CSC 466 Lab 7 Report:
PageRank and Link Analysis

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CSC 466: Knowledge Discovery from Data, Fall 2023

Abstract

This lab report examines the PageRank algorithm's efficacy across diverse datasets: NCAA Football, Dolphins, and Les Miserables. Using directed graphs, adjacency, and transition matrices, the algorithm's performance in identifying central nodes was analyzed. The results varied: with the NCAA Football dataset, PageRank didn't align with the actual season outcomes, suggesting limited suitability for sports ranking. With the Dolphins dataset lacking a ground truth, this presented challenges to verify the accuracy of the rankings. With the Les Miserables dataset, PageRank identified central figures but not the main characters, indicating its limitations in narrative contexts. The study highlights PageRank's effectiveness in networks where centrality is key and its limitations in datasets with complex dynamics.

I. Introduction

This lab report focuses on the implementation and analysis of the PageRank algorithm, a fundamental technique in link analysis and web search optimization. Utilizing datasets like NCAA Football, Dolphins, and Les Miserables, the assignment involves building a system to compute PageRank scores for various nodes. Our approach includes constructing directed graphs from the datasets, formulating adjacency and transition matrices, and iteratively computing the PageRank values. The aim is to gain insights into the significance of nodes within each network and understand the performance implications of different aspects of the PageRank algorithm, such as convergence behavior and the impact of the damping factor.

II. Description of Datasets

A. NCAA Football Dataset

This dataset includes detailed records of 1,537 games from the 2009 NCAA Division I football season. The data captures game outcomes, which can be used to analyze team performance, predict future outcomes, and understand the dynamics of college football competitions.

B. Dolphins Dataset

This dataset tracks the social interactions of a dolphin group, providing a network structure illustrating relationships and hierarchies. Analyzing this data can reveal social patterns, dominance structures, and interaction frequencies within the dolphin community.

C. Les Miserables Dataset

The dataset creates a network of character interactions from Victor Hugo's "Les Miserables." It offers a unique way to visualize and analyze the relationships between characters, their prominence in the novel, and the narrative's structure. This analysis can provide insights into character development and plot dynamics.

III. Methods

The implementation of our PageRank algorithm starts by preprocessing the input data. For the NCAA Football dataset, this involves cleaning and reformatting the data before converting it to a data frame, ensuring consistency and accuracy for analysis. Next, a directed graph is constructed from the data frame, creating a network where nodes represent entities like football teams or novel characters or dolphins, and edges represent their interactions or connections.

The core of the implementation lies in the creation of the adjacency matrix from the graph, which is then used to form the transition matrix. This matrix is crucial for the PageRank calculation, as it reflects the probability of transitioning from one node to another in the network. The damping factor, a key component of the PageRank algorithm, is incorporated into the transition matrix to account for the likelihood of random jumps in the network. The damping factor is an optional argument, but the default is 0.85.

Finally, the PageRank values are computed iteratively using the transition matrix until convergence is achieved. The algorithm checks for convergence in each iteration to ensure the stability of PageRank values. The convergence value is set at 0.001. The final output is a ranked list of nodes based on their PageRank scores, providing insight into the importance or influence of each node within the network.

IV. Results

A. NCAA Football Dataset

In the PageRank analysis of the 2009 NCAA football season dataset, a damping factor of 0.85 and a convergence criterion of 0.001 was used.

Output 1: NCAA Football PageRank Results (Top 15)

```
Data File: NCAA_football.csv

Read Time: 0.02647 seconds
Processing Time: 0.00094 seconds
Number of Iterations: 4
```

Damping Factor: 0.85

Rank	Node	Page Rank
1	East Carolina	0.002503
2	North Carolina State	0.002495
3	Duke	0.002490
4	Louisiana-Lafayette	0.002485
5	Pittsburgh	0.002476
6	Vanderbilt	0.002476
7	West Virginia	0.002468
8	Rutgers	0.002462
9	Southern Miss	0.002450
10	Virginia	0.002446
11	Florida Atlantic	0.002446
12	Iowa	0.002444
13	Alabama	0.002443
14	Bowling Green	0.002442
15	Texas	0.002441

The algorithm converged in just 4 iterations, indicating efficient processing. Interestingly, East Carolina, the 2009 Conference USA football champions, and North Carolina State, where Russell Wilson set a new Division I record for most passes attempted without an interception, ranked highly. This suggests PageRank's efficiency in identifying network centrality, though not necessarily on-field success. Teams like Alabama and Texas who were most dominant in terms of results were still in the top 15, indicating a reasonable alignment with their strong season performances. Other notable mentions include Pittsburgh players winning offensive and defensive player of the year in the Big East Conference, Virginia's firing of head coach Al Groh, Iowa's win in the FedEx Orange Bowl, and Bowling Green's Freddie Barnes breaking the single-season record for receptions in addition to their head coach Gregg Brandon being fired in the pre-season[1]. This suggests that while PageRank is effective in identifying teams of key players in the network, it also reflects significant season highlights and team accomplishments.

B. Dolphins Dataset

For the dolphins dataset, the PageRank algorithm was applied with a damping factor of 0.85 and a convergence criterion of 0.001, converging in 8 iterations.

Output 2: Dolphins (Directed) PageRank Results (Top 15)

Data File: dolphinsDir.csv

Read Time: 0.00487 seconds
Processing Time: 0.00085 seconds

[1] https://en.wikipedia.org/wiki/2009_NCAA_Division_I_FBS_football_season

Number of Iterations: 8

Damping Factor: 0.85

Rank	Node	Page Rank
1	TR88	0.001692
2	TSN83	0.001602
3	TR120	0.001602
4	SMN5	0.001353
5	Whitetip	0.001345
6	Zipfel	0.001279
7	Stripes	0.001153
8	TSN103	0.001095
9	Thumper	0.001020
10	TR99	0.000991
11	Zig	0.000958
12	Vau	0.000950
13	SN4	0.000949
14	Patchback	0.000946
15	SN63	0.000942

The ranking generated by PageRank might not directly correspond to any known hierarchy or social structure within the dolphin group, as it primarily reflects the network centrality based on observed interactions. The ranking, therefore, could be indicative of the most connected or central dolphins in the social network, rather than a hierarchy or dominance order. This suggests that while PageRank effectively identifies central figures in a network, the results should be used cautiously. Given the lack of a ground truth or a well-defined social hierarchy for the dolphin group, it's challenging to verify the accuracy or relevance of the rankings. The PageRank algorithm excels at identifying central or highly connected nodes in a network, but interpreting these results in the context of dolphin social structures requires careful consideration and an understanding of the limitations and nature of the algorithm.

C. Les Miserables Dataset

For the Les Miserables dataset, the PageRank settings were set with a damping factor of 0.85 and a convergence criterion of 0.001, requiring 9 iterations for convergence.

Output 3: Les Miserables PageRank Results (Top 15)

Data File: lesmisDir.csv

Read Time: 0.00619 seconds
Processing Time: 0.00096 seconds
Number of Iterations: 9

Damping Factor: 0.85

Rank	Node	Page Rank
1	MmeHucheloup	0.003446
2	Grantaire	0.003383
3	Joly	0.003242
4	Bahorel	0.003132
5	MotherPlutarch	0.003123
6	Courfeyrac	0.003024
7	Bossuet	0.003022
8	Feuilly	0.002979
9	Prouvaire	0.002867
10	Combeferre	0.002774
11	Brujon	0.002710
12	MmePontmercy	0.002632
13	Mabeuf	0.002594
14	Child2	0.002586
15	Montparnasse	0.002485

Interestingly, the top-ranked characters in the PageRank results, such as Madame Hucheloup, Grantaire, and Joly, are not the central characters in Victor Hugo's novel. The novel's main characters include Jean Valjean, Javert, Fantine, Cosette, and Eponine[2]. This discrepancy indicates that either PageRank effectively identifies central figures in a network based on their connections, but it does not necessarily align with the narrative importance or prominence of characters in the literary context of Les Miserables. Or PageRank does not effectively identity the central figures in a network based on their connections. This reinforces the notion that the interpretation of PageRank results should be context-sensitive, particularly in literary analyses where character importance is not solely defined by their interactions but also by their narrative roles and development.

V. Performance Evaluation

In evaluating the performance of the PageRank implementation, the number of iterations and running times for each dataset were observed. For the NCAA Football dataset, the algorithm converged in 4 iterations with a processing time of 0.00094 seconds. For the Dolphins dataset, it took 8 iterations and 0.00085 seconds, while for the Les Miserables dataset, 9 iterations and 0.00096 seconds were needed. These results suggest efficient performance on small datasets. However, scaling up to larger graphs might present challenges, particularly in processing time and memory usage. The observed trend shows a correlation between the complexity of the network (in terms of nodes and edges) and the number of iterations and processing time required. This suggests that for larger graphs, optimizations may be needed to maintain efficiency.

[2] https://bookanalysis.com/victor-hugo/les-miserables/character-list/

VI. Conclusion

In conclusion, the PageRank implementation effectively identified central nodes in various datasets, but its efficacy varied. In the NCAA Football dataset, the algorithm didn't align well with actual season outcomes, suggesting it may be less suitable for sports ranking. For the Dolphins dataset, while it highlighted central individuals, the lack of ground truth in social hierarchies made the results speculative. In the Les Miserables dataset, PageRank identified central figures in the story network, but these did not always correspond to the main characters. Thus, PageRank works best with datasets where centrality is key, and less effectively where the importance is contextually or narratively defined.

VII. Appendix

A. README

```
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Professor Alexander Dekhtyar
CSC 466: Fall 2023
Lab 7

How to run: python3 pageRank.py <datafile> <OPTIONAL: damping
factor (default = 0.85)>

Note: program only works with .csv files as the inputted
datafile (undirected or directed)

Submitted files:
README.txt (this file)
pageRank.py
NCAA_football.csv
dolphins.csv
dolphinsDir.csv
lesmis.csv
lesmisDir.csv
```

B. NCAA Football Output

```
Data File: NCAA_football.csv

Read Time: 0.02647 seconds
Processing Time: 0.00094 seconds
Number of Iterations: 4
```

Damping Factor: 0.85

Rank	Node	Page Rank
1	East Carolina	0.002503
2	North Carolina State	0.002495
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5	Pittsburgh	0.002476
6	Vanderbilt	0.002476
7	West Virginia	0.002468
8	Rutgers	0.002462
9	Southern Miss	0.002450
10	Virginia	0.002446
11	Florida Atlantic	0.002446
12	Iowa	0.002444
13	Alabama	0.002443
14	Bowling Green	0.002442
15	Texas	0.002441
16	Tennessee	0.002440
17	Wake Forest	0.002440
18	Rice	0.002438
19	UTEP	0.002434
20	Connecticut	0.002433
21	Buffalo	0.002429
22	Michigan	0.002425
23	Michigan State	0.002425
24	Middle Tennessee State	0.002420
25	Texas A&M	0.002419
26	Boston College	0.002417
27	Northwestern	0.002413
28	Cincinnati	0.002408
29	San Diego State	0.002408
30	Miami (FL)	0.002407
31	South Florida	0.002406
32	LSU	0.002405
33	Nebraska	0.002404
34	Penn State	0.002404
35	Boise State	0.002402
36	South Carolina	0.002402
37	Utah	0.002398
38	Tulsa	0.002395
39	Florida International	0.002393
40	Utah State	0.002392
41	Colorado State	0.002390
42	Houston	0.002384
43	Virginia Tech	0.002380
44	Nevada	0.002378
45	North Carolina	0.002377
46	Ohio State	0.002374
47	Florida	0.002369
48	Kansas	0.002367
49	Wisconsin	0.002367
50	Fresno State	0.002366
51	Purdue	0.002366
52	New Mexico	0.002365
53	San Jose State	0.002363
54	Texas Tech	0.002358
55	Akron	0.002356
56	Minnesota	0.002356
57	Georgia	0.002355
58	Colorado	0.002354

59	Air Force	0.002354
60	Kentucky	0.002351
61	Navy	0.002351
62	Memphis	0.002351
63	Missouri	0.002349
64	Mississippi	0.002348
65	Kent State	0.002342
66	Kansas State	0.002338
67	Auburn	0.002336
68	Louisiana Tech	0.002336
69	Troy	0.002335
70	Illinois	0.002333
71	Georgia Tech	0.002329
72	UAB	0.002324
73	Louisville	0.002318
74	Ball State	0.002317
75	Army	0.002313
76	Maryland	0.002312
77	Clemson	0.002309
78	Mississippi State	0.002309
79	Wyoming	0.002303
80	Arkansas	0.002302
81	Syracuse	0.002298
82	UNLV	0.002295
83	Temple	0.002292
84	UCF	0.002288
85	Tulane	0.002288
86	TCU	0.002287
87	Louisiana-Monroe	0.002287
88	Arkansas State	0.002280
89	Toledo	0.002279
90	Marshall	0.002270
91	Central Michigan	0.002270
92	Western Michigan	0.002238
93	Oklahoma State	0.002212
94	Idaho	0.002209
95	Hawaii	0.002203
96	Ohio	0.002193
97	New Mexico State	0.002184
98	North Texas	0.002174
99	Villanova	0.002171
100	Florida State	0.002162
101	Indiana	0.002157
102	James Madison	0.002156
103	Brigham Young	0.002153
104	Oklahoma	0.002141
105	Hofstra	0.002140
106	Notre Dame	0.002132
107	Miami (OH)	0.002111
108	Iowa State	0.002089
109	William & Mary	0.002048
110	Northeastern	0.002043
111	Northern Illinois	0.002039
112	Massachusetts	0.002027
113	New Hampshire	0.002017
114	Richmond	0.002010
115	Maine	0.002008
116	Baylor	0.001992
117	Towson	0.001977
118	Northern Colorado	0.001972
119	USC	0.001931
120	Rhode Island	0.001918

121	Florida A&M	0.001900
122	Morgan State	0.001890
123	Colgate	0.001887
124	Oregon	0.001880
125	California	0.001875
126	Fayetteville State	0.001874
127	Western Kentucky	0.001871
128	Southern Methodist	0.001864
129	Winston-Salem	0.001861
130	Coastal Carolina	0.001848
131	Delaware State	0.001846
132	South Carolina State	0.001838
133	Oregon State	0.001830
134	Montana	0.001826
135	Lehigh	0.001820
136	Arizona	0.001815
137	Hampton	0.001813
138	Eastern Michigan	0.001810
139	Bethune-Cookman	0.001801
140	Holy Cross	0.001781
141	Idaho State	0.001765
142	Harvard	0.001760
143	Cal Poly	0.001756
144	Delaware	0.001746
145	Stony Brook	0.001744
146	Lafayette	0.001741
147	Tennessee State	0.001725
148	Nicholls State	0.001721
149	Fordham	0.001720
150	Eastern Washington	0.001719
151	Stanford	0.001694
152	Cornell	0.001674
153	Weber State	0.001667
154	Rhodes	0.001662
155	Tuskegee	0.001658
156	Portland State	0.001653
157	Eastern Kentucky	0.001651
158	Brown	0.001641
159	Bucknell	0.001638
160	Northern Arizona	0.001631
161	Jacksonville State	0.001602
162	UCLA	0.001594
163	Montana State	0.001593
164	Austin Peay	0.001583
165	Presbyterian	0.001583
166	Alabama State	0.001574
167	Appalachian State	0.001567
168	UC Davis	0.001565
169	Norfolk State	0.001564
170	Northern Iowa	0.001560
171	Yale	0.001557
172	Gardner-Webb	0.001552
173	North Carolina Central	0.001552
174	Texas State	0.001552
175	Princeton	0.001536
176	Central Arkansas	0.001530
177	Pennsylvania	0.001527
178	Albany	0.001518
179	Georgia Southern	0.001501
180	Arizona State	0.001501
181	Murray State	0.001500
182	Elon	0.001498

183	Wofford	0.001497
184	Sacramento State	0.001493
185	Washburn	0.001483
186	Charleston Southern	0.001477
187	Sam Houston State	0.001469
188	Liberty	0.001465
189	North Dakota State	0.001464
190	Southern Illinois	0.001447
191	Central Connecticut State	0.001436
192	Northwestern State	0.001431
193	Southern University	0.001422
194	Grambling State	0.001418
195	North Carolina Pembroke	0.001411
196	Tennessee-Martin	0.001407
197	Southeastern Louisiana	0.001387
198	Eastern Illinois	0.001374
199	South Dakota State	0.001372
200	Georgetown	0.001359
201	Stonehill	0.001344
202	Monmouth	0.001343
203	McNeese State	0.001340
204	Furman	0.001328
205	North Carolina A&T	0.001322
206	Tennessee Tech	0.001289
207	Jackson State	0.001288
208	Robert Morris	0.001276
209	Virginia Military Institute	0.001270
210	Dayton	0.001267
211	Prairie View A&M	0.001262
212	Alabama A&M	0.001251
213	Southeast Missouri State	0.001232
214	Columbia	0.001227
215	Missouri State	0.001224
216	Washington State	0.001223
217	Wesley College	0.001222
218	Illinois State	0.001222
219	Franklin	0.001220
220	Western Illinois	0.001210
221	Southern Utah	0.001201
222	Stephen F. Austin	0.001200
223	San Diego	0.001196
224	Arkansas-Monticello	0.001172
225	Henderson State	0.001172
226	Alcorn State	0.001164
227	Jacksonville	0.001159
228	Duquesne	0.001156
229	St. Francis (IL)	0.001153
230	Marian	0.001153
231	Howard	0.001128
232	Edward Waters	0.001128
233	Marist	0.001095
234	Citadel	0.001082
235	Sacred Heart	0.001074
236	Youngstown State	0.001073
237	Western Carolina	0.001060
238	Wagner	0.001046
239	Samford	0.001033
240	Bryant University	0.001028
241	Davidson	0.000998
242	Morehead State	0.000978
243	Arkansas-Pine Bluff	0.000925
244	Drake	0.000925

245	Mississippi Valley State	0.000916
246	Butler	0.000910
247	Iona	0.000891
248	Valparaiso	0.000864
249	Savannah State	0.000838
250	North Dakota	0.000825
251	Birmingham Southern	0.000760
252	Methodist	0.000760
253	Texas Southern	0.000751
254	South Dakota	0.000670
255	Campbell	0.000513
256	Chattanooga	0.000513
257	Angelo State	0.000259
258	Cumberland University	0.000259
259	Johnson Smith	0.000259
260	Langston	0.000259
261	North Greenville	0.000259
262	Culver-Stockton	0.000259
263	Virginia State	0.000259
264	Shaw	0.000259
265	Missouri S&T	0.000259
266	Montana-Western	0.000259
267	Faulkner	0.000259
268	Albion	0.000259
269	Clark Atlanta	0.000259
270	Lenoir-Rhyne	0.000259
271	Delta State	0.000259
272	Assumption	0.000259
273	Carthage	0.000259
274	Southwest Baptist	0.000259
275	Humboldt State	0.000259
276	East Central Oklahoma	0.000259
277	Baker University	0.000259
278	Southern Oregon	0.000259
279	Western Washington	0.000259
280	Concordia University (WI)	0.000259
281	Central State	0.000259
282	Washington	0.000259
283	Central Washington	0.000259
284	West Chester	0.000259
285	Bentley College	0.000259
286	St. Ambrose	0.000259
287	Texas A&M-Kingsville	0.000259
288	Lambuth	0.000259
289	Wisconsin-La Crosse	0.000259
290	St. Francis (PA)	0.000259
291	Quincy	0.000259
292	Dartmouth	0.000259
293	Glenville State	0.000259
294	Azusa Pacific	0.000259
295	Tusculum	0.000259
296	Southeastern Oklahoma	0.000259
297	Kentucky Wesleyan	0.000259
298	Indiana State	0.000259
299	Southern Virginia	0.000259
300	Dixie State	0.000259
301	William Penn	0.000259
302	Pace	0.000259
303	Lincoln (MO)	0.000259
304	Texas College	0.000259
305	Shorter	0.000259
306	Stillman	0.000259

307	Morehouse	0.000259
308	New Mexico Highlands	0.000259
309	Merrimack	0.000259
310	Delaware Valley	0.000259
311	Chowan	0.000259
312	Texas A&M-Commerce	0.000259
313	Upper Iowa	0.000259
314	Mars Hill	0.000259
315	Webber International	0.000259
316	Central Methodist	0.000259
317	Concordia College	0.000259
318	Western Oregon	0.000259
319	Benedict	0.000259
320	West Georgia	0.000259
321	Southern Connecticut State	0.000259
322	Adams State	0.000259
323	Livingstone	0.000259
324	St. Cloud State	0.000259

C. Dolphins Output

Data File: dolphinsDir.csv

Read Time: 0.00487 seconds
Processing Time: 0.00085 seconds
Number of Iterations: 8

Damping Factor: 0.85

Rank	Node	Page Rank
1	TR88	0.001692
2	TSN83	0.001602
3	TR120	0.001602
4	SMN5	0.001353
5	Whitetip	0.001345
6	Zipfel	0.001279
7	Stripes	0.001153
8	TSN103	0.001095
9	Thumper	0.001020
10	TR99	0.000991
11	Zig	0.000958
12	Vau	0.000950
13	SN4	0.000949
14	Patchback	0.000946
15	SN63	0.000942
16	SN89	0.000927
17	Topless	0.000927
18	Trigger	0.000923
19	MN105	0.000893
20	Shmuddel	0.000859
21	TR77	0.000824
22	Kringel	0.000789
23	Scabs	0.000776
24	Quasi	0.000770
25	Mus	0.000770
26	MN23	0.000770
27	SN9	0.000752
28	Zap	0.000751
29	Notch	0.000736
30	Number1	0.000733
31	Oscar	0.000693
32	MN83	0.000686

```
   33         Web   0.000670
   34          PL   0.000651
   35 Ripplefluke   0.000634
   36       SN100   0.000612
   37       Jonah   0.000583
   38        Hook   0.000583
   39        SN96   0.000560
   40        SN90   0.000537
   41      Upbang   0.000521
   42         Jet   0.000488
   43    Gallatin   0.000422
   44      Double   0.000341
   45        Knit   0.000341
   46        Fish   0.000341
   47    Haecksel   0.000341
   48        Grin   0.000341
   49        Wave   0.000341
   50     Feather   0.000341
   51  Beescratch   0.000151
   52         CCL   0.000151
   53        DN63   0.000151
   54        MN60   0.000151
   55        Five   0.000151
   56        TR82   0.000151
   57        DN21   0.000151
   58      Bumper   0.000151
   59       Cross   0.000151
   60        Beak   0.000151
   61        DN16   0.000151
   62        Fork   0.000151
```

D. Les Miserables Output

```
Data File: lesmisDir.csv

Read Time: 0.00619 seconds
Processing Time: 0.00096 seconds
Number of Iterations: 9

Damping Factor: 0.85

 Rank             Node  Page Rank
    1     MmeHucheloup   0.003446
    2        Grantaire   0.003383
    3             Joly   0.003242
    4          Bahorel   0.003132
    5   MotherPlutarch   0.003123
    6       Courfeyrac   0.003024
    7          Bossuet   0.003022
    8          Feuilly   0.002979
    9        Prouvaire   0.002867
   10       Combeferre   0.002774
   11           Brujon   0.002710
   12     MmePontmercy   0.002632
   13           Mabeuf   0.002594
   14           Child2   0.002586
   15     Montparnasse   0.002485
   16        BaronessT   0.002482
   17       Claquesous   0.002458
   18          Gribier   0.002447
   19      MlleVaubois   0.002429
   20         Enjolras   0.002414
```

21	Cochepaille	0.002413
22	Anzelma	0.002412
23	Child1	0.002329
24	Boulatruelle	0.002327
25	Pontmercy	0.002327
26	Chenildieu	0.002326
27	Babet	0.002318
28	LtGillenormand	0.002273
29	Gueulemer	0.002246
30	Eponine	0.002243
31	Brevet	0.002223
32	Magnon	0.002209
33	Marius	0.002200
34	Champmathieu	0.002097
35	Simplice	0.002071
36	Toussaint	0.002015
37	Woman2	0.002015
38	Javert	0.001996
39	Fauchelevent	0.001957
40	Woman1	0.001957
41	Bamatabois	0.001951
42	MlleGillenormand	0.001939
43	Perpetue	0.001938
44	MotherInnocent	0.001936
45	Judge	0.001933
46	Gavroche	0.001846
47	Thenardier	0.001841
48	Gillenormand	0.001779
49	MmeThenardier	0.001681
50	Cosette	0.001661
51	Fantine	0.001473
52	Marguerite	0.001425
53	Isabeau	0.001425
54	Gervais	0.001425
55	MmeDeR	0.001425
56	Scaufflaire	0.001425
57	Zephine	0.001355
58	Dahlia	0.001280
59	Favourite	0.001191
60	Blacheville	0.001081
61	Valjean	0.000994
62	Fameuil	0.000939
63	MmeMagloire	0.000939
64	MmeBurgon	0.000734
65	Champtercier	0.000734
66	MlleBaptistine	0.000734
67	Count	0.000734
68	OldMan	0.000734
69	Cravatte	0.000734
70	Listolier	0.000734
71	Geborand	0.000734
72	CountessDeLo	0.000734
73	Napoleon	0.000734
74	Labarre	0.000354
75	Tholomyes	0.000354
76	Jondrette	0.000354
77	Myriel	0.000354