

# Facebook Friend's Network Analysis

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# Outline

- ① Network Source
- ② Network Preprocessing
- ③ Network Summary
- ④ Structural Analysis
- ⑤ Community Detection

## Network Source - Facebook

- Data has been collected from Facebook using the selenium framework which is popularly known for automation web testing.
- It took 89 hours to collect the data, due to limited number of user actions at a time on Facebook platform.

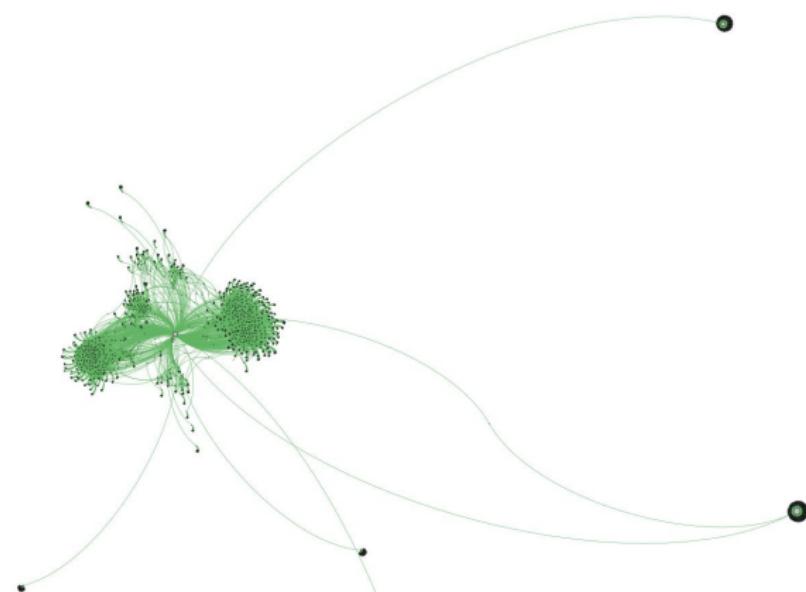


Fig-1 Unprocessed Network

# Network Preprocessing

## ① Centralize the network

Remove friends of friends nodes from network to make it centralize.

## ② Remove low degree nodes

Remove the friends having mutual friends less than 4.

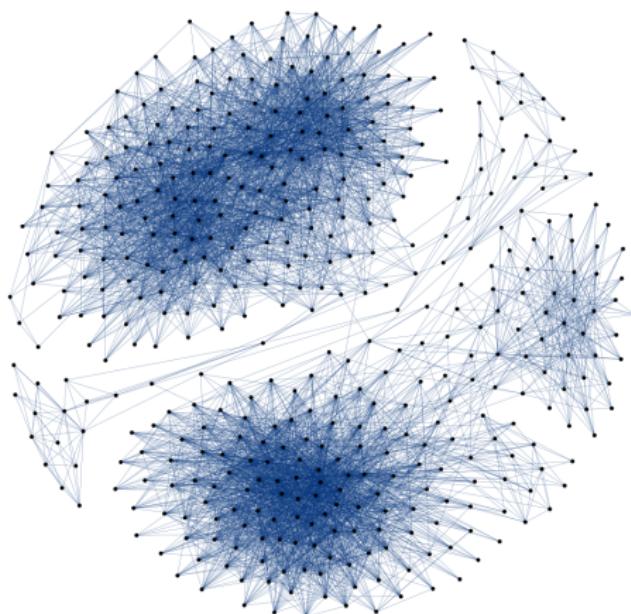


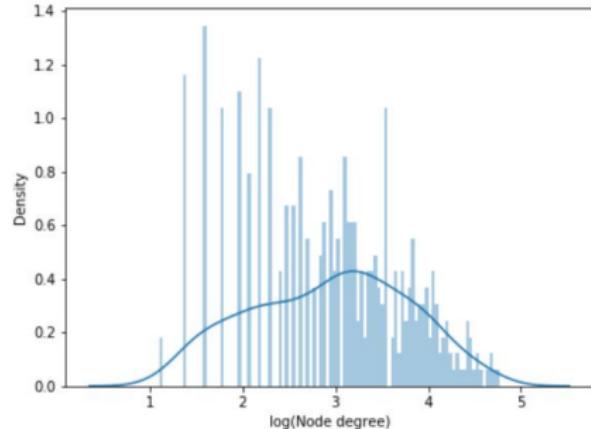
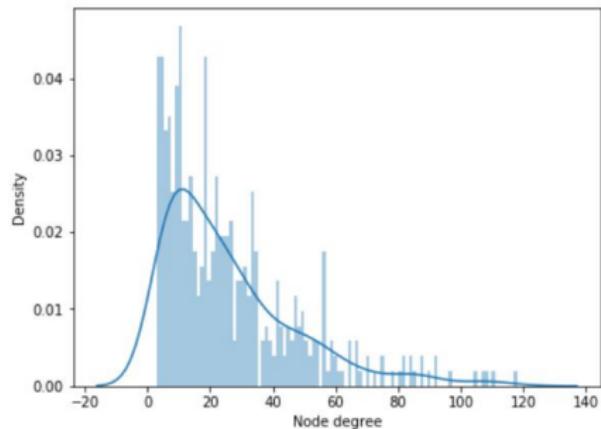
Fig-2 Preprocessed Network

# Network Summary

- Size(number of edges in the network) : 5826
- Order(number of nodes in the network) : 446
- Average Degree: 3
- Average Clustering coefficient: 0.468633
- Network density: 0.0587091
- Node Attributes: Name, Gender, Follower, Hometown, Birthday
- No. of Connected Components: 2
- Giant Component's Diameter: 8

# Degree Distribution

Degree Distribution



# Structural Analysis - Centeralites (Top 5 nodes Interpretation)

## Degree Centerality

- Aditya Kumar Thakur
- Mohammad Javed Ansari
- Talha Ansari
- Mohd Shakir
- Sanjeev Sonu

## Betweenness Centerality

- Talha Ansari
- Er Md Imran
- Sanjeev Sonu
- Mohd Javed
- Arshad Ansari

## Closeness Centerality

- Talha Ansari
- Mohd Javed
- Er Md Imran
- Sanjeev Sonu
- Arshad Ansari

## Eigen-vector Centerality

- Mohammad Javed Ansari
- Mohd Shakir
- Talha Ansari
- Faizan Ansari
- Azhar Chouhan

# Structural Analysis - PageRank

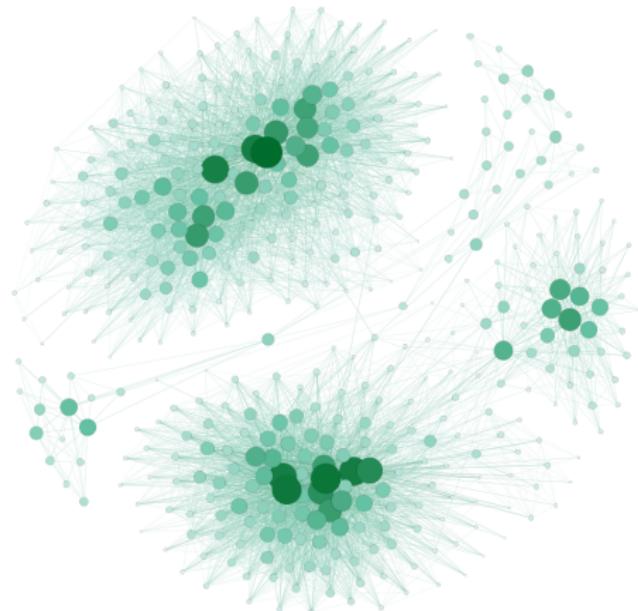
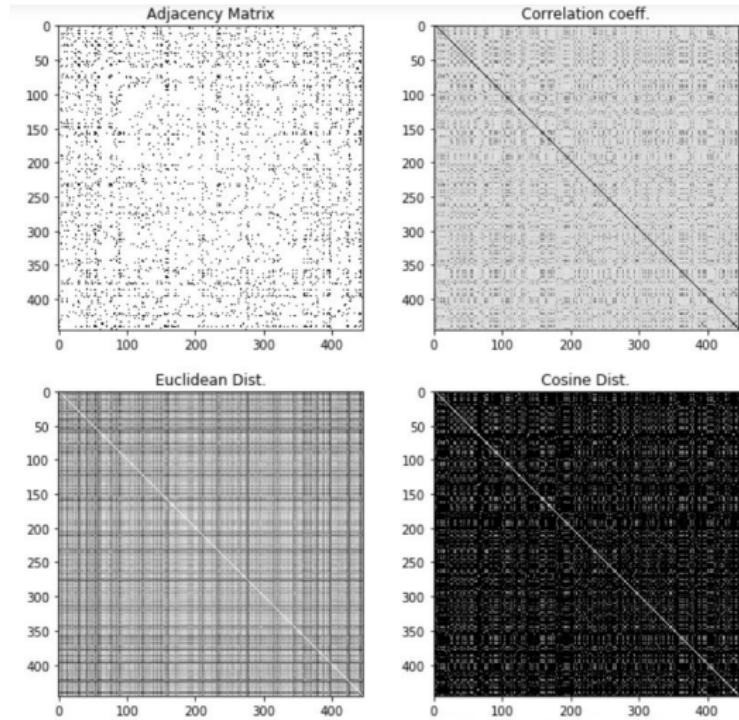


Fig-3 Node size and color based on PageRank

## Page Rank

- Aditya Kumar Thakur
- Talha Ansari
- Mohammad Javed Ansari
- Mohd Shakir
- Arshad Ansari

# Assortativity



- By Follower: 0.043663
- By Birthday: -0.000457
- By Hometown: 0.124714
- By Gender: 0.162277

# Random Graph similar to my SN

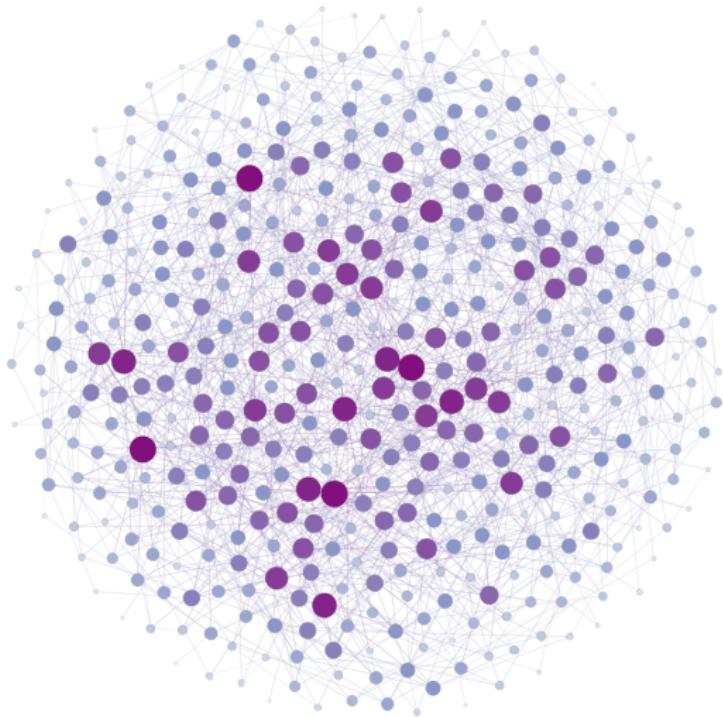


Fig-4 Erdos-Rényi random graph

# Random Graph similar to my SN

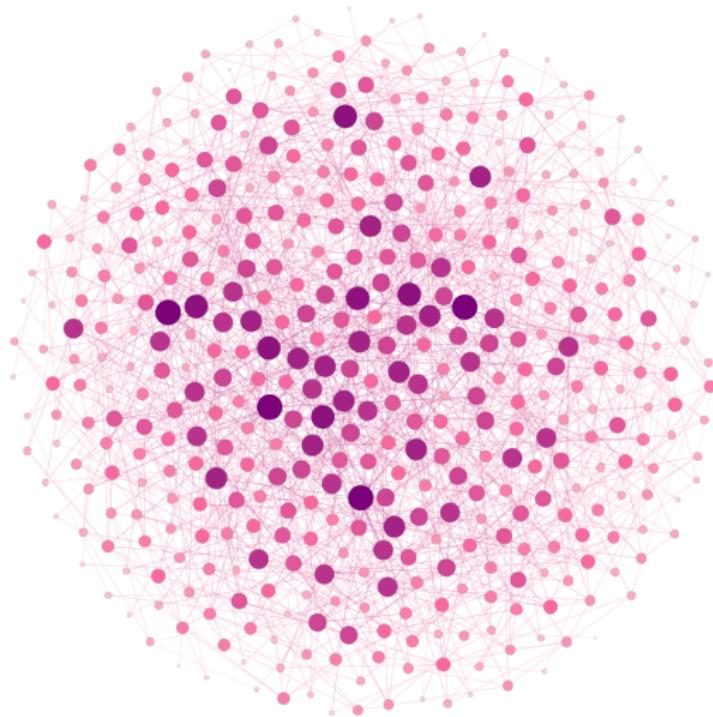


Fig-5 Barabasi-Albert random graph

# Descriptive statistics

	My SN	Erdos-Rényi	Barabasi-Albert
<b>Number of nodes</b>	446	446	446
<b>Number of edges</b>	5826	1388	1329
<b>Maximum degree</b>	118	13	70
<b>Minimum degree</b>	3	1	3
<b>Std degree</b>	21.5851	2.43092	6.6006
<b>Average degree</b>	26.1256	6.22422	5.95964
<b>Median degree</b>	20	6	4

Fig-6 Descriptive statistics of Random Graphs and my SN

# Community Detection - Clique Search

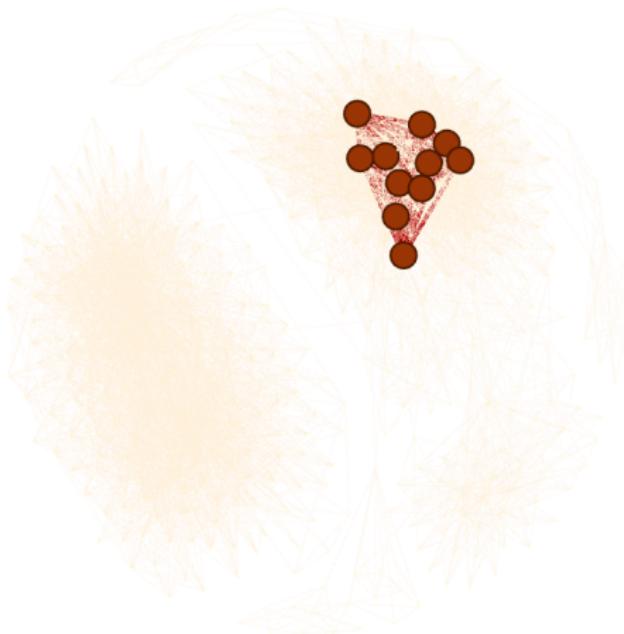


Fig-7 Maximum Clique Graph

## Community Detection (Using Louvain heuristics)

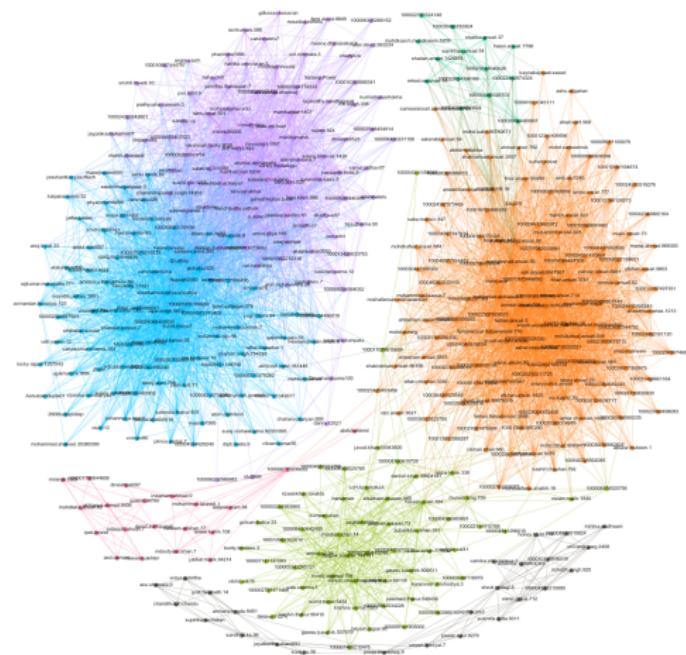


Fig-8 Communities Graph

# Communities Summary

- Gray Community: includes friends from my previous job.
- Orange Community: includes friends from my hometown.
- Green Community: includes friends from school which are connected to 'Orange Community' because my school was in my hometown.
- Light and Sky blue Communities: includes friends from my Bachelor degree University in which Light Blue Community consists 'Faculty of CS&IT' friends and Sky blue Community consists Other faculties friends. That's why, there is strong connectivity between these two communities.

*Thank You!*