Data Driven Strategic Management Project : Facebook TV Show Interactions

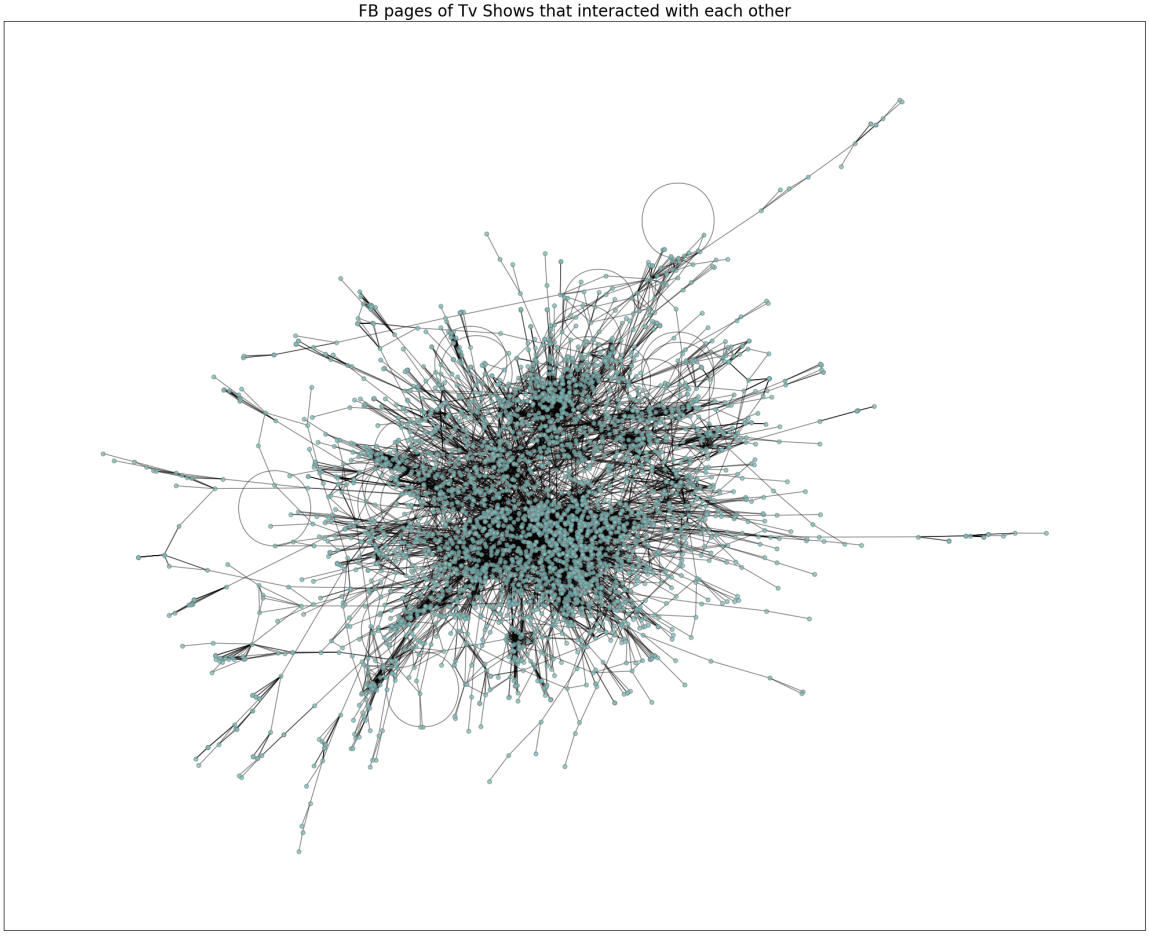
Introduction:

This Report uses a social network of tv-show facebook pages. This network is about mutually liked facebook pages where Nodes represent the pages and edges are the mutual likes among them.This Data was collected about Facebook pages (November 2017). These datasets represent blue verified Facebook page networks of different categories.

Network Structure and Visualization:

This is the Initial Analysis of the Network. As shown in the figure the network is highly connected with only 1 single component. A lot of different communities can also be seen within the graph that represent perhaps the shows of similar genres while some nodes remain distant from all the communities.These distant nodes might be niche TV-shows that are not part of any big genres.

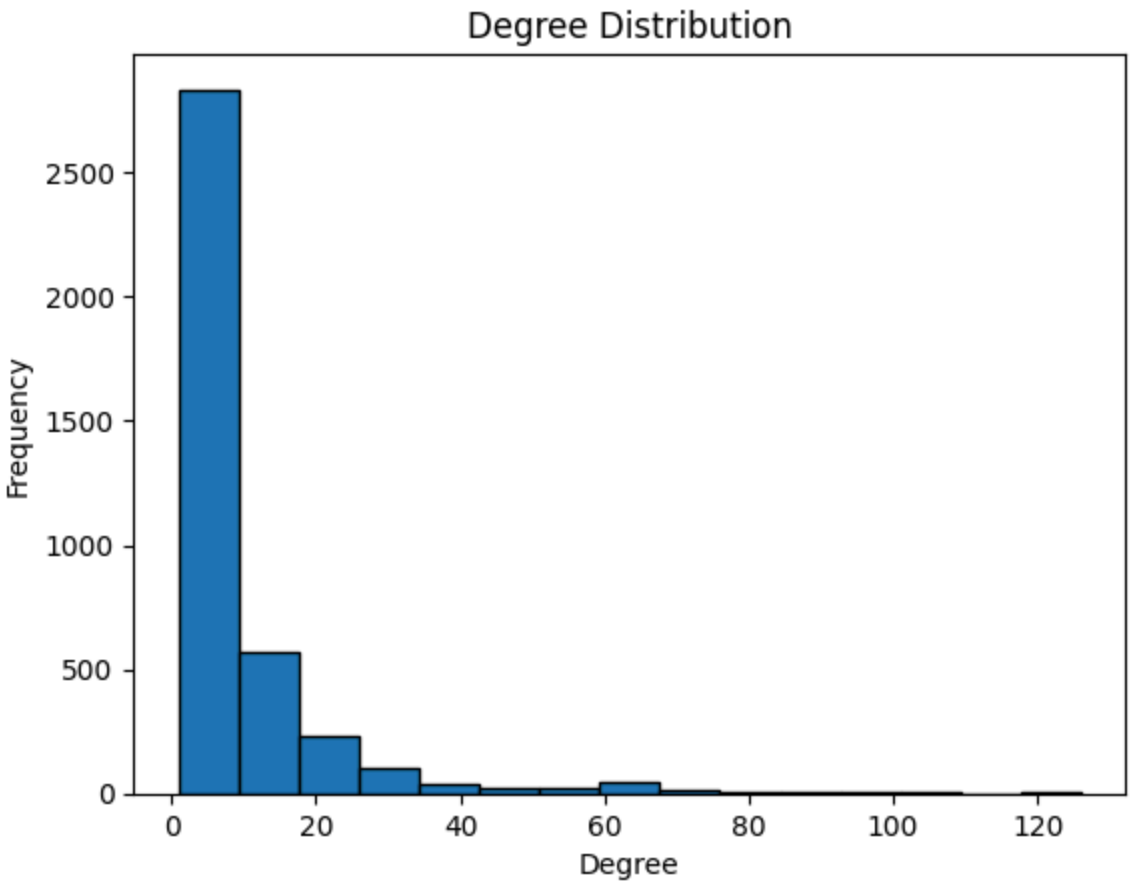
FB pages of Tv Shows that interacted with each other



Network Analysis:

Degree Distribution

The degree distribution is a skewed distribution, implying the presence of a few highly connected pages (hubs) while most tv shows have fewer connections. This indicates a network with influential players alongside a broader base of less connected pages.



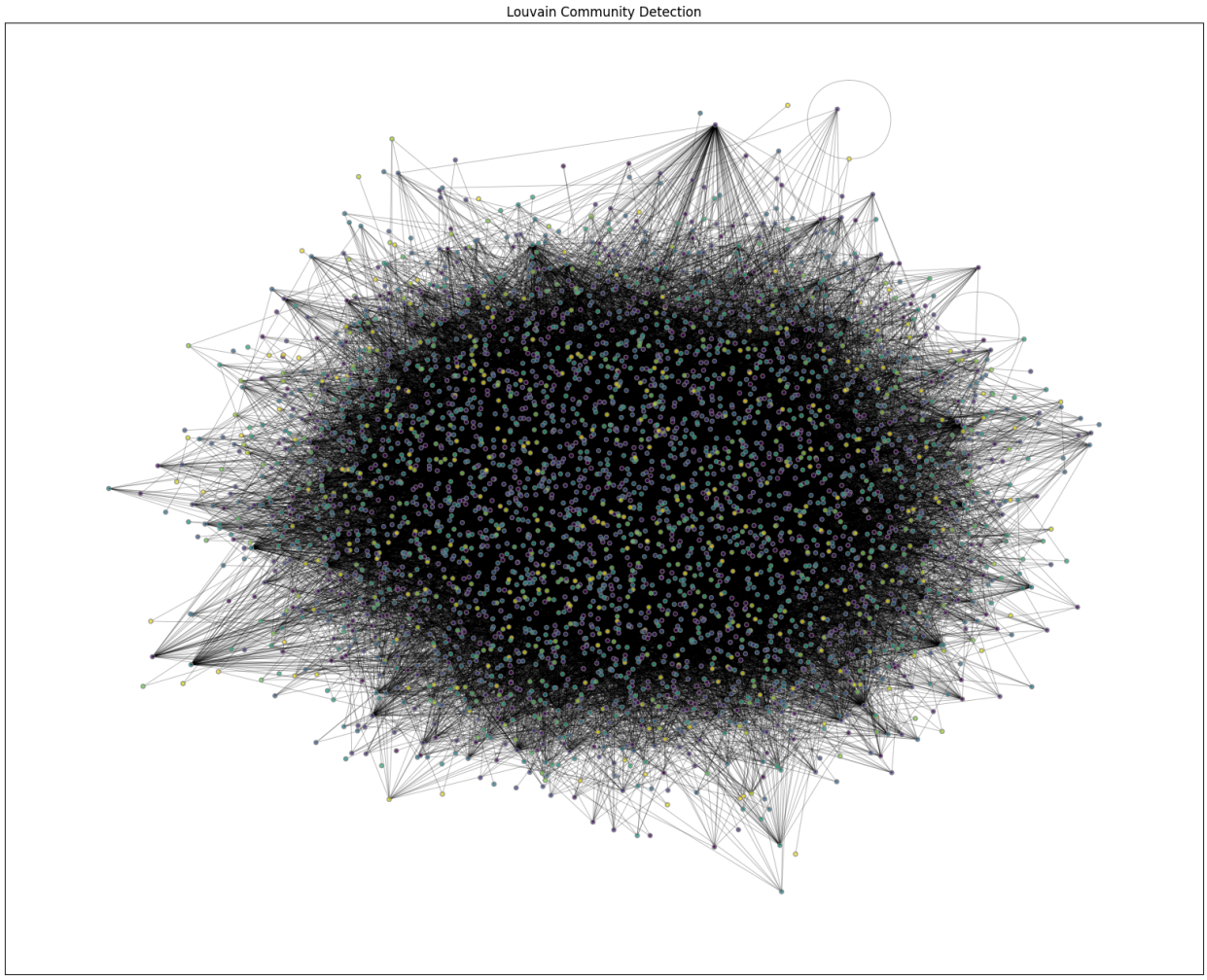
Centrality Measures

- Largest component size is 3892
- Path Analysis gave us the Average Shortest path as : 6.3 (suggests a small-world network where most nodes are closely connected.)
- Network Diameter is : 20
- Average Clustering Coefficient: 0.37
- Network Density: 0.002
- Top most influential nodes by various centrality:
  - Degree Centrality : Queen of the South, Centrality: 0.03
  - Betweenness Centrality:Queen of the South, Score: 0.105
  - Closeness Centrality: Queen of the South, Score: 0.26
  - Eigenvector Centrality: So You Think You Can Dance, Score: 0.139

    - Page Rank: Home & Family, Score: 0.00306
- (TV shows like So You Think You Can Dance and Queen of the South are highly influential within the network.)

Community Detection

By Using Louvain Community Detection we found out that there are 50 different communities in our network. These communities that tightly connected together perhaps represent different genres or Tv Shows like Comedy, Horror etc. But maybe a combination of different genres as well. There might be groups of TV show pages that are from different genres but has a similar consumer base, making them interact with each other despite their differences.



Comparison with Random Graph Models

Degree Distribution:

The Erdős–Rényi graph's degree distribution is more uniform compared to the real network.The ER graph follows a Normal Distribution ,but the real network does not.

The real network has a steep drop in degree distribution, same as Barabási network(BA). The BA model produces a similar degree distribution as the real network.

Unlike the real network's skewed distribution, the Watts Strogatz Model has a more uniform degree spread, that means it is highly connected.

Connected Components:

All networks are fully connected, meaning every node is reachable from any other. However, due to the randomness in Erdős–Rényi(ER) it sometimes ends up with different number of components than the real network.

Shortest Path & Diameter:

The average shortest path length in the ER model is much smaller compared to the real-world network.

The BA model has a much shorter average shortest path length (3.62 < 6.27) and a smaller diameter (6 < 20). This suggests the real network has longer-range connections, whereas the BA model paths are generally shorter.

The Watts-Strogatz (WS) model exhibits high clustering similar to the real network, but it has a longer shortest path and diameter, thus, it is less efficient in connectivity.

Clustering Coefficient:

The real network (0.37) has a much higher clustering coefficient than the BA model (0.0128). This means the real network has more local communities, while the BA model forms weak local clustering.

Network Density:

Both The real and the BA networks have similar density (~0.0023 real vs. ~0.0020 BA), that means they have similar connectivity levels.

Centrality Measures:

ER graphs don’t have hubs like the real network; most nodes have similar degrees. Betweenness Centrality: ER graphs don’t form bottlenecks, leading to much lower betweenness values.

In both networks, the top-ranked nodes in degree, betweenness, and eigenvector centrality act as major hubs. However, the BA model overemphasizes the importance of a few nodes, leading to higher concentration of influence compared to the real-world distribution.

The WS model distributes centrality more evenly across nodes, while the real network has distinct influential hubs.

Strategic Management Implications

The insights derived from network analysis have direct implications for strategic management in the entertainment industry:

- **Influencer Marketing:** Highly central TV show pages, identified through centrality analysis, represent potential influencers for marketing collaborations. Partnering with these influential pages can broaden reach and amplify brand awareness.
- **Content Recommendation:** Leverage community detection results to personalize content recommendations for users based on their preferred genres or communities, improving engagement and satisfaction.
- **Competitive Analysis:** Analyze the network structure to identify competing TV shows and their market relationships. This information can guide strategic positioning and content development to stand out in the competitive landscape.
- **Risk Management:** Assess network robustness through simulated node removal, identifying vulnerabilities and developing strategies to mitigate potential risks.

Conclusion

Data-driven strategic management empowers informed decision-making in the entertainment industry. By analyzing the network of Facebook TV show interactions, businesses can glean valuable insights into audience preferences, influencer identification, and competitive dynamics. These insights guide strategic actions to enhance marketing effectiveness, content creation, and risk management.