

VIRGINIA STATE UNIVERSITY FACULTY COLLABORATION NETWORK DASHBOARD

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Data Science For The Public Good(DSPG)



Project Objective



Project: VSU Social network
analysis of research collaborations



Project Goal: Develop a dynamic
dashboard to analyze and visualize
research collaborations among
VSU faculty

Background

Network analysis studies complex networks of interconnected entities, with the entities represented as nodes and their connections as edges.

Network Analysis Concepts:

- **Nodes:** Represent faculty members
- **Edges:** Illustrate collaborations between faculty
- **Centrality:** Measures the importance and influence of nodes within the network(Ex. degree, closeness, etc.)
- **Community Detection:** Identifies and reveals clusters or groups of closely connected nodes (help identify clusters of faculty members who frequently collaborate with each other, potentially highlighting research groups or collaborative teams.)

Why Network Analysis:

- **Purpose:** To visualize and understand the structure of research collaborations
- **Goal:** To uncover key patterns and insights within the collaborative network

Data Sources

The data set was provided to us, and it includes key details such as:

- **Request Amount:** The funding or resource amount requested.
- **Submission Date:** When the request was submitted.
- **Collaboration Type:** The nature of the collaboration (e.g., interdepartmental, not collaborative).
- **Team:** The team involved in the collaboration.
- **Faculty Members:** Names of the faculty members participating.
- **Department:** The department each faculty member belongs to
- **Project Title:** The title of the collaborative project.

Data Analysis

Tools I use to construct the project:

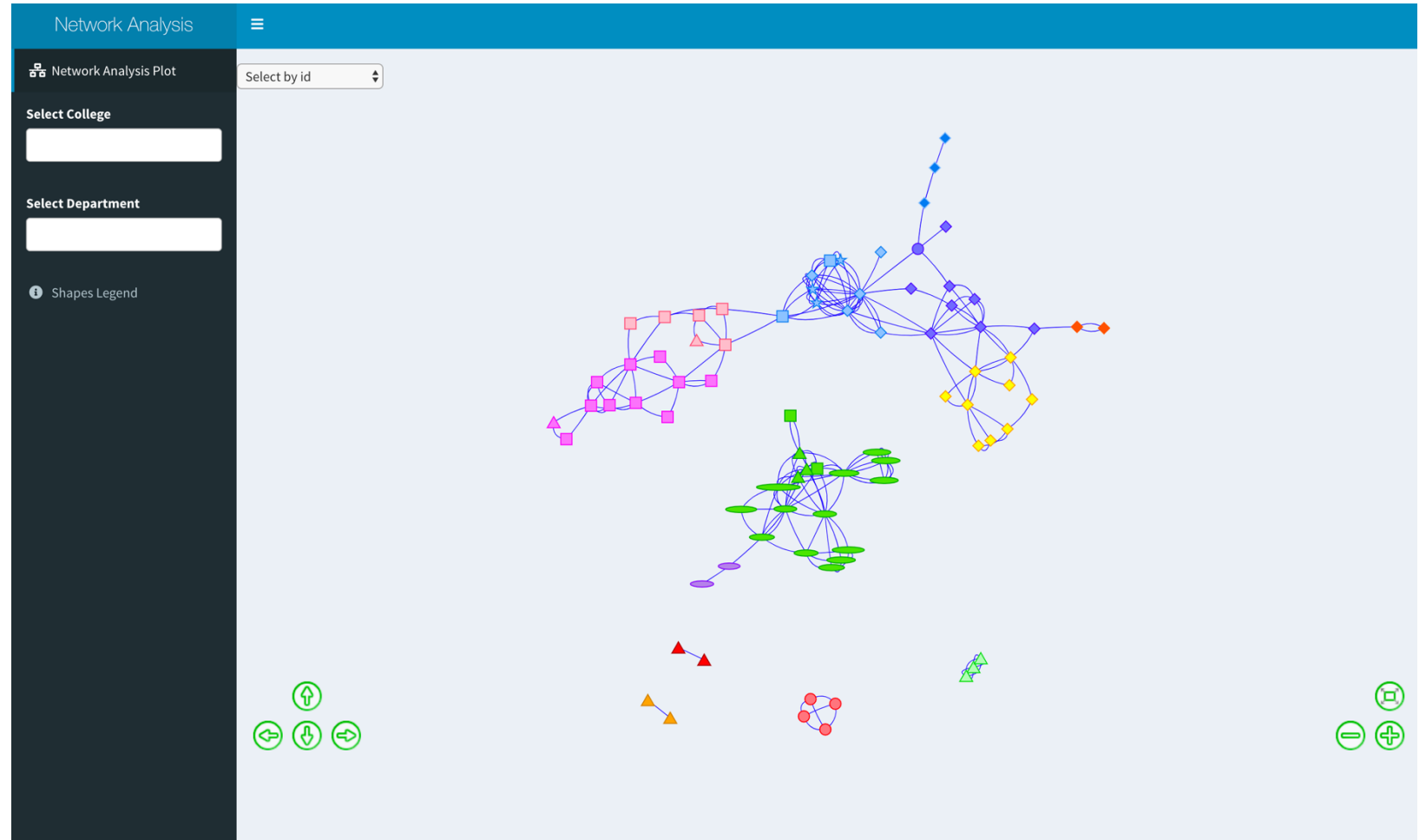
- **R and RStudio:** A language for developing the Shiny dashboard, graphs, table, and more.
- **Shiny:** R package for building interactive web applications.
- **Data Manipulation:** dplyr, tidyr, readr (all R packages to help read, filter, and clean data)
- **Visualization:** ggplot2, visNetwork, igraph (R packages to help create visual such as network plot)

Techniques I use to construct the project:

- **Data Collection and Preparation:** Import, clean, and prepare data.
- **Network Analysis:** Visualize collaborations with igraph or networkD3
- **Shiny Dashboard Design:**
 - **UI Design:** Layout with fluidPage, sidebarLayout.
 - **Server Logic:** Reactive expressions and rendering outputs.

Key Insights

- Most collaborations occur within the same department. This suggests strong internal networks within departments.



Interpretation and implications

Interpretation:

- The dashboard provides a clear and intuitive visual representation of how faculty members collaborate, making it easier to identify trends and key members in the network graph.
- The dashboard also gives the viewer information about each nodes such as degree, betweenness, closeness, eigenvector, college, and department

Implications:

- Faculty members can use the insights from the dashboard to make informed decisions about funding opportunities and strategic initiatives to promote further collaboration.

Challenges and Future Directions

Limitations:

- The data already have existing records of faculty collaborations, which might be incomplete or outdated. Some informal or unpublished collaborations may not be recorded in the data

Future Directions:

- Continue to refine and enhance the dashboard, making it more user-friendly and accessible to different stakeholders, including faculty, administrators, and external partners.
- Conduct longitudinal studies to track changes and trends in collaboration patterns over time.



QUESTIONS?



THANK YOU