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Presentation on Structure and Architecture of a Scientific Paper

Philosophy of Science and Good Scientific Practice

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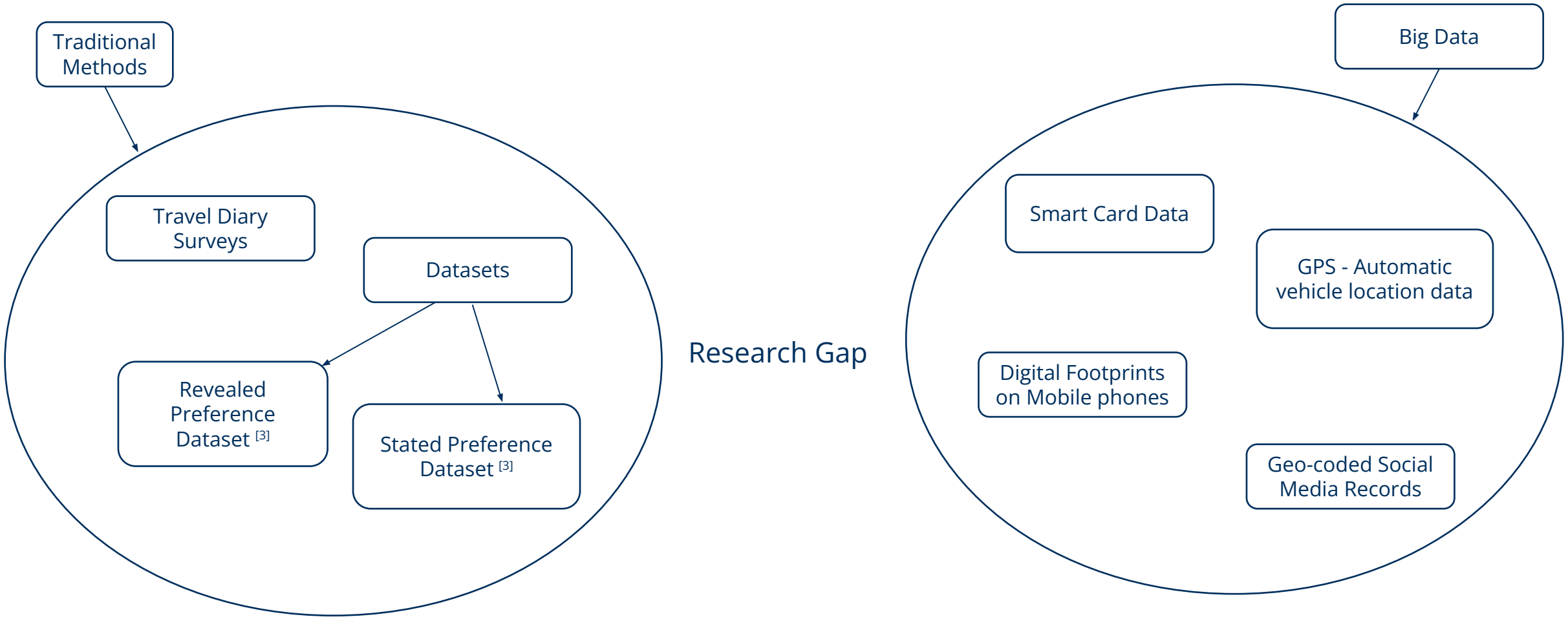
Emerging Big Data Sources for Public Transport Planning: A Systematic Review on Current State of Art and Future Research Directions. [1]

Motivation

- Overview of the contemporary research related to the application of Big data on Public Transport Planning
- Future research direction regarding the application of emerging data sources for Public Transport Planning

[2]

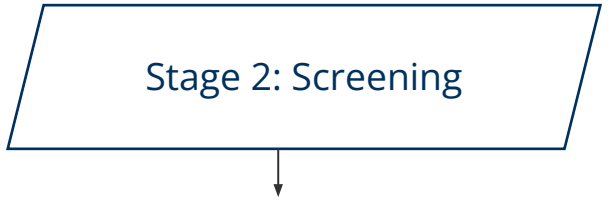
Overview - Transport Planning



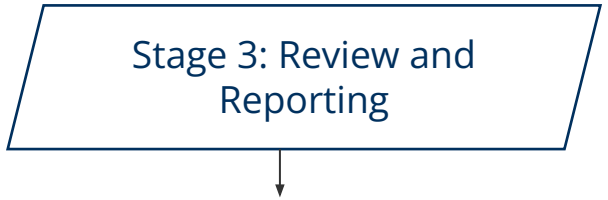
Methodology

Data Sources: Scopus, Web of Science, Science Direct, Wiley Online Library, Taylor & Francis, and Google scholar.

Keywords: Big Data, Smart Card, Mobile Phone, Social Media, Passive Data, Public Transport, Transportation, Planning.



272 articles screened - 47 articles considered for review

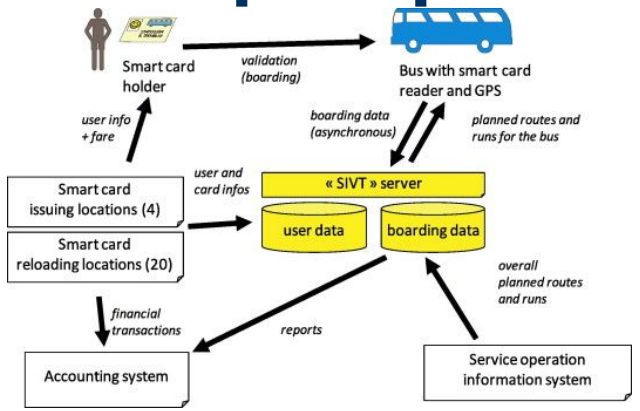


Contribution to the Domain along with research gap

Emerging data sources available for transport planning

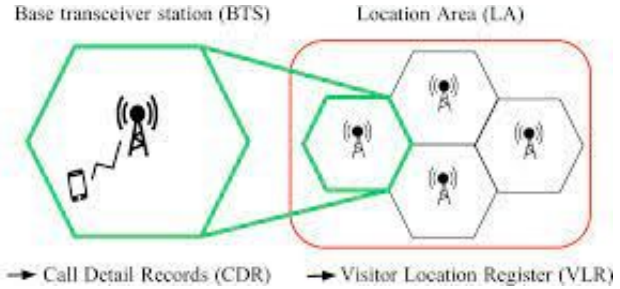
- Smart Card Data

[4]

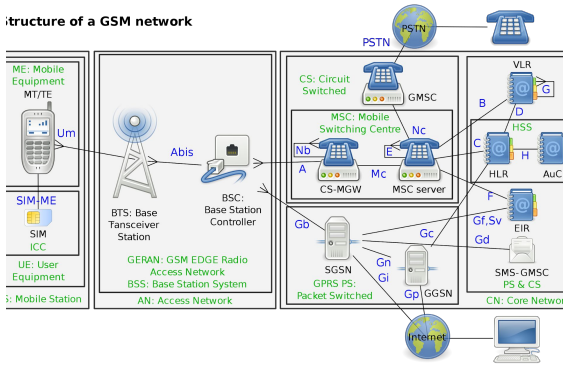


[5]

- Mobile Phone Data
  - CDR data
  - GSM data



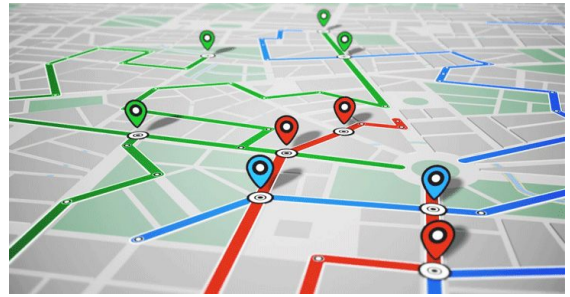
[6]



[7]

- GPS and AVL Data

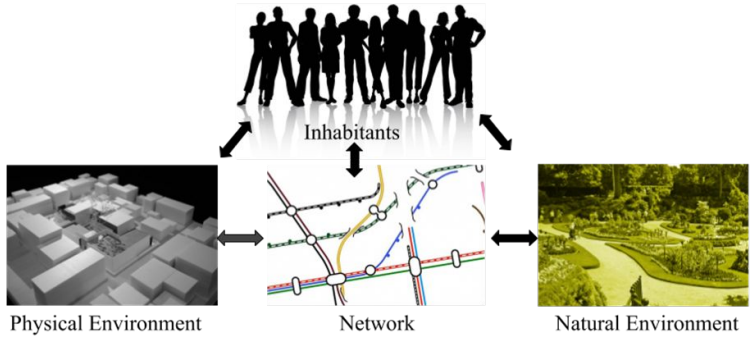
[8]



[9]

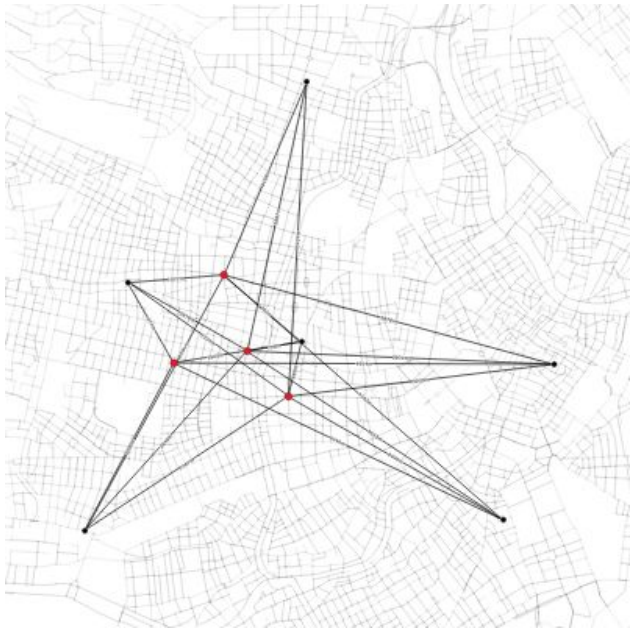
Present State of Big Data in PT Planning

- Individual travel pattern Analysis (mode choice, departure time choice, destination choice)



[10]

- Aggregate transport modeling (trip generation, trip distribution, modal split and route choice)



[10]

- Performance assessment of public transport services

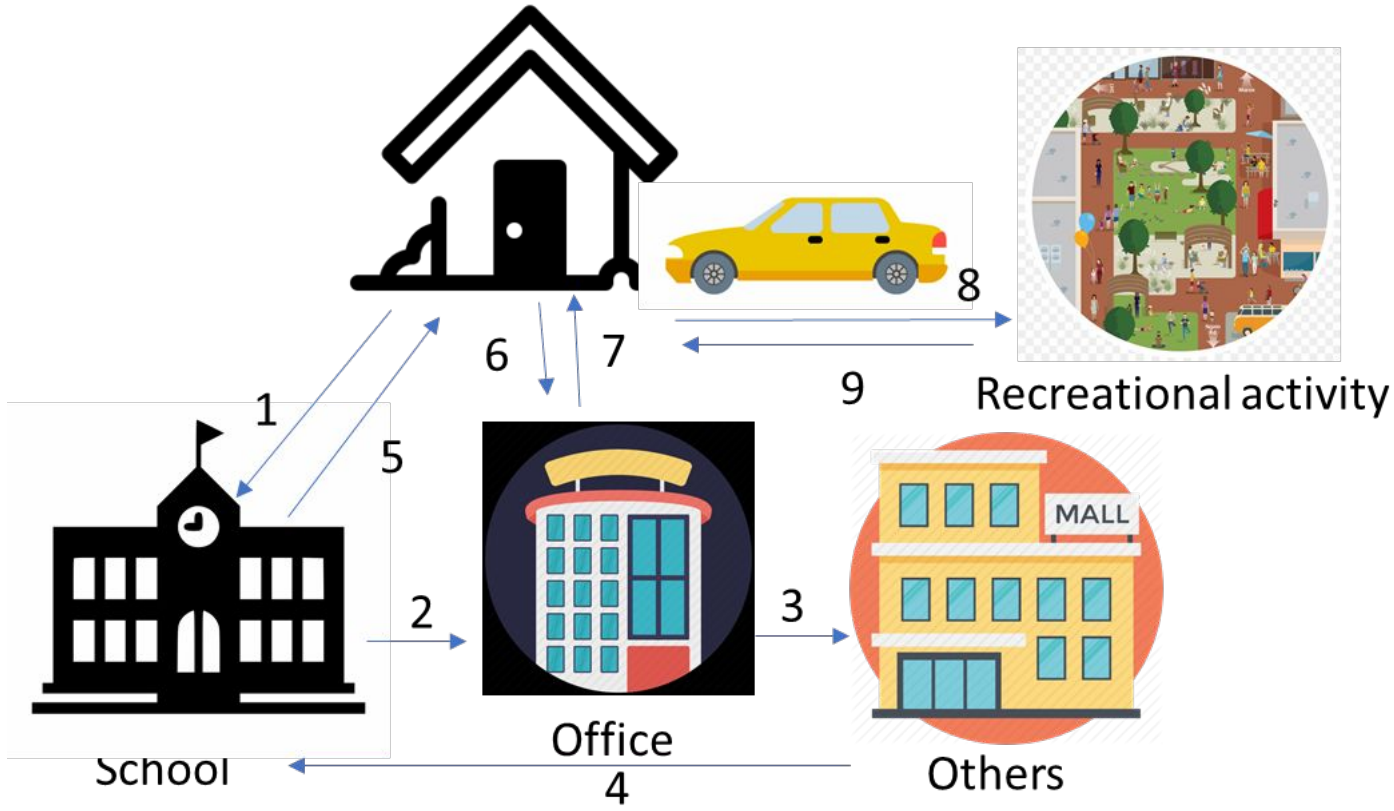
[11]

Benefits of Big Data compared to traditional data sources

- Provide updated and near or real time spatial and temporal information.
- Large amount of individual level data with greater detail and higher accuracy at lower cost.
- Allow to develop panel data for a large sample size and longer observation period.

Challenges of using Big data in Public Transport Planning

- Presence of data gap.
- Absence of personal or socio-demographic information.
- Some details (e.g., trip purposes, accompanying travelers) are not explicitly recorded.
- Data are generated by non-transport activity (e.g., during phone call, text message etc.); hence, cannot be converted directly to mobility data for transport studies.



Complexities in travel pattern [10]

Future Research Direction

- Reviewed articles are focused on investigating traditional planning topics (e.g. O-D estimation, mode choice etc.), future research can focus more on dynamic transport modelling.
- Application of multiple big data sources (big data and traditional data) to improve the accuracy in travel behaviour prediction is still infancy.
- Majority of the studies are assumption based, very few studies worked on the validity of the proposed method.
- Big data has been used in transport research predominantly in context of developed countries.

Conclusion

- Cross-cutting research is needed to explain the applicability of big data in transport planning research domain.
- Application of big data in the context of developing countries need to explore the dynamic landscape of developing countries.
- Useful guide for fellow researchers.

References

[1] Zannat, K., Choudhury, C.F. Emerging Big Data Sources for Public Transport Planning: A Systematic Review on Current State of Art and Future Research Directions. J Indian Inst Sci 99, 601–619 (2019). https://doi.org/10.1007/s41745-019-00125-9

[2] http://icet-usa.org/big-data-and-transport

[3] Bwambale, A., Choudhury, C. F., & Hess, S. (2019). Modelling departure time choice using mobile phone data. Transportation research part A: policy and practice, 130, 424-439.

[4] https://en.wikipedia.org/wiki/File:Oyster_Card.jpeg

[5] Pelletier, M. P., Trépanier, M., & Morency, C. (2011). Smart card data use in public transit: A literature review. Transportation Research Part C: Emerging Technologies, 19(4), 557-568.

[6] Jacques, D. C. (2018). Mobile phone metadata for development. arXiv preprint arXiv:1806.03086.

[7] https://commons.wikimedia.org/wiki/File:Gsm_structures.svg

[8] https://img.etimg.com/photo/msid-61791390,quality-100/.jpg

[9] https://thehackernews.com/2018/01/gps-location-tracking.html

References (Cont.)

[10] Zannat et al.

[11] https://en.wikipedia.org/wiki/Public_transport

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Thank You