Optimizing the ACT public bus network through assessment and simulation
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We are studying the Canberra public bus transport network because we're interested in measuring resilience, robustness and efficiency of the network in order to make data driven decisions to optimize improve public transport services for citizens.

Using public data sets provided by the ACT we will be looking into established measurements for resilience and robustness and perform analysis on the efficiency of the network. We plan to analyse underutilized and underserved routes, congestion in the network and use the data to create a statistical simulation of the network through which we would observe changes in the network such as the effect of removing or adding bus stops. Additionally, we would be visualising different network measures using kepler.gl such as representing congestion using a heatmap.

In order to improve the public transport network we would create certain measures of the network that approximately model desirable attributes of the network such as geographic coverage vs number of bus stops, resiliency of the network, average trip duration, and average walking time to a stop and then use a optimization algorithm such as regression or Stochastic Gradient Descent to optimize these measures to create a better network.

Network

Type	Nodes	Edges
Graph Attributes	Bus Stops	Whether a bus passes through the nodes
Associated data	Routes that pass through the bus stop	Weights = Distance between the stops

Data	Attributes	Type	Reference
Bus Stop Locations	StopId, Latitude, Longitude, Location	GeoJson	(Government, 2017)
Bus Routes	Latitude, Longitude	GeoJson	(ACT, 2017)
Boarding per hour per stop	Stop Id, Hourly boarding	csv	(ACT, 2019)
Alighting per hour per stop	Stop Id, Hourly alighting	csv	(ACT, 2019)
GTFS Data	Trips, Stop_Times	text	(ACT, 2019)
Population Projection	Year, Suburb,	csv	(ACT, 2018)

per suburb	Population		

References

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