Facebook Ego-Network

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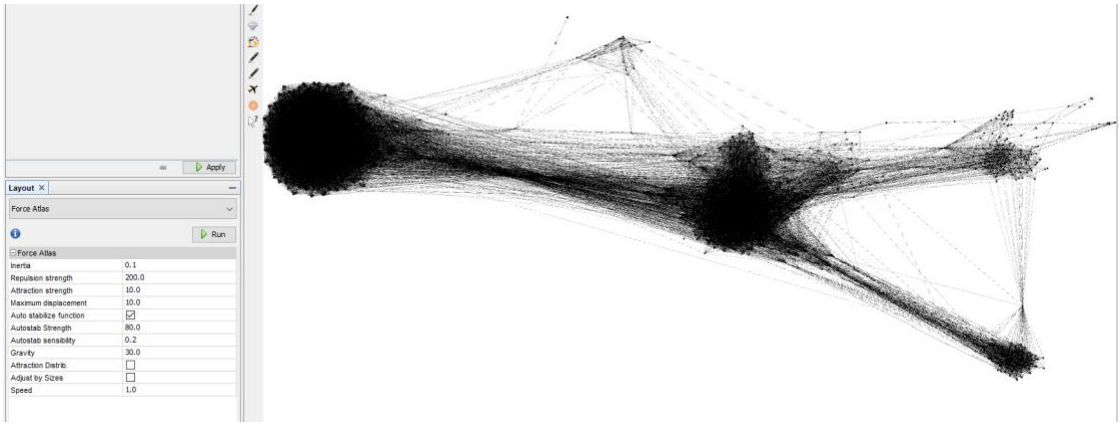
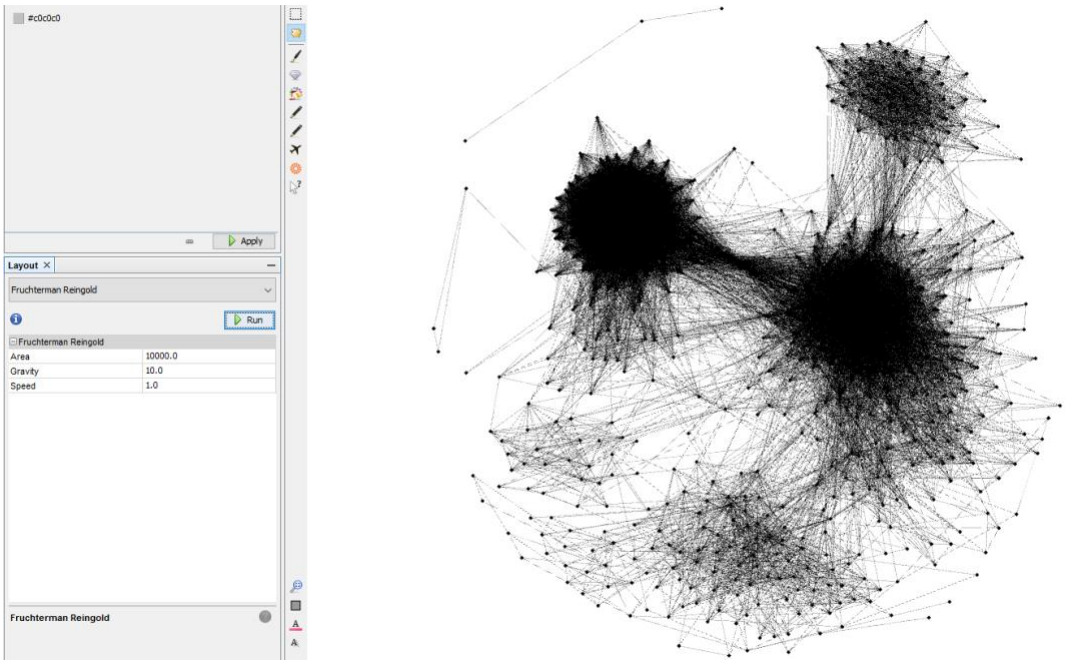
Visualizations

Force Atlas Network

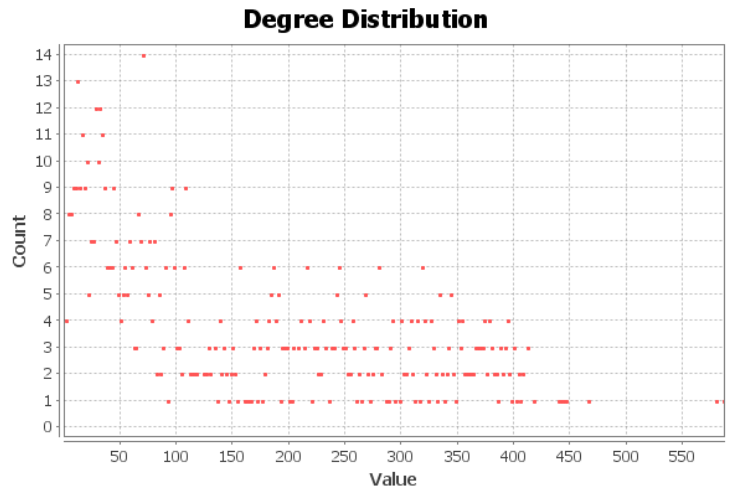


Fruchterman Reingold Network

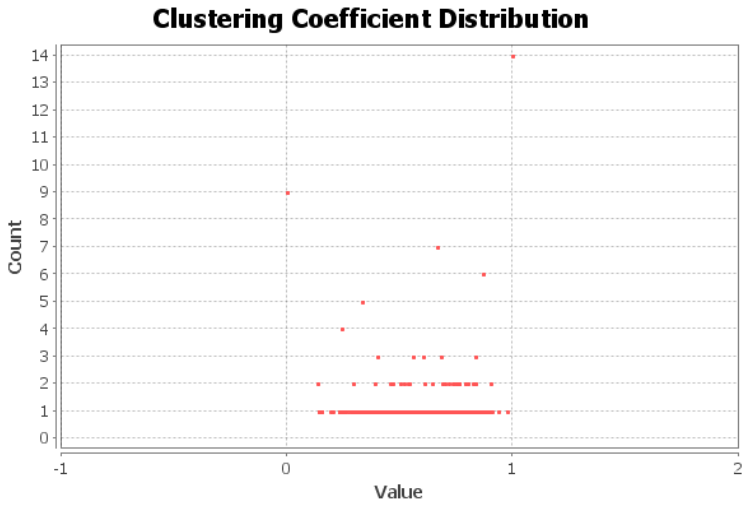


Network characteristics

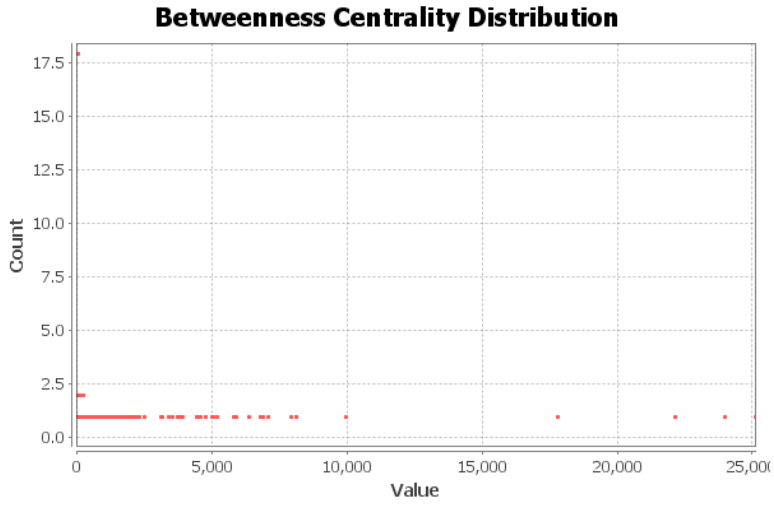
Average Degree: 160.776



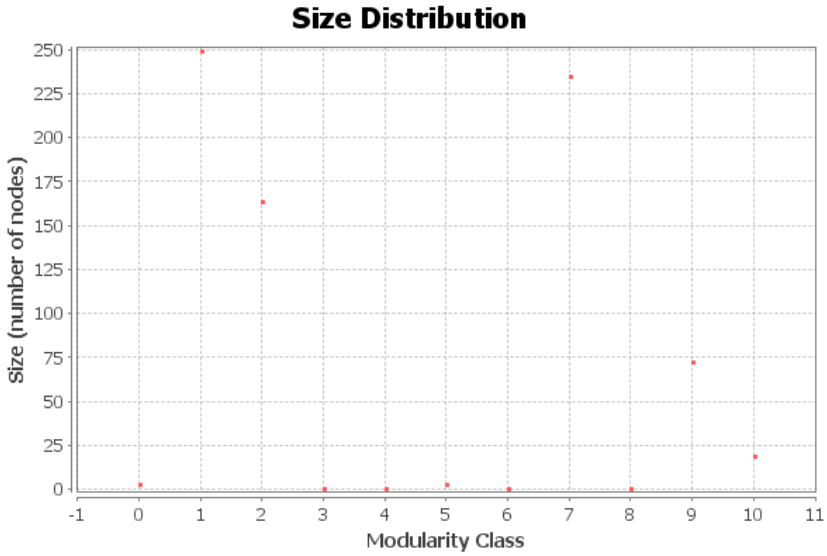
Average Clustering Coefficient: 0.639
Total triangles: 916277
The Average Clustering Coefficient is the mean value of individual coefficients.



Diameter: 7
Radius: 1
Average Path length: 2.558337765332002



Modularity: 0.528
Modularity with resolution: 0.528
Number of Communities: 11



Popularity

Node 2543 has the highest degree.

Id	Degree
2543	586
2347	580
2266	466
1985	446
1941	444
2233	442
2142	440

Node 2313 has the highest betweenness centrality, and node 2543 actually has the third highest betweenness centrality.

Id	Betweenness Centrality
2313	25094.268459
2047	23917.277098
2543	22108.454519
2347	17737.997872
1941	9881.168249
2126	8076.285997
2233	8037.52733

We do see that nodes with high degree generally have high betweenness centrality.

Community structure

Id	Modularity Class	Circle
2202	9	
2207	10	
2490	10	
1924	10	
2047	1	circle0 circle10 circle38 circle41
2183	1	circle0 circle15 circle38
2332	1	circle0 circle15 circle38
1941	1	circle0 circle20 circle38
2094	2	circle0 circle34
2540	2	circle0 circle41
2543	1	circle0 circle7 circle10 circle20 circle38
2015	2	circle1
2658	9	circle1
2009	9	circle1
2645	9	circle1
2297	9	circle1

There are 11 communities in modularity class, but there are 46 circles in the network. Each community is a disjoint set of nodes (no node exists in more than one community), but some nodes exist in multiple circles in the network. Every node must belong to one community, but some nodes do not belong to any circle. More importantly, nodes in the same circle(s) usually belong to the same community (shown in above table). Since each community is disjoint, there are no people (nodes) who act as bridges among communities. However, since there are people (nodes) who belong to multiple circles, they act as bridges among circles.

Clustering

Circle	Clustering Coefficient	Circle	Clustering Coefficient	Circle	Clustering Coefficient
Circle0	0.490696	Circle16	0.80905	Circle32	0.546036
Circle1	0.635754	Circle17	0.690286	Circle33	0.597085
Circle2	0.238095	Circle18	0.582066	Circle34	0.536328
Circle3	0.808241	Circle19	0.505896	Circle35	0.527316
Circle4	0.686062	Circle20	0.750532	Circle36	0.627215
Circle5	0.60875	Circle21	0.592504	Circle37	0.66492
Circle6	0.556367	Circle22	0.505896	Circle38	0.598265
Circle7	0.611229	Circle23	0.421471	Circle39	0.49851
Circle8	0.610605	Circle24	0.666667	Circle40	0.681646
Circle9	0.383333	Circle25	0.666667	Circle41	0.44724
Circle10	0.437761	Circle26	0.562779	Circle42	0.583854
Circle11	0.500403	Circle27	0.697903	Circle43	0.436397
Circle12	0.768953	Circle28	0.547922	Circle44	0.769842
Circle13	0.468838	Circle29	0.605711	Circle45	0.607399
Circle14	0.626311	Circle30	0.0		
Circle15	0.502243	Circle31	0.667255		

The average clustering coefficient of entire network is 0.639. We see that most circles have cluster coefficients around 0.5 and 0.6. Circle 16 has the highest clustering coefficient which is 0.80. Circle 30 has the lowest clustering coefficient which is 0.0. It is surprising that circle 30 has such low clustering coefficient, and this means that the friends in circle 30 are very loosely clustered and do not form any triangle.

Homophily

Below table shows calculated homophily for the 3 most popular features: anonymized feature 53 (feat 1), anonymized feature 55 (feat 2), and anonymized feature 127 (feat 3). The homophily of each feature in a circle is computed by number of people sharing the feature in the circle divided by total number of people in the circle.

Circle	Feat 1	Feat 2	Feat 3	Circle	Feat 1	Feat 2	Feat 3	Circle	Feat 1	Feat 2	Feat 3
Circle0	0.8571	0.7143	0.8571	Circle16	0.5714	1	0.8571	Circle32	0.8333	0.8333	0.8333
Circle1	0.7286	0.7571	0.9429	Circle17	1	1	1	Circle33	0.75	0.75	1
Circle2	1	1	1	Circle18	0.3333	0.3333	0.6667	Circle34	0.6	0.6	0.9
Circle3	1	1	0.75	Circle19	1	1	1	Circle35	0.8182	0.8182	1
Circle4	0.8182	1	0.9091	Circle20	0.8405	0.9009	0.5776	Circle36	0.72	0.6533	0.9067
Circle5	1	0.8333	1	Circle21	0.85	0.8333	0.9833	Circle37	1	1	1
Circle6	0.6667	0.6667	1	Circle22	1	1	1	Circle38	0.8346	0.812	0.9699
Circle7	0.8333	0.8333	0.8333	Circle23	0.7143	0.5714	1	Circle39	0.5	0.5	1
Circle8	0.7	0.6	1	Circle24	1	0	1	Circle40	0.6667	0.6	1
Circle9	0	0	1	Circle25	1	0	1	Circle41	0.7516	0.646	0.9565
Circle10	0.7778	0.7407	0.8519	Circle26	0.8	0.8	0.6	Circle42	0.7857	0.7857	1
Circle11	0.9474	0.8947	0.8947	Circle27	0.8	0.8	0.6	Circle43	0.5	0.5	1

Circle12	1	1	0.8571	Circle28	0	0	1	Circle44	1	1	0.75
Circle13	0.75	0.75	1	Circle29	1	1	1	Circle45	0.8	0.8	1
Circle14	0.75	0.75	0.75	Circle30	1	0.75	1				
Circle15	0.68	0.66	0.94	Circle31	0.7857	0.8571	0.7857				

From above table, we see that the calculated homophilies of each feature for each circle are either very high (close to 1.0) or very low (close to 0.0). In other words, most people within each circle either share the same feature or do not share the same feature. So, this is a direct proof that similar people belong to the same circle, and we conclude that many circles do share similar characteristics.

Since the average clustering coefficient is relatively high across all circles, the networks of nodes within each circle is mostly interconnected. Moreover, there is a total of 751 nodes in the network: 41 nodes do not belong to any circle (41/751 = 5%) but 261 nodes belong to more than one circle (261/751 = 35%). Since there is also a high degree of overlap (bridges) among the circles in the network, the entire network is mostly interconnected.