

Clustering and Fitting Analysis

Introduction:

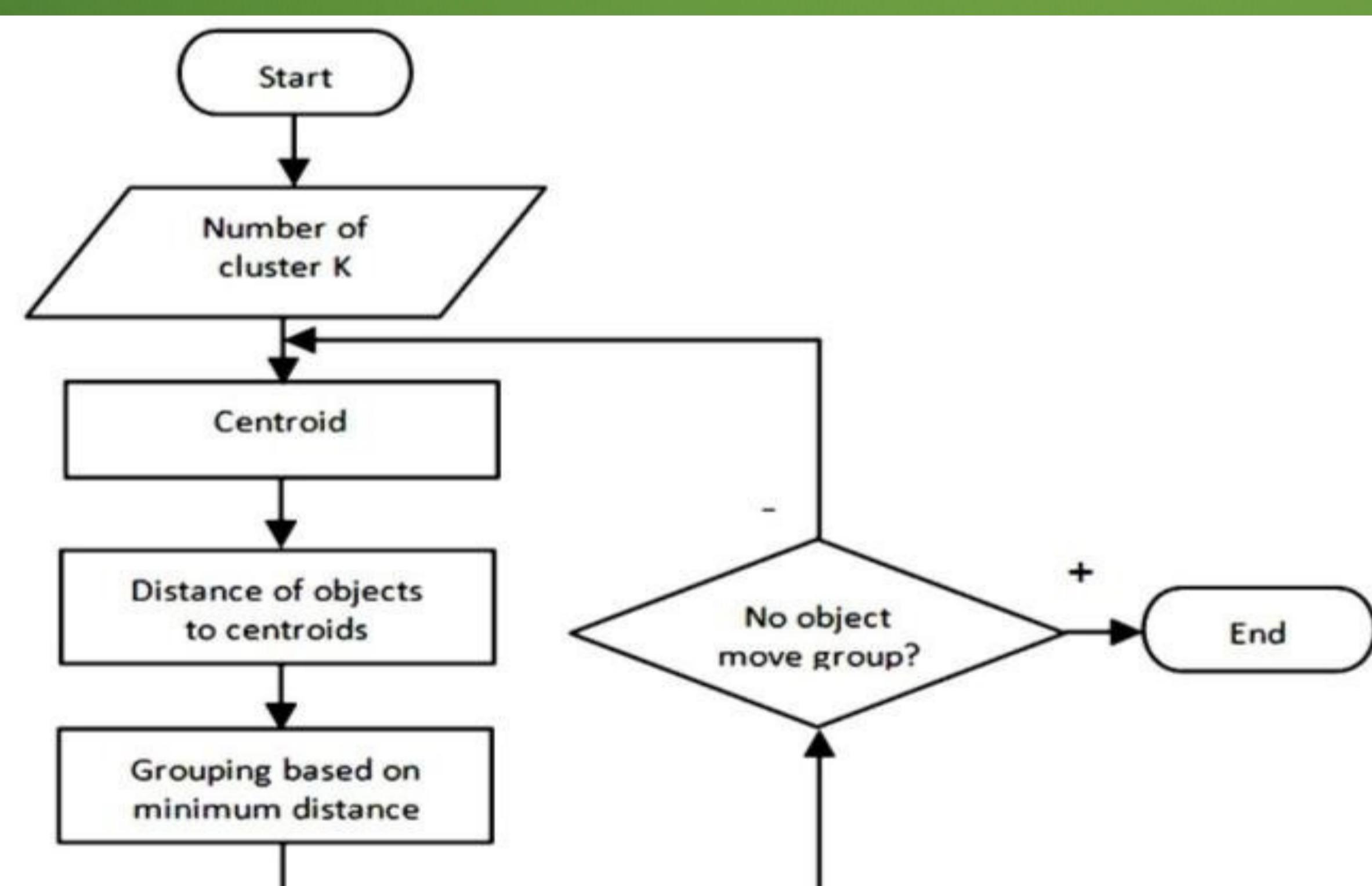
This documentation provides an overview of the codebase, functionalities, and methodologies applied in analysing and visualising balance of payments data taken from the world bank. The project consists of two main parts: clustering analysis and curve fitting for predictive modelling.

AIM:

- An international financial organisation called the World Bank helps developing nations with initiatives and programmes related to development by offering both financial and technical support. Its main objective is to promote economic growth and reduce poverty by providing grants, loans, and professional guidance.
- GDP percentage of current account balance:
 - ❖ This measure shows how well a nation is balanced between its investments and savings. It comprises net current transfers, net income from overseas sources, and the trade balance.
- Foreign Direct Investment, Net Inflows (% of GDP):
 - ❖ This measures the net inflow of foreign direct investment relative to the country's GDP. It reflects the amount of investment from foreign entities into the country.
- Foreign Direct Investment, Net Outflows (% of GDP):
 - ❖ Conversely, this indicator measures the net outflow of a country's direct investment to other nations as a percentage of its GDP.
- Receivables from Individuals as a Percentage(% of GDP):
 - ❖ Personal transfers represent the financial transitions made by individuals working abroad back to their home country. This indicator reflects the significance of remittances in the national economy.
- Travel Services (% of Service Exports, BoP):
 - ❖ This metric assesses the proportion of a country's service exports that come from travel-related services, such as tourism.
- Travel Services (% of Service Imports, BoP):
 - ❖ Similar to the previous indicator, this measures the share of service imports related to travel.
- Transport Services (% of Service Exports, BoP):
 - ❖ This indicates the percentage of a country's service exports related to transportation services.
- Transport Services (% of Service Imports, BoP):
 - ❖ Like the previous indicator, this measures the share of service imports related to transportation.
- Trade in Services (% of GDP):
 - ❖ This reflects the value of services traded internationally as a percentage of the country's GDP.

Clustering:

In machine learning and data analysis, the process of clustering is putting related data points in one group according to specific traits or attributes. Finding innate structures or patterns in a collection without the need for labels is the aim of clustering..

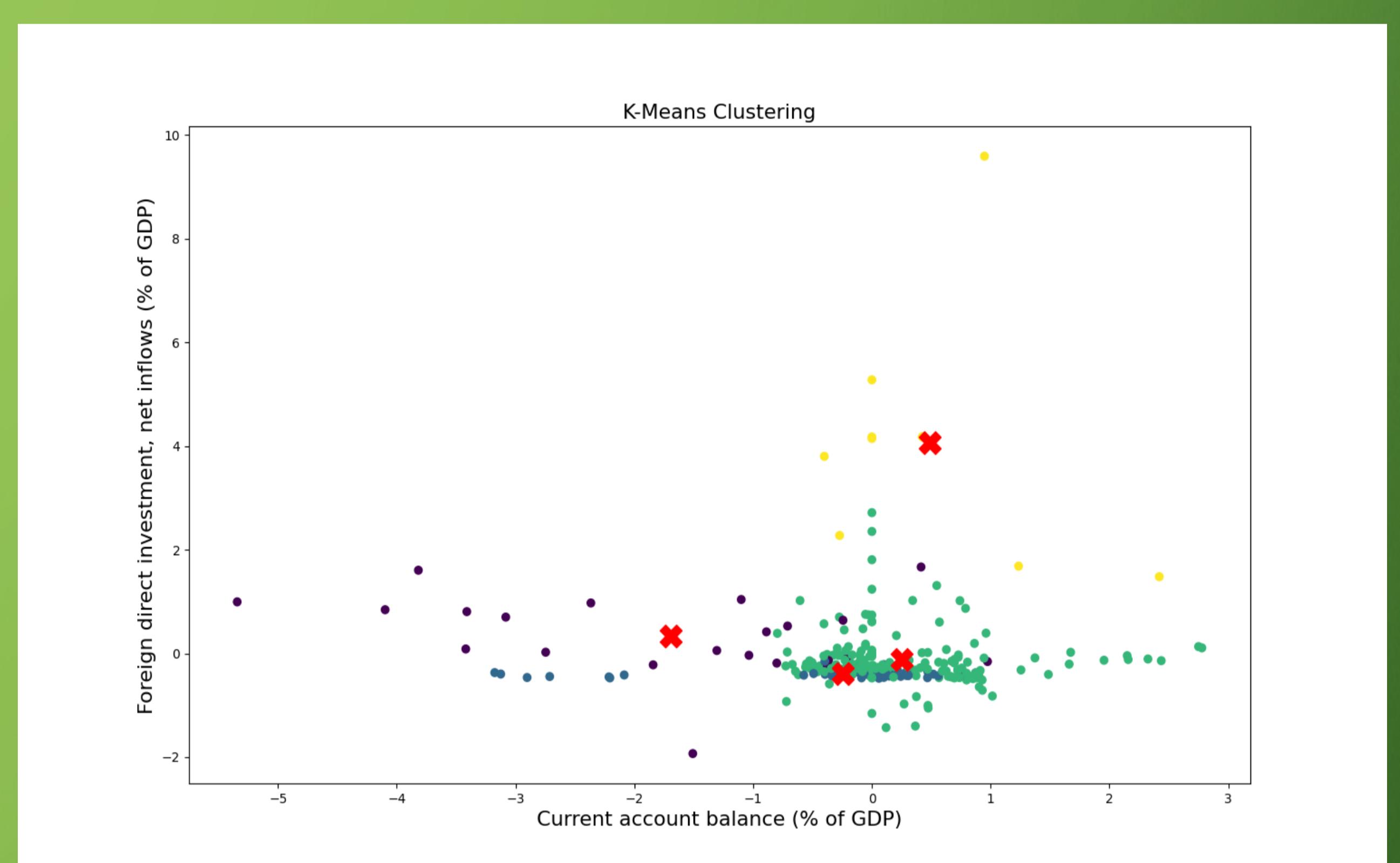


K-Means Clustering:

An effective unsupervised machine learning technique for dividing a dataset into K unique, non-overlapping subsets or clusters is K-Means clustering. Sorting data points into clusters so that each point is a member of the cluster with the closest mean, or centroid, is the main goal of the K-Means algorithm.

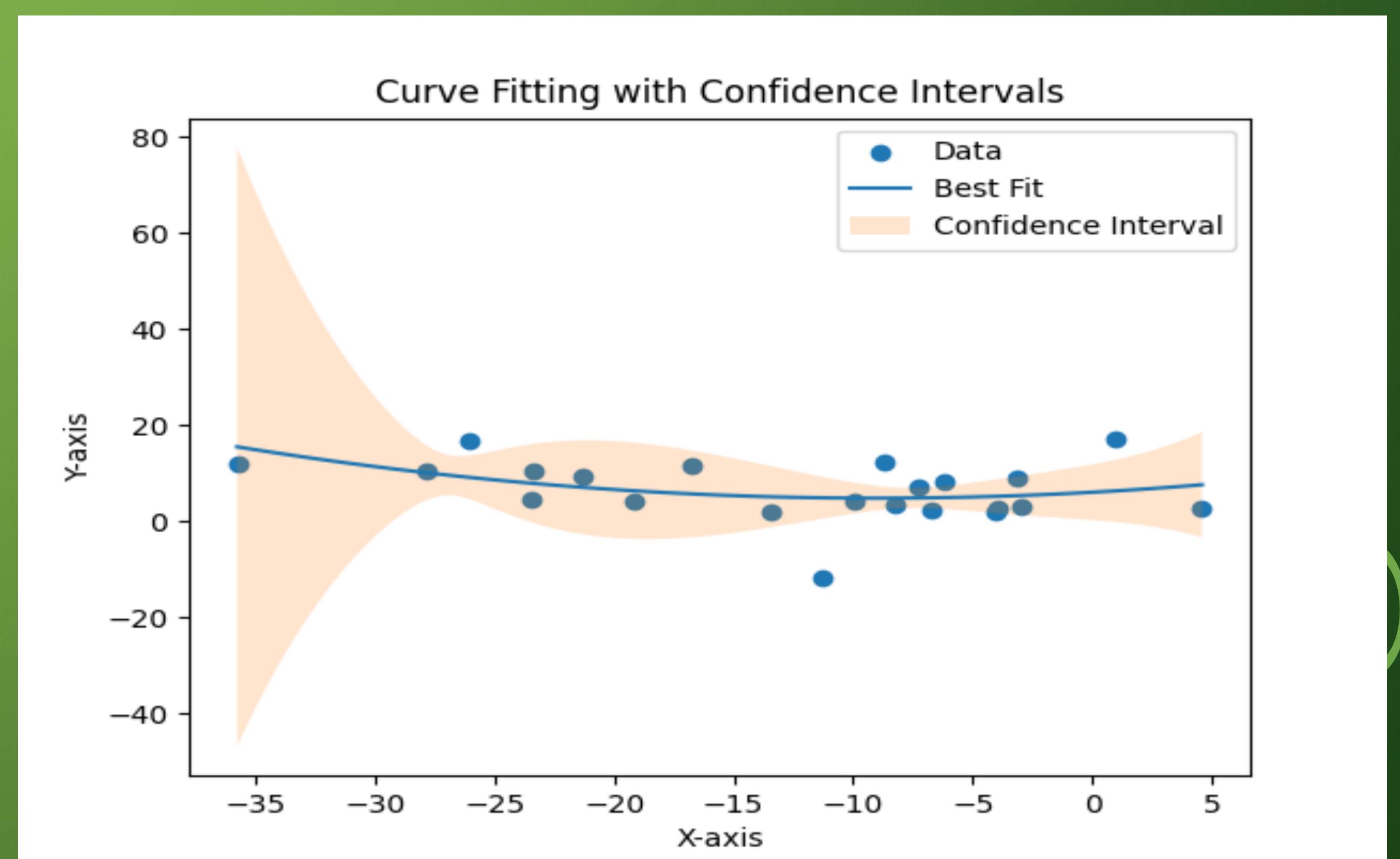
Findings from the Clustering Process:

As the clustering outcomes demonstrate a distinct equilibrium, showcasing a well-balanced distribution of data points across each identified cluster. This balance signifies that no single cluster exerts dominance over the overall composition of the dataset. Instead, each cluster effectively captures and represents a proportionate share of the data, contributing to an equitable representation. This uniform distribution enhances the reliability of the clustering results, emphasising the fair and comprehensive allocation of data points across all identified clusters.



Curve Fitting:

Regression analysis is another name for curve fitting, is a mathematical method for determining which curve or function best fits a dataset's data to depict the relationship between the variables. Curve fitting's main objective is to model the underlying pattern or trend in the data and use the fitted curve to infer or forecast future events.



Prediction Result:

Afghanistan's expected net inflows of foreign direct investment (as a percentage of GDP) [BX.KLT.DINV.WD.GD.ZS] in 2023 are 11.506171179848025.