Centrality Analysis of Economic Network Graph Using Rust

In this project, I have developed a Rust-based application for analyzing graph data, focusing on an economic network dataset obtained from Network Repository (https://networkrepository.com/econ-beacxc.php). The goal was to explore various centrality measures, which can provide insights into the most influential nodes within this network.

The main objective was to process the provided dataset, representing an economic network, and calculate three types of centrality measures: degree, closeness, and betweenness. These measures are crucial for understanding the influence and importance of individual nodes in an economic context.

The dataset used is the "econ-beacxc" dataset from Network Repository. It represents a bipartite network of countries and the products they are known to export. Each node represents either a country or a product, and each edge signifies that a country exports a particular product. This dataset is particularly interesting as it provides insights into global economic patterns and relationships.

The project consists of four Rust modules:

* graph\_utils.rs: This module offers basic graph operations, such as printing the graph's size.
* centrality.rs: It computes the centrality measures for nodes in the graph.
* parser.rs: Handles the parsing of the dataset from a CSV file into a graph structure.
* main.rs: The main driver of the application, orchestrating the overall process.

On execution, the program outputs:

* Basic Graph Information: The total number of nodes (countries and products) and edges (export relationships) in the graph.
* Centrality Measures: For each node, the program calculates and displays:
  + Degree Centrality: Indicating how connected a node is.
  + Closeness Centrality: Showing how close a node is to all other nodes.
  + Betweenness Centrality: Highlighting nodes that serve as bridges within the network.

My program effectively handles the complexity of the economic network dataset, providing valuable centrality analyses. These analyses offer a deeper understanding of the key players in the global export network, highlighting influential countries and products. The modular design of the application also allows for easy adaptation to other graph datasets and additional types of analyses in the future.