MSc Data Science

Course: DSCD 609 Social Networks and Graph Analysis

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Network Analysis of Research Group Connections

The purpose of this assignment is to construct and analyze a social network representing the relationships among members of my research group/department. A graph-based approach was used to model interactions, compute key network statistics, and visualize structural patterns using Python (NetworkX). Each node represents an individual member of the research group, and each edge represents a relationship such as collaboration, communication, shared coursework, or project participation. The dataset was constructed manually based on known interactions within the group.

A simple undirected graph (G = (V, E)) was created, where:

- (V) = set of members (nodes)
- (E) = set of pairwise relationships (edges)

This model is appropriate because relationships are reciprocal and do not require directionality.

Number of Nodes and Edges

Number of nodes (|V|): 7, there are 7 nodes, representing Dr. Ackah, Bismark, Naana, Joseph, Mike, Priscilla, Fred

Number of edges (|E|): 12, there are 12 edges, representing the collaboration or relationship links between members

Degree Distribution

The degree of a node is the number of connections a node has.

Degree of 6 - Dr. Ackah.

Degree of 3 - Bismark, Naana, Joseph, Mike, Priscilla and Fred

Isolated Nodes.

There are no isolated nodes. Every member is involved in at least 3 relationships. This indicates a cohesive network with good collaboration and no disconnected individuals.

Visualization

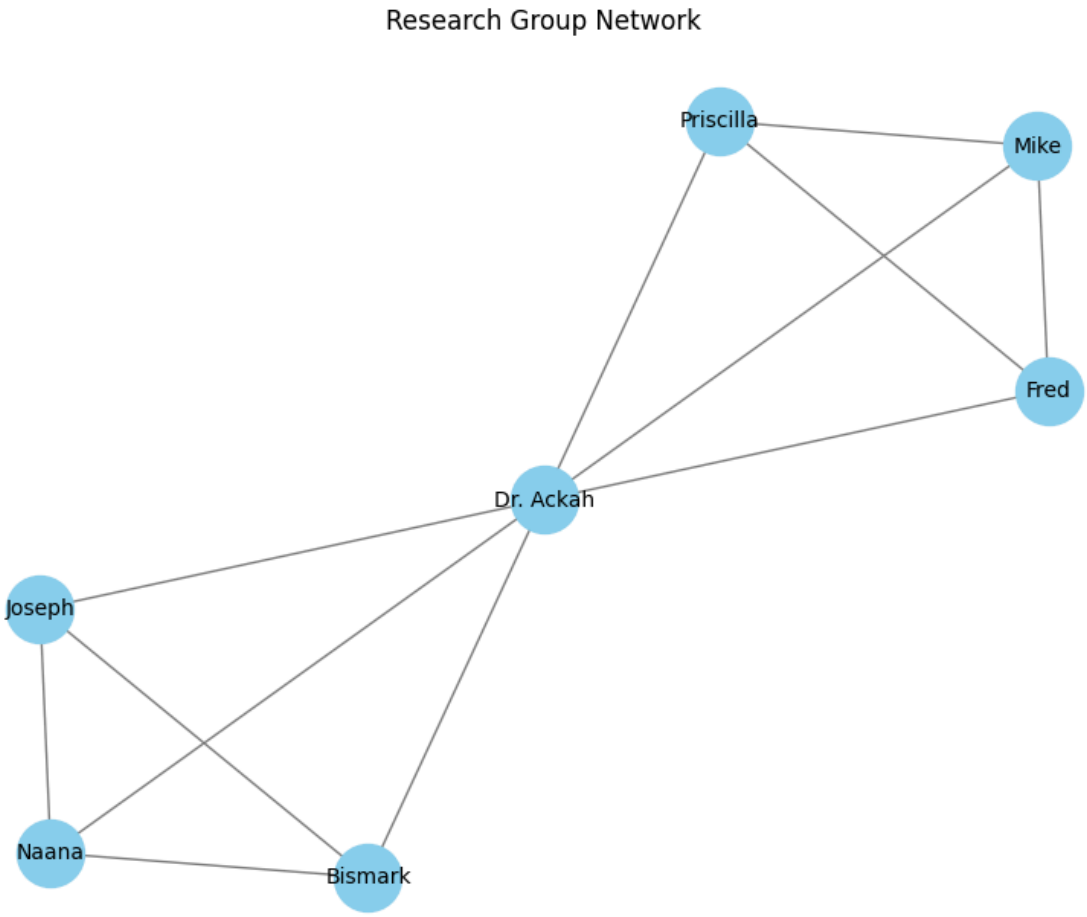
The network consists of 7 nodes (Dr. Ackah, Bismark, Naana, Joseph, Mike, Priscilla, and Fred) and 12 undirected edges representing collaboration or supervision relationships.

Dr. Ackah connects to all six others, reflecting a supervisory role.
The students form two tightly knit subgroups: (Bismark, Naana, Joseph) and (Mike, Priscilla, Fred), each fully connected internally.

The degree distribution shows one highly central node (Dr. Ackah, degree 6) and six nodes of equal degree (3).

There are no isolated nodes, meaning every member has multiple connections in the research network.

Below is the python code in google colab and the screen shot Research Group Network



This network analysis provides a structural understanding of how the research group interacts. It highlights the central node, collaboration patterns, and opportunities to improve connectivity. The network visualization and metrics help reveal underlying social dynamics that may not be obvious from observation alone.