

2024-01-18

# **Simple Open Data Measures of Public Transit Service Availability Usecases for Closeness Centrality and Isochrones**

**Emily C. Wilke**

35xxxxxxxxx

emilycwilke@gmail.com

Ruprecht-Karls-Universität Heidelberg

xxxxxxx

## Contents

1 Introduction .....	3
1.1 Transit Equity and Equality .....	3
1.2 Related Work .....	3
1.3 Methodological Approach .....	3
1.4 Geographic Case Studies .....	3
2 Closeness or Reachability .....	4
2.1 Closeness Centrality .....	4
2.2 Isochrones as a Measure of Reach .....	4
2.3 Comparison Use Cases .....	4
2.4 Methods .....	4
2.5 Results .....	4
3 Comparisons with Non-Schedule-Based Modes .....	5
3.1 Cycling .....	5
3.1.1 Methods .....	5
3.1.2 Results .....	5
3.2 Cars .....	5
3.2.1 Methods .....	5
3.2.2 Results .....	5
3.3 Temporal Discrepancies with Scheduled Transit .....	5
3.4 Limitations .....	5
4 Distinguishing Transit Footprints .....	6
4.1 Historical Urban Blueprints .....	6
4.2 Radial and Tangential Services .....	6
4.3 Methods .....	6
4.3.1 Visual Differences .....	6
4.3.2 Inequality Measures .....	6
4.4 Results .....	6
4.5 Hub and Spoke Transit Planning .....	6
5 Results .....	6
6 Discussion .....	6
6.1 General Limitations .....	6
Bibliography .....	7

# **1 Introduction**

In recent years, but for decades by now, the demand for a paradigm shift in transportation infrastructure and service has become louder and louder. While calls for a shift away from car centric mobility are nothing new and where a well established part of German Academic discourse in the 1990s already, [1] it has become part of a widespread political discourse around the so called *Verkehrswende* [2]. With increased awareness and concrete experiences of climate change this discourse has reached states of heated debate.

## **1.1 Transit Equity and Equality**

- How can an easy closenes centrality measure help asses transit service availability and equality

## **1.2 Related Work**

## **1.3 Methodological Approach**

## **1.4 Geographic Case Studies**

## **2 Closeness or Reachability**

### **2.1 Closeness Centrality**

### **2.2 Isochrones as a Measure of Reach**

### **2.3 Comparison Use Cases**

### **2.4 Methods**

### **2.5 Results**

## **3 Comparisons with Non-Schedule-Based Modes**

### **3.1 Cycling**

#### **3.1.1 Methods**

#### **3.1.2 Results**

### **3.2 Cars**

#### **3.2.1 Methods**

- added parking times

#### **3.2.2 Results**

### **3.3 Temporal Discrepancies with Scheduled Transit**

### **3.4 Limitations**

- limitations to car traffic estimations
- limitations to parking times

## **4 Distinguishing Transit Footprints**

### **4.1 Historical Urban Blueprints**

### **4.2 Radial and Tangential Services**

### **4.3 Methods**

#### **4.3.1 Visual Differences**

#### **4.3.2 Inequality Measures**

- Lorenz Curves and Gini Coefficients being silly sometimes [3]

### **4.4 Results**

### **4.5 Hub and Spoke Transit Planning**

## **5 Results**

## **6 Discussion**

### **6.1 General Limitations**

- Lack of real world measures as Comparisons
- *inequality* being silly at times [3].

## Bibliography

- [1] H. Holzapfel, “Hat das Auto in der Stadt noch etwas zu suchen?“, *Strategien gegen den Verkehrsinfarkt*. in Deutsche-Bank-Research. Schäffer-Poeschel, Stuttgart, pp. 63–80, 1993.
- [2] H. Holzapfel, *Urbanismus und Verkehr: Beitrag zu einem Paradigmenwechsel in der Mobilitätsorganisation*. Wiesbaden: Springer Fachmedien Wiesbaden, 2020. doi: 10.1007/978-3-658-29587-5.
- [3] D. Graeber and D. Wengrow, *The Dawn of Everything. A New History of Humanity*. Dublin: Penguin Books, 2022.