Annotated Bibliography

A red star (*) indicates I think the paper is most closely related.

Geospatial Data Structures

*Libera, F. D. (1986). Using B-trees to solve geographic range queries. *The Computer Journal*, *29*(2), 176–180. https://doi.org/10.1093/comjnl/29.2.176

- Although my project isn't intended for the user to make queries, I could potentially use some kind of query-like operation to search for points of interest in determining likely parts of the map to connect.

*Samet, H., Rosenfeld, A., Shaffer, C. A., & Webber, R. E. (1984). A geographic information system using Quadtrees. *Pattern Recognition*, *17*(6), 647–656. https://doi.org/10.1016/0031-3203(84)90018-9

- From the beloved professor of this course. I saw interest in Prof. Samet's quadtree and B-tree structures to divide the map into regions of interest. Same comment as above, the main goal of my work isn't to enable the user to make geographic queries, but a query-like operation may be interesting to pursue in determining points of transit need.

Toman, J., & Olszewska, J. I. (2014). Algorithm for graph building based on google maps and google earth. *2014 IEEE 15th International Symposium on Computational Intelligence and Informatics (CINTI)*, 55–60. https://doi.org/10.1109/cinti.2014.7028728

- This paper proposes an algorithm to build geographic data into a network graph. It uses KML files and is compatible with Google Earth and GIS programs. Could be useful for the identification of station locations and the building of a network.

Graph Deep Learning

I'm not leaning towards a deep learning approach at this time but did some literature review.

Georgousis, S., Kenning, M. P., & Xie, X. (2021). Graph deep learning: State of the art and Challenges. *IEEE Access*, *9*, 22106–22140. https://doi.org/10.1109/access.2021.3055280

- This one is about graph representation learning with CNNs. It may be informative for the graph deep learning approach I proposed. This paper is mostly a survey over the field.

Twaty, M., Ghrab, A., & Skhiri, S. (2019). GraphOpt: A Framework for automatic parameters tuning of graph processing frameworks. *2019 IEEE International Conference on Big Data (Big Data)*, 3744–3753. https://doi.org/10.1109/bigdata47090.2019.9006320

- Another paper informative for the graph deep learning approach.

Liu, X., Meng, S., Li, Q., Qi, L., Xu, X., Dou, W., & Zhang, X. (2023). SMEF: Social-aware multi-dimensional edge features-based graph representation learning for recommendation. *Proceedings of the 32nd ACM International Conference on Information and Knowledge Management*, 1566–1575. https://doi.org/10.1145/3583780.3615063

- Another graph deep learning paper.

Genetic Algorithms

*Chien, S., Yang, Z., & Hou, E. (2001). Genetic algorithm approach for transit route planning and Design. *Journal of Transportation Engineering*, *127*(3), 200–207. https://doi.org/10.1061/(asce)0733-947x(2001)127:3(200)

- I was a bit skeptical at first because of the title, as genetic algorithms seem to have fallen out of interest. However, it kept coming up and up. The algorithm here is useful because it almost exactly formulates the problem here that I want to solve, except it does so with bus networks and shows great results.

*Dib, O., Moalic, L., Manier, M.-A., & Caminada, A. (2017). An advanced GA–VNS combination for multicriteria route planning in public transit networks. *Expert Systems with Applications*, *72*, 67–82. https://doi.org/10.1016/j.eswa.2016.12.009

- This paper proposes a routing algorithm augmenting a genetic algorithm to determine optimal transit routes. One key difference between this paper and mine is that this one assumes the existence of an existing network. It may be useful in determining how to score my network. For example, by running this algorithm on a random sample of hypothetical transit users and taking a weighted average?

Overview of Field

*Bast, H. *et al*. (2016). Route Planning in Transportation Networks. In: Kliemann, L., Sanders, P. (eds) Algorithm Engineering. Lecture Notes in Computer Science(), vol 9220. Springer, Cham. https://doi.org/10.1007/978-3-319-49487-6_2

- Chapter from an overview book on transit route planning algorithms. Should be good in getting an overview of the field.

*Davis, S., & Impagliazzo, R. (2007). Models of greedy algorithms for graph problems. *Algorithmica*, *54*(3), 269–317. https://doi.org/10.1007/s00453-007-9124-4

- An overview paper of greedy algorithms, including ones for graph network creation problems. My a priori interest in greedy algorithms in particular may not give the best

results but it may be interesting to investigate. These methods may be among the fastest even if suboptimal.

Real-World Connection

Not included in this bibliography but essential to the construction of my project will be the crystallization of a narrative about the Washington Metro and why my work is justified. This will require an explanation of the transit network's history with citations from news sources, books, interviews, and other non-academic-article sources for claims such as "The Washington Metro was designed primarily for 9-5 commuters" and "The modeshare of Washington, D.C. remains X% towards personal vehicles".

Camporeale, R., Caggiani, L., Fonzone, A., & Ottomanelli, M. (2016). Quantifying the impacts of horizontal and vertical equity in transit route planning. *Transportation Planning and Technology*, *40*(1), 28–44. https://doi.org/10.1080/03081060.2016.1238569

- This non-technical paper on equity in transit planning will be informative in grounding my approach in real-world concerns.

Modes Besides Rapid Transit

I consider the creation of similar computational processes for other modes of transportation, such as smart/adaptive transit, buses, and high-speed rail.

Nayan, A. (n.d.). *Optimal Bus Transit System Considering Service Network Design and Route Packaging*. https://doi.org/10.32657/10356/69546

Owais, M., & Ahmed, A. S. (2022). Frequency based transit assignment models: Graph Formulation Study. *IEEE Access*, *10*, 62991–63003. https://doi.org/10.1109/access.2022.3182046

*Périvier, N., Hssaine, C., Samaranayake, S., & Banerjee, S. (2021). Real-time approximate routing for Smart Transit Systems. *ACM SIGMETRICS Performance Evaluation Review*, *49*(1), 73–74. https://doi.org/10.1145/3543516.3460096

- I may take interest in the algorithms that smart transit systems (such as micromobility or autonomous vehicles) use in determining routes, as they may also be useful in finding static routes. Furthermore, this paper's proposed algorithm adheres to constraints that seem useful for my network, namely limiting transfers and pre-defined lines.

*Roy, S., & Maji, A. (2023). High-speed rail station location optimization using customized utility functions. *IEEE Intelligent Transportation Systems Magazine*, *15*(3), 26–35. https://doi.org/10.1109/mits.2022.3207411

- I am highly interested in this paper's methodology, particularly its evaluation method. Also, the gravity model based on population density. Certain factors this study considers would not be relevant to my project, such as the transfer potential to local modes.

Theses/Dissertations

Fan, W. (2004). *Optimal transit route network design problem: Algorithms, implementations, and numerical results* (Order No. 3143741). Available from ProQuest Dissertations & Theses Global. (305127519). https://www.proquest.com/dissertations-theses/optimal-transit-route-network-design-problem/docview/305127519/se-2

*Mahmoudi, R. (2024). Optimal configurations for urban transit: A study on bus and express network design via analytical approaches and mathematical programming (Doctoral thesis, University of Calgary, Calgary, Canada). Retrieved from https://prism.ucalgary.ca.

- This one's a doctoral thesis from a civil engineer. The mathematical programming methods the thesis discusses may give me a different perspective.