

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.

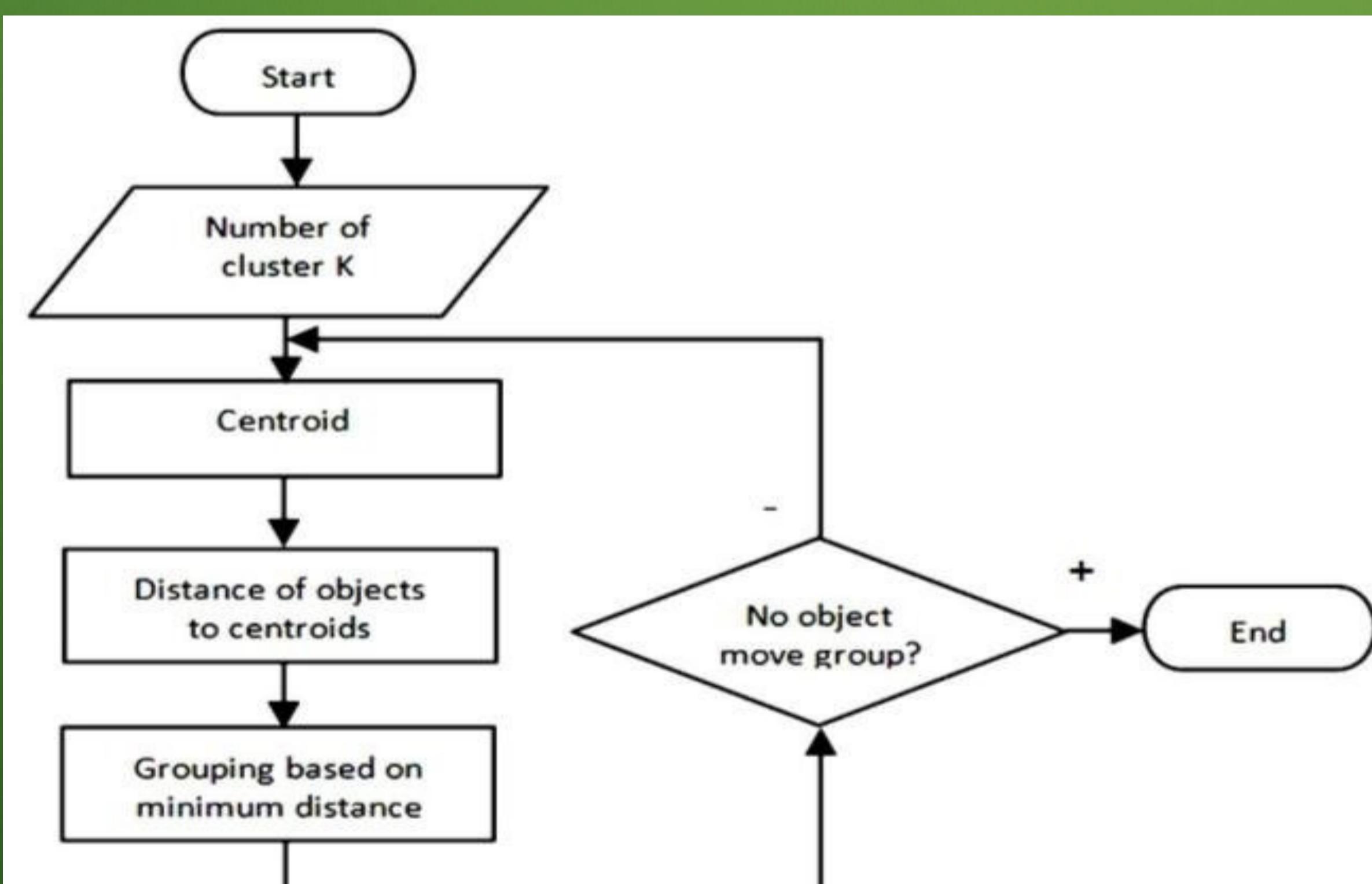
AIM:

The World Bank is an international financial institution that provides financial and technical assistance to developing countries for development projects and programs. Its primary goal is to alleviate poverty and support economic development by offering loans, grants, and expert advice.

- Current Account Balance (% of GDP):
 - ❖ This indicator represents the balance between a country's savings and its investment. It includes the trade balance, net income from abroad, and net current transfers.
- 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.
- Personal Remittances, Received (% of GDP):
 - ❖ Personal remittances represent the financial transfers 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:

Clustering is a technique in machine learning and data analysis that involves grouping similar data points together based on certain features or characteristics. The goal of clustering is to identify inherent patterns or structures within a dataset without predefined labels.



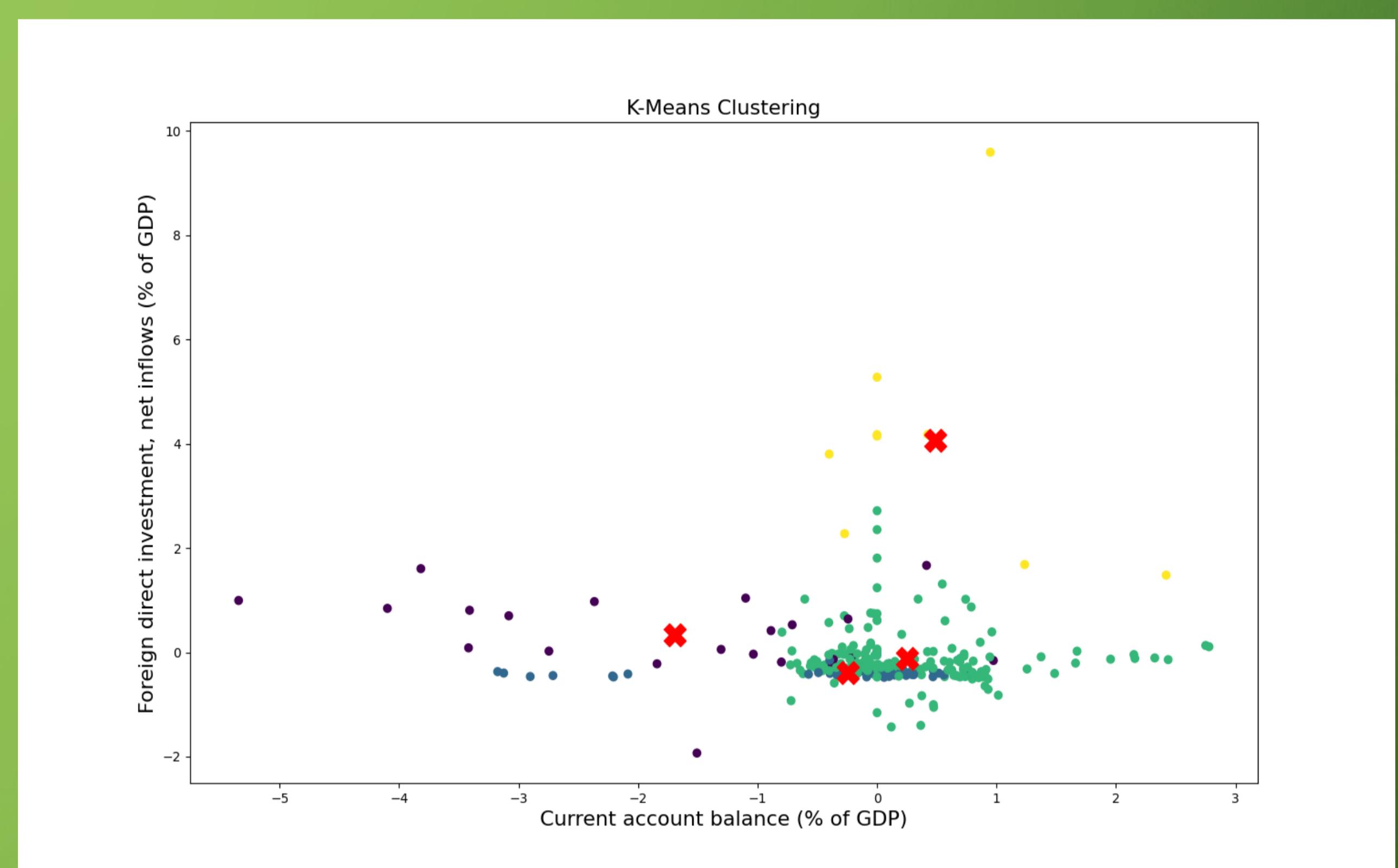
Name : Venkatesh Chattu
Student Id : 22074132

K Means Clustering:

K-Means clustering is a popular unsupervised machine learning algorithm used for partitioning a dataset into K distinct, non-overlapping subsets or clusters. The primary objective of the K-Means algorithm is to group data points into clusters in a way that each data point belongs to the cluster with the nearest mean, or centroid.

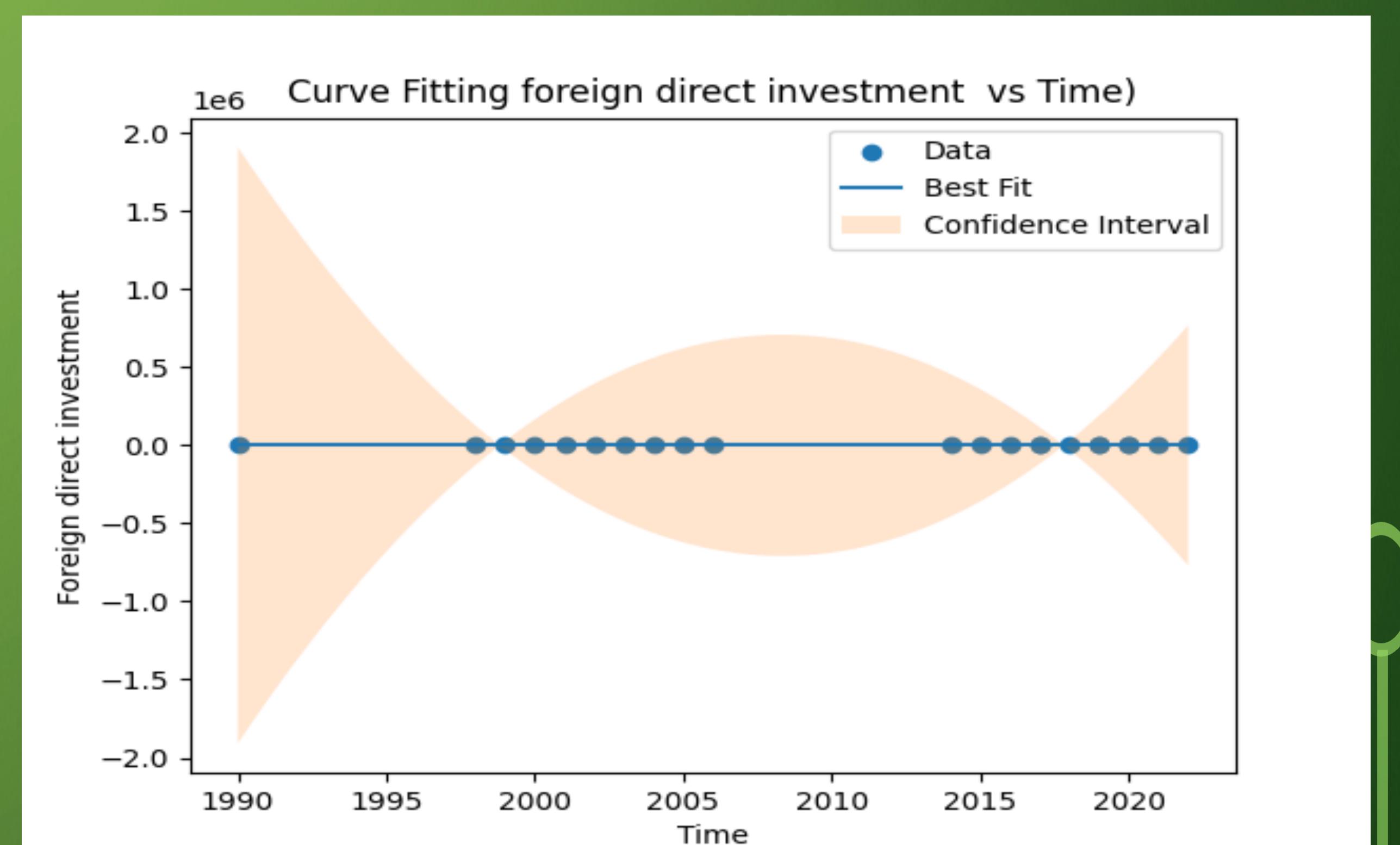
Result of Clustering:

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:

Curve fitting, also known as regression analysis, is a mathematical technique used to find the best-fitting curve or function that describes the relationship between variables in a dataset. The primary goal of curve fitting is to model the underlying pattern or trend in the data and make predictions or extrapolations based on the fitted curve.



Prediction Result:

Predicted value for Afghanistan in Foreign direct investment, net inflows (% of GDP) [BX.KLT.DINV.WD.GD.ZS] in 2023: 11.506171179848025.