**Assignment 3 Report: Critical Analysis**

**Introduction**

Startups often struggle to get noticed by large acquirers — not because their products aren’t good, but because they lack the right connections.

In this project, we use network science to solve that problem by analyzing board director relationships across companies.

Our goal is to find key individuals who can help a startup like ours reach influential buyers.

This report is structured around five tasks. We expand on the work from Assignment 1 by improving the code, introducing new features, and tailoring our results for a non-technical audience.

**Task 1: Extending Centrality Metrics**

In Assignment 1, we used degree centrality and eigenvector centrality to find important directors based on how connected they are.

In Assignment 3, we added a new layer:

- Betweenness Centrality: This helps us identify directors who serve as bridges between different groups of companies. These are the connectors — the people who can introduce us to acquirers outside our immediate network.

Why this matters: Sometimes the most connected person isn’t the most valuable — the person who can connect two worlds might be the one who can unlock real opportunity.

**Task 2: Improving the Code**

We took a close look at the original code and made a few important changes:

- Renamed Variables: Instead of using generic names like df, we used directorships\_df to make it clear what the data represents.

- Cleaned Graph Logic: Removed redundant steps and clarified how the graph is built.

- Commented Code: Every step now includes a plain English explanation.

- Documented Model Parameters: We explained values like eps and min\_samples in DBSCAN so future readers understand why they were chosen.

Why this matters: Clean code isn’t just about aesthetics — it helps others (especially non-technical stakeholders) understand, trust, and potentially reuse our work.

**Task 3: Exploring a New Feature – Software Background**

We introduced a new column: software background, which identifies whether a director has experience in the software/tech industry.

This feature was selected because:

- Directors from a software background are more likely to understand tech-based value propositions.

- They may have stronger ties to acquirers or VCs in the tech ecosystem.

- They’re often more open to startup-style innovation and exits.

We visualized this feature on the network graph using colors, so we could spot clusters of tech-savvy directors easily.

Why this matters: We want allies who get us — people who speak the same language and can advocate for our acquisition internally.

**Task 4: Proposing an External Dataset**

To make our network even more insightful, we suggested bringing in external data from:

- Crunchbase or PitchBook: These databases track funding rounds, acquisitions, and board memberships. With them, we could:

- Identify directors involved in past acquisitions.

- Prioritize those with a track record of getting deals done.

- Combine our network graph with historical success data.

Why this matters: It’s not just about who you know, but what they’ve done. This makes our model much more action-oriented.

**Task 5: Communicating to a Non-Technical Audience**

Simplifying the Story for Investors

We tailored our results for a business audience by:

- Using clear, clean visuals: Nodes are color-coded by software experience, sized by influence.

- Writing legends in plain language: No jargon.

- Creating a pitch-ready takeaway:

“We analyzed over 1,000 directors and found five individuals who are perfectly positioned to help us get acquired by major players.”

**Addressing Ethical Considerations**

We also reflected on the ethics of this project:

- ✅ Used publicly available data only.

- ✅ Did not make personal judgments — we only analyzed connections.

- ✅ Promoted transparency: Anyone we approach should know how and why we identified them.

- ❌ Avoided bias in interpreting metrics.

Conclusion: As long as we use this analysis to build respectful, honest relationships, the approach is ethical.