop_duplicates(['city'], keep='first')
city_h = city_2.head(10)
city_h = pd.DataFrame(city_h, columns = ['city'])
city = pd.merge(city,city_h)
z.sh
```



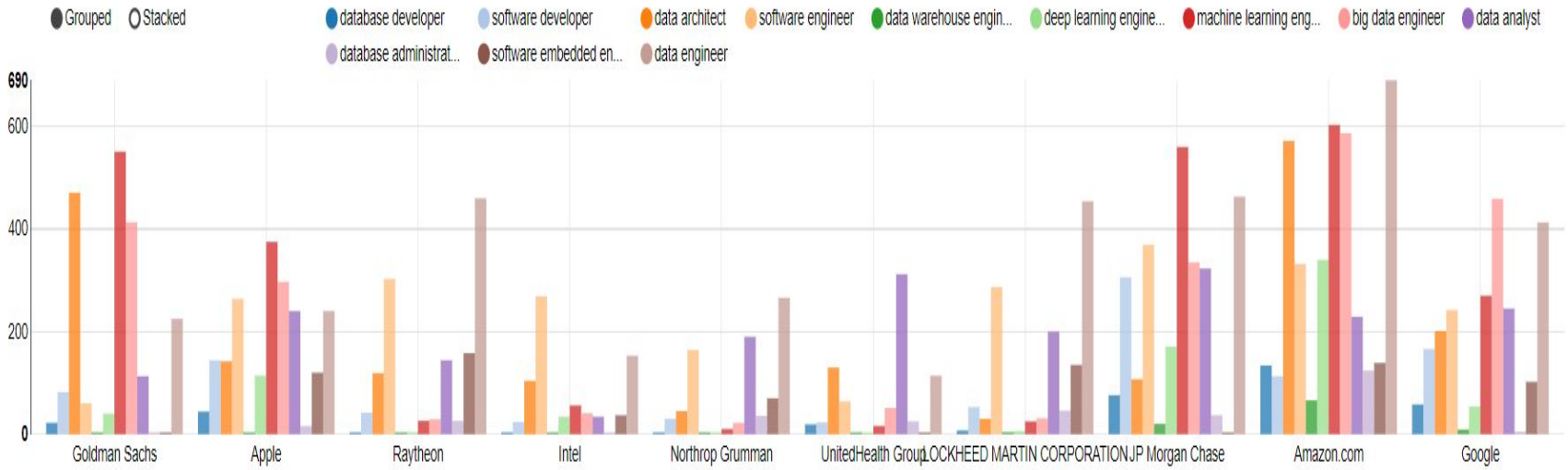
Visualization



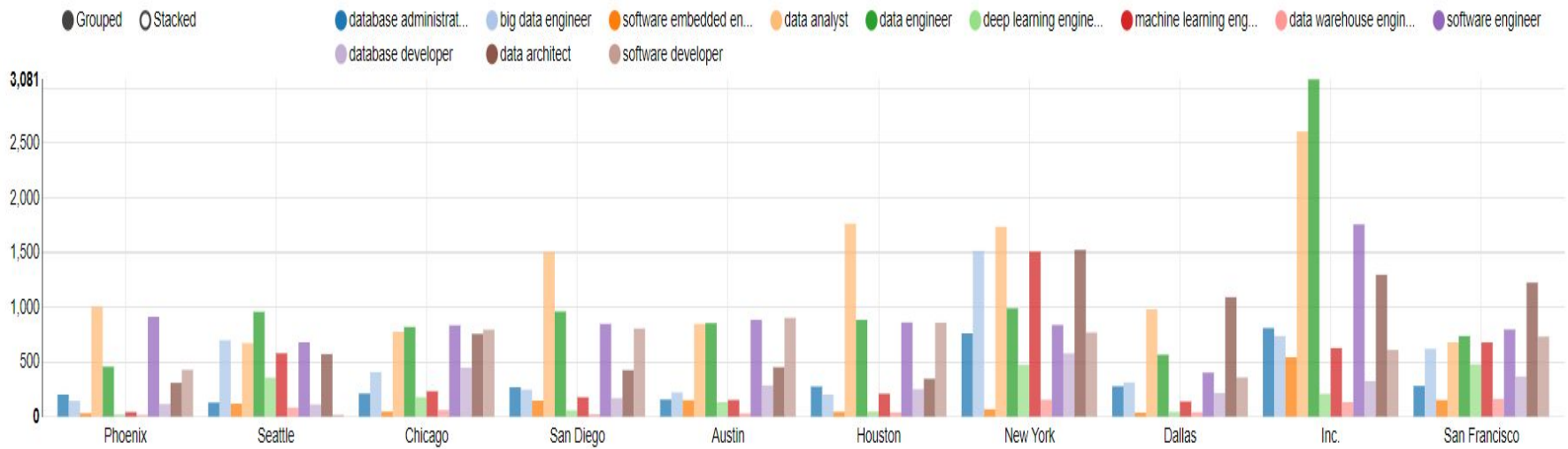
Visualization



Visualization

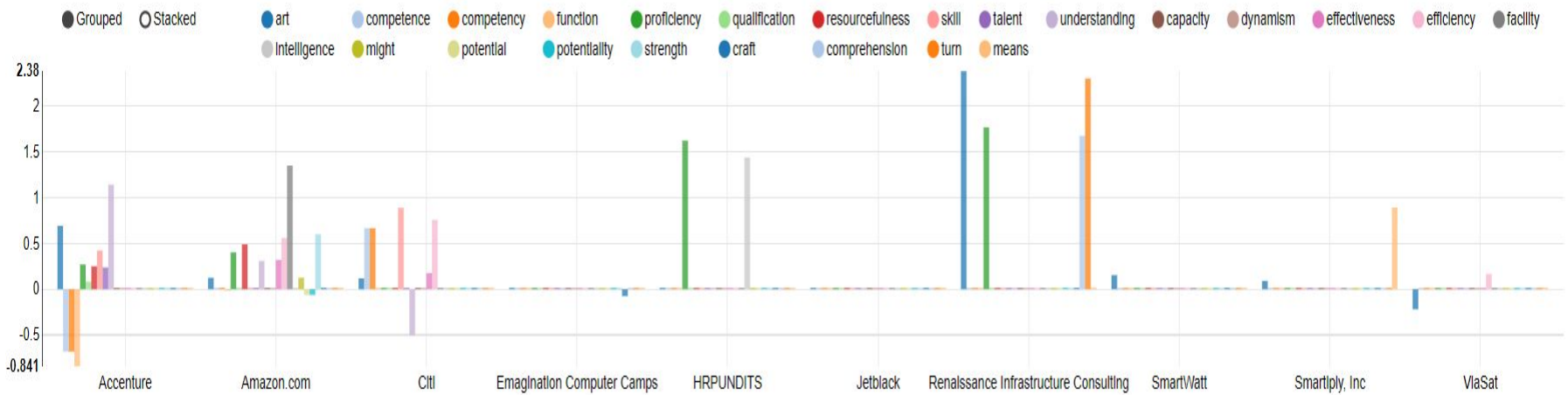


Visualization



Visualization

Visualization



Visualization