

A Comparative Analysis of Clustering Approaches for Understanding Patterns in Health Insurance Uptake: Evidence from Sociodemographic Kenyan Data

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Abstract : The study investigated the low uptake of health insurance in Kenya despite efforts to achieve universal health coverage through various health insurance schemes. Unsupervised machine learning techniques were employed to identify patterns in health insurance uptake based on sociodemographic factors among Kenyan households. The aim was to identify key demographic groups that are underinsured and to provide insights for the development of effective policies and outreach programs. Using the 2021 FinAccess Survey, the study clustered Kenyan households based on their health insurance uptake and sociodemographic features to reveal patterns in health insurance uptake across the country. The effectiveness of k-prototypes clustering, hierarchical clustering, and agglomerative hierarchical clustering in clustering based on sociodemographic factors was compared. The k-prototypes approach was found to be the most effective at uncovering distinct and well-separated clusters in the Kenyan sociodemographic data related to health insurance uptake based on silhouette, Calinski-Harabasz, Davies-Bouldin, and Rand indices. Hence, it was utilized in uncovering the patterns in uptake. The results of the analysis indicate that inclusivity in health insurance is greatly related to affordability. The findings suggest that targeted policy interventions and outreach programs are necessary to increase health insurance uptake in Kenya, with the ultimate goal of achieving universal health coverage. The study provides important insights for policymakers and stakeholders in the health insurance sector to address the low uptake of health insurance and to ensure that healthcare services are accessible and affordable to all Kenyans, regardless of their socio-demographic status. The study highlights the potential of unsupervised machine learning techniques to provide insights into complex health policy issues and improve decision-making in the health sector.

Keywords : health insurance, unsupervised learning, clustering algorithms, machine learning

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