BMTC Geospatial Data Analysis

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Background

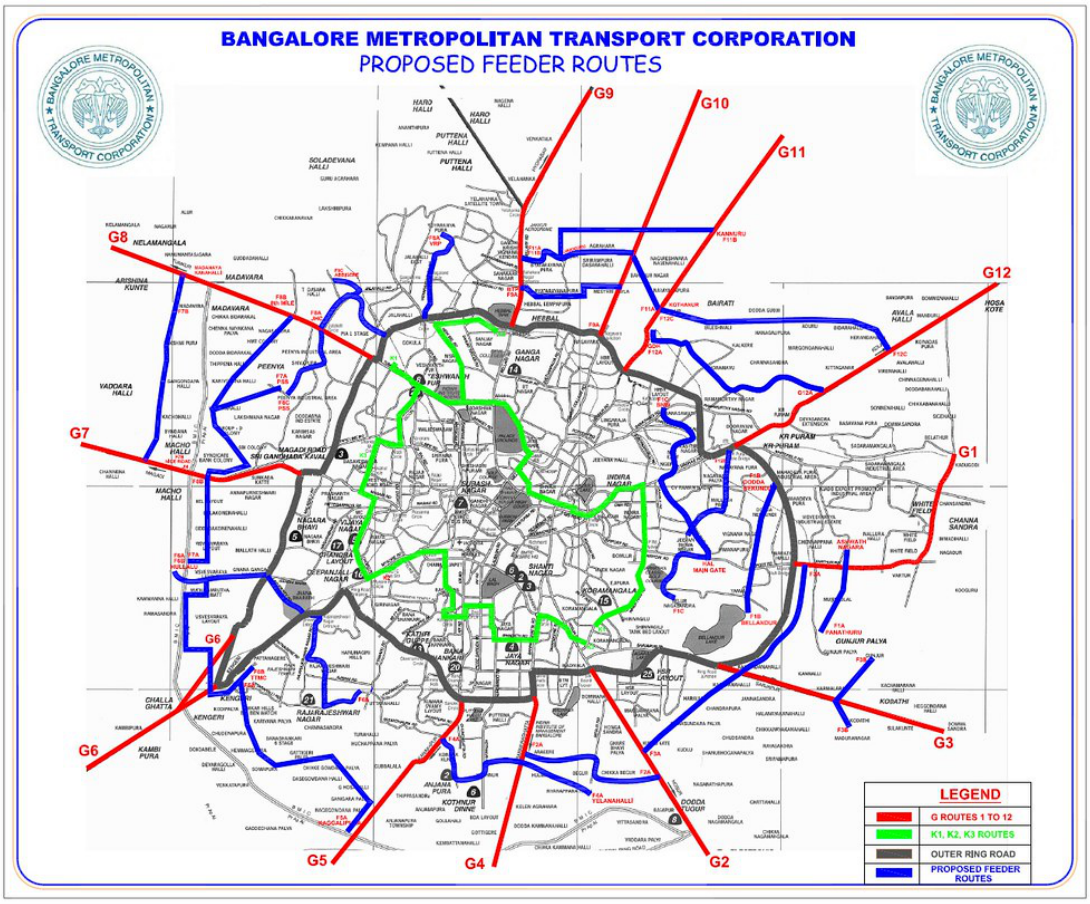

Figure 1: BMTC Bus Map

City bus commute is an integral part of daily routine for people living in Bangalore. Bangalore is known for its huge proportion of IT professionals. Many use BMTC busses as a primary source of commute from daily work. Bangalore is also known for small, congestive roads and lack of alternative routes between places. This causes major traffic concerns particularly for the city buses. Given the importance of these, it is necessary to understand the dynamics of these systems. Study of congestion patterns and commuter frequency enables us to come up with better plans for change and enhancement of these bus services.

Problem statement

BMTC bus data consists of time series latitude-longitude data of buses and ticketing information for various routes. One of the major problems that BMTC buses face is congestion (heavy traffic in Bangalore) which further leads to bus bunching. We aim to solve this problem by analysing the data and finding the congestion patterns throughout the bus routes.

Objective

Objectives include finding highly congested routes and finding congestion patterns enabling us understand and improve the bus services. The objective is to observe patterns to make inferences [1].

- Congestion detection techniques using GPS data [2].
- Velocity calculation using GPS coordinates.
- Bus bunching identification [3].
- Commuter frequency estimation.

Research questions

- A novel approach to detect and avoid bus bunching of BMTC buses.
- Correlation between traffic congestion and bus bunching of BMTC buses.

Possible methods to be adopted

- Analysis of Bus congestion using floating car data technique which consists of segment travel speed estimation, map matching, coordinate transformation and road congestion classification [4].
- Statistical analysis using temporal and spacial dimensions to estimate the key factors affecting the travel time, stagnant time and bus bunching [3].

Expected results

- To find the congestion patterns in the BMTC bus data.
- To visualize BMTC bus data for better understanding.
- To analyse the data for bus bunching.
- To estimate the arrival time of the passenger.

Tentative Monthly Plan

- February - Data collection, cleaning, and visualisation.
- March - Applying various techniques mentioned above and drawing inferences.
- April - Conclusions and future work - TBD.

Keywords

congestion, bus bunching, segment travel speed, stagnant time.

References

[1] S. Kamran and O. Haas. A multilevel traffic incidents detection approach: Identifying traffic patterns and vehicle behaviours using real-time gps data. In *2007 IEEE Intelligent Vehicles Symposium*, pages 912–917, June 2007.

[2] Glen D'Este, Rocco Zito, and Michael Taylor. Using gps to measure traffic system performance. *Computer-Aided Civil and Infrastructure Engineering*, 14:255 – 265, 12 2002.

[3] B. Du and P. Dublanche. Bus bunching identification using smart card data. In *2018 IEEE 24th International Conference on Parallel and Distributed Systems (ICPADS)*, pages 1087–1092, Dec 2018.

[4] Zhang Yong-chuan, Zuo Xiao-qing, Zhang li ting, and Chen Zhen-ting. Traffic congestion detection based on gps floating-car data. *Procedia Engineering*, 15:5541–5546, 12 2011.