CLUSTERING AND FITTING ON POPULATION MOVEMENT

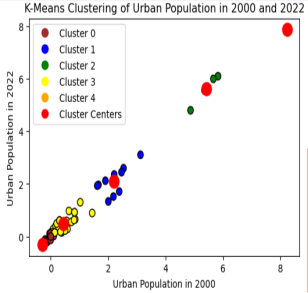
ABSTRACT

This study examines urban population data from 2000 to 2022 using K-means clustering and curve fitting. To show clusters and centres, graphs and scatter charts classify nations according to their degree of urbanization. Predicting population movements with a confidence interval is possible using exponential curve fitting in Python. Urban residents are more likely to be clustered demographically. This can be useful for urban planners looking for comparable countries for research. Evidence suggests that urban planners can better address the challenges of global urbanization using clustering and curve fitting..

INTRODUCTION

Data analysis uses clustering and curve-fitting techniques to explore the characteristics of urban populations. From 2000 to 2022, the clustering method uses the K-means method to organize countries by urban population and show clusters and centres. At the same time, production curve analysis uses an exponential growth framework to predict expected population trends and different levels of commitment. This study uses observations of urban population data in a typical country to examine cluster characteristics in more detail.

K-MEANS CLUSTERING

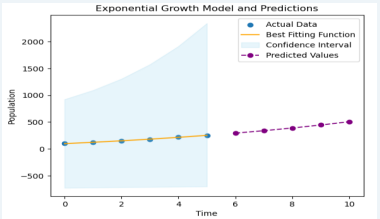


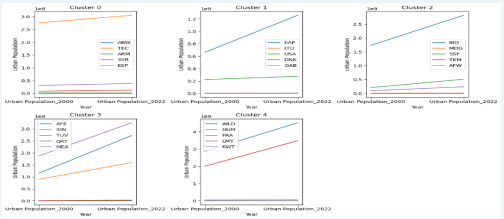
Based on the urbanised population in 2000 and 2022, countries are highly ranked using Pyplot design and K-means clustering. Scatterplots use a colour-coded scheme to show the relationships between various features. It is noticed that red dots indicate cluster centroids. Researchers can exploit this study and the results to determine patterns in groups of countries with similar urban population dynamics, helping them plan infrastructure projects and expand cities.

TRENDS IN THE CLUSTERS

Demographic changes in cities can be seen through demographic changes between groups. The subsections show how urban populations in different groups of countries have changed over time. These recurring themes reveal similarities and differences between groups. The clustering method works easily, as urban conditions are similar in countries in the same group. At the same time, the differences between the clusters show different patterns of development and positioning. Complex legal structures can be considered in many ways, but programs can target specific populations.

CURVE FITTING





Python uses the concept of exponential growth to fit a curve. The model can be configured to predict future developments by providing global population data. The' err_ranges' method uses confidence intervals to indicate the level of uncertainty of models and parameters. Scatterplots show the best fit with confidence intervals and data points. Graphical representation of projected population growth to show future numbers. Improving forecast accuracy by using a curve based on confidence limits will help governments and planners better understand the diversity of options and make informed decisions.

CONCLUSION

It is concluded that through the successful implementation of K-means clustering and curve-fitting methods, this study and its results can provide insights into the different characteristics of urban communities around the world. The ranking allows urban planners to target countries with similar urbanization characteristics. Better decisions are made after using the correct curve to provide reliable growth forecasts and confidence intervals. Group samples reveal similarities and differences, allowing for more formal assessments. The result of this comprehensive approach is that policymakers and city developers have access to useful information to help them address the many challenges facing the global industry in a smart way.

BIBLIOGRAPHY

Cao, W., Dong, L., Wu, L. and Liu, Y., 2020. Quantifying urban areas with multi-source data based on percolation theory. Remote Sensing of Environment, 241, p.111730.
Trangenstein, P.J., Gray, C., Rossheim, M.E., Sadler, R. and Jernigan, D.H., 2020. Alcohol outlet clusters and population disparities. Journal of urban health, 97, pp.123-136.
Zhu, X.X., Qiu, C., Hu, J., Shi, Y., Wang, Y., Schmitt, M. and Taubenböck, H., 2022. The urban morphology on our planet–Global perspectives from space. Remote Sensing of Environment, 269, p.112794.

GitHub:
Dataset Source: https://data.worldbank.org/indicator/SP.URB.TOTL?view=chart