**Executive Summary**

**Purpose of the Application:** This K-Means application aims to analyze the geographical distribution of patients to optimize healthcare resource allocation. By examining patient locations, we can strategically deploy medical personnel and facilities, enhancing patient care and operational efficiency (Delamater et al., 2019).

**Data Set Chosen**: The analysis utilizes patient information from the Registry of Open Data on AWS, focusing on geographical location data to identify patient clusters across different areas (AWS Open Data, 2023).

**Results of Clustering**: I applied the K-means clustering algorithm to patient location data, resulting in distinct geographical clusters. The accompanying figure visualizes these clusters, with each point representing a patient and colors denoting cluster membership.

**Insights and Conclusions**

1. Cluster Identification: The analysis successfully delineated several patient groups based on geographical coordinates, providing a clear visualization of patient distribution across regions.
2. Resource Allocation: By identifying areas with higher patient concentrations, healthcare administrators can make data-driven decisions about resource distribution. Regions with dense clusters may require increased healthcare personnel and facilities (Cardoso et al., 2020).
3. Improved Efficiency: Targeted deployment of healthcare resources based on patient location data can potentially reduce wait times and improve patient outcomes by ensuring services are available where most needed (Gruca et al., 2022).

To summarize, applying K-means clustering to patient location data offers valuable insights into geographical patient distribution. This data-driven approach is crucial for optimizing healthcare resource allocation, potentially improving the efficiency and effectiveness of healthcare services delivery.

**References**

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