Problem Statement

- With proper planning and operation, bus transit systems can be a fast, convenient, and reliable means of transportation to/from work, shopping centers, ... 
- Arlington is the largest city in the US that does not have a public transportation system.
- Bus transit systems provide multiple benefits including reduction in traffic congestion, decreasing air pollution, reducing fuel consumption, ...
- City’s voters have rejected transit proposals three times, opponents mostly argue that Arlington is a low-density city and a public transit system is not economically feasible.
- Arlington central area encircles several attraction points including University of Texas Arlington, AT&T Stadium, Ballpark Stadium, Parks Mall, GM Plant and ...

Methodology

- Five loops bus routes, are designed in the area in a way to have the highest coverage in residential areas and provide access to the major city attractions.
- ArcGIS is used for analysis and modeling of socio-spatial data in tract scale.
- Transit propensity of each tract is modeled comparing the average tract income to city average income.
- The coverage area for the low propensity zones are assumed to be a 1/4 mile, while the walking distance for both low and medium propensity zones are assumed to be 1/8 of a mile.

Demand Estimation

- In this research, various public transit demand estimation models including Corradino’s and Butte’s methods were taken into consideration.
- For estimating the demand, multiple socio-economic variables including number of households in tract, average income, population, & coverage was considered.
- Suggested transit system specifications including headway, quality of service, level of service was considered.
- Designated route characteristics including length of routes, length of one-way segments, effect of peak hour traffic, trip generators/attracters, land use were considered.

Capacity Analysis

- The system is designed to work at level of service D. This suggests the headway to be 21-30 mins, 12 -13 hours of operation daily, and coverage percentage of 60% - 69%.
- There are two types of capacities: (1) Maximum theoretical load, and (2) Possible throughput load.
- The maximum theoretical load is the maximum volume under ideal conditions for the system.
- The possible throughput load is the maximum volume under prevailing conditions for the system.

Research Goal

- This research tries to design a bus transit network in central area of Arlington
- This research tries to estimate potential bus ridership in central area of Arlington to find out if the designed bus system is justifiable.

Results

- The demand model shows that the designated transit system will have 754,200 riders/year.
- Based on system configuration, the capacity analysis reveals that the system will have 1,704,000 pax/year theoretical capacity and 994,115 pax/year Throughput.
- The results of the study shows that Arlington Central districts provides enough ridership to support a local bus transit system.