Feuture Engineering

1. **Feature Selection**:

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# Selecting the most influential features: 'Quality and Safety' and 'Affordability' selected\_features = food\_security\_df\_normalized[['Quality and Safety', 'Affordability']]

1. **Hierarchical Clustering on Selected Features**:

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# Perform hierarchical clustering on the selected features linked\_selected = linkage(selected\_features, method='ward') # Visualizing the dendrogram plt.figure(figsize=(12, 6)) dendrogram(linked\_selected, truncate\_mode='level', p=3, color\_threshold=0) plt.title('Dendrogram for Selected Features') plt.xlabel('Countries') plt.ylabel('Euclidean Distance') plt.show()

1. **Partitioning into Clusters & Visualization**:

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# Partitioning the countries into two clusters based on the selected features selected\_labels = fcluster(linked\_selected, 2, criterion='maxclust') # Add cluster labels to the DataFrame food\_security\_df\_normalized['Selected\_Cluster'] = selected\_labels # Visualize the clusters using the two selected features plt.figure(figsize=(12, 8)) sns.scatterplot(x=food\_security\_df\_normalized['Quality and Safety'], y=food\_security\_df\_normalized['Affordability'], hue=selected\_labels, palette='viridis', s=100, alpha=0.7) plt.title('Clusters based on Quality and Safety & Affordability') plt.xlabel('Quality and Safety') plt.ylabel('Affordability') plt.legend(title='Cluster') plt.show()