

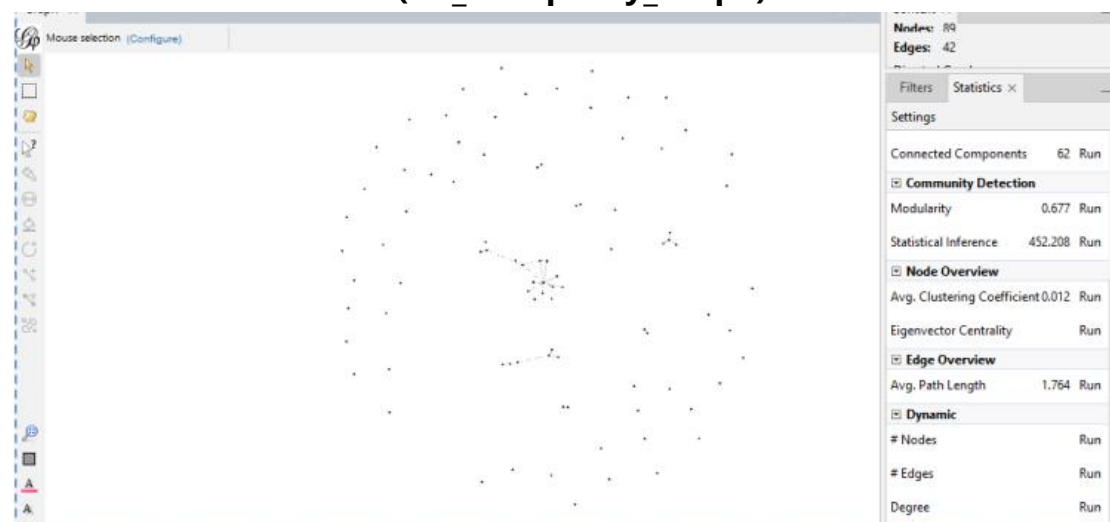
## Social Network Analysis Report

### 1. Introduction

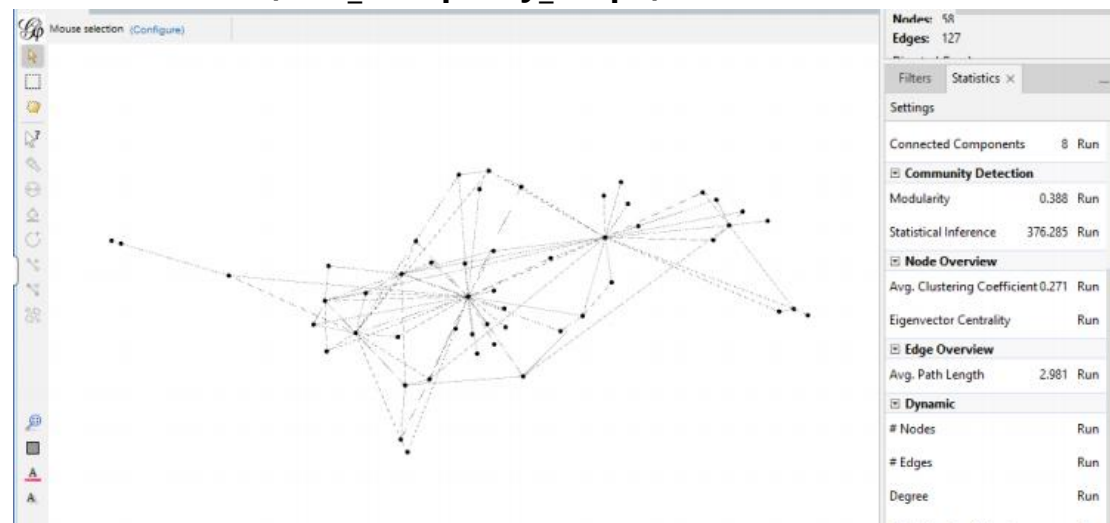
This report presents an analytical comparison between two Twitter subgraphs extracted from the WICO Graph Dataset one originating from the 5G\_Conspiracy collection (representing a misinformation environment) and the other drawn from the Non\_Conspiracy set (representing typical online interactions). The purpose of this comparison is to highlight how structural network characteristics differ between misinformation driven activity and standard social engagement.

### Presentation of the Selected Networks

#### Misinformation Cluster (5G\_Conspiracy\_Graph)



## Normal Cluster (Non\_Conspiracy\_Graph)



### 3. Network Measurement Summary

Metric	Normal Network (Non-Conspiracy)	Misinformation Network (5G Conspiracy)
Number of Nodes	58	89
Number of Edges	127	42
Average Degree	2.190	0.472
Graph Density	0.038	0.005
Average Clustering Coefficient	0.271	0.012
Modularity (Q)	0.396	0.685
Number of Communities	13	63
Weakly Connected Components	8	62
Strongly Connected Components	29	76
Diameter	7	4
Average Path Length	2.980	1.764

## 4. Comparative Analysis of Both Networks

This comparison explains the main findings from the two networks the Normal interaction network and the Misinformation (5G Conspiracy) network and compares their structural behavior based on the metrics.

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### 1. Connectivity and Interaction Patterns

The Normal network demonstrates noticeably stronger interaction between users. Its higher number of edges (127 vs. 42) and larger average degree (2.19 vs. 0.47) **indicate that individuals in this network tend to communicate with multiple others.**

In contrast, **the Misinformation network is extremely sparse.** Most users interact with only one other account none suggesting a pattern typical of automated posting, one-directional sharing, or weak engagement among participants.

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### 2. Network Density and Engagement Level

The Normal network is much denser (0.038) than the Misinformation network (0.005).

This means that connections among normal users **are far more frequent and consistent, while the misinformation environment shows very limited cross-interaction.** The low density in the misinformation network reflects a broadcast style structure rather than a conversational one.

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### 3. Community Structure and Organization

The two networks differ drastically in how their communities form.

The Misinformation network has 63 separate communities with a very high modularity score (0.685). This indicates that the network is highly fragmented, with many isolated pockets of users who rarely interact outside their small groups.

The Normal network, however, forms only 13 communities and shows a lower modularity value (0.396). **This means discussions are more interconnected**, with smoother communication between groups.

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#### 4. Clustering and Group Cohesion

Clustering further highlights the contrast:

The Normal network has a high clustering coefficient (0.271), **meaning users often form triangles groups where multiple users interact with each other.**

**The Misinformation network has a very low clustering coefficient (0.012), showing almost no triadic relationships.** Users rarely engage in mutual conversations, reinforcing the idea of separated, isolated interactions.

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#### 5. Network Connectivity

The structure of the misinformation graph is extremely fragmented: 62 weakly connected components and 76 strongly connected components.

**This indicates many isolated nodes** and almost no broad structure linking users together.

**The Normal network is much more cohesive, with only 8 weakly and 29 strongly connected components**, showing more integrated communication and larger connected groups.

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#### 6. Information Flow and Reachability

The Misinformation network has a shorter diameter (4) and a smaller average path length (1.76).

This suggests information moves quickly from central accounts outward without passing through many intermediaries typical in networks driven by a few active sources.

The Normal network has a larger diameter (7) and longer path length (2.98), **indicating deeper, multi step conversations and more layered communication.**

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## Summary of the Comparison

In conclusion, the Normal interaction network behaves like a healthy social ecosystem:

**Users interact frequently**

**Communities are connected**

**Conversations are richer and more mutual**

The Misinformation network, on the other hand, shows signs of:

**Fragmentation**

**Low engagement**

**Weak clustering**

**Sparse, one-directional communication**

These differences **highlight** how misinformation spreads differently: through disconnected pockets, automated patterns, and minimal user to user interaction.