Cluster Analysis and COVID-19 Immigration Policies

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Next Steps

► Cluster analysis: unsupervised machine learning method to group observations, with little to no prior knowledge of what the groups should look like

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Preliminary Result

Vext Steps

- Cluster analysis: unsupervised machine learning method to group observations, with little to no prior knowledge of what the groups should look like
- Common applications: image research and market applications

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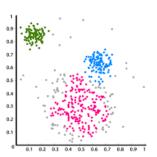
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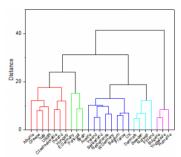
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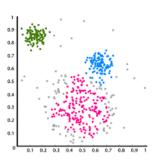
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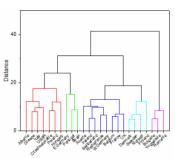
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Research Question: Can we find patterns in the cluster analyses of countries' COVID-19 immigration policies and their demographic characteristics?

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▶ In general, clustering is not as common in social sciences – typically used in sociology (social groups) Cluster Analysis and COVID-19 Immigration Policies

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- Variable selection significantly affect clustering methods to select variables based on their "clusterability"

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► Latent class models, Kamila, K-prototypes typically performed best in heterogenous data settings

- Variable selection significantly affect clustering methods to select variables based on their "clusterability"
- "Worse still, because there are several clustering methods and proximity measures, for each combination (method, proximity measure) cluster analysis output (dendogram) is quite different ..."

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▶ COVID Border Accountability Project and World Bank

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- COVID Border Accountability Project and World Bank
- Narrowing down variables of interest: Visa bans, history of travel bans, citizen bans, policy length, policy type, travel blockage (air, land, sea), refugee bans, country exceptions, work exceptions

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- ▶ Dealing with NA values: visa bans, history of travel bans, citizen bans

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- Other data cleaning: one-hot encoding, assumptions for strange data entries

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- Aggregated by country; merged on demographic data after clusters were determined by policy

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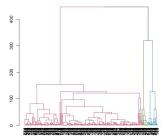
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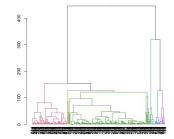


Figure: Hierarchical Clustering using 3 (left) and 6 (right) clusters and Euclidian distance between cluster centroids

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GDP and Population with HAC and K-Means Clusters of 3 and 6.

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► The effect of including/excluding certain variables on the structure of the clusters

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- ► The effect of including/excluding certain variables on the structure of the clusters
- Running cluster analysis on more demographic features
 - are countries in the same clusters?

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- ► Changing the number of clusters

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- ► Uncertainty: visualizing data

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- Investigating cluster analysis for more "mixed" data
- Uncertainty: visualizing data
- Uncertainty: scope of project and time constraints
- Uncertainty: finding meaningful results in general :(

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Sources

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