Coronahistorier & teledata

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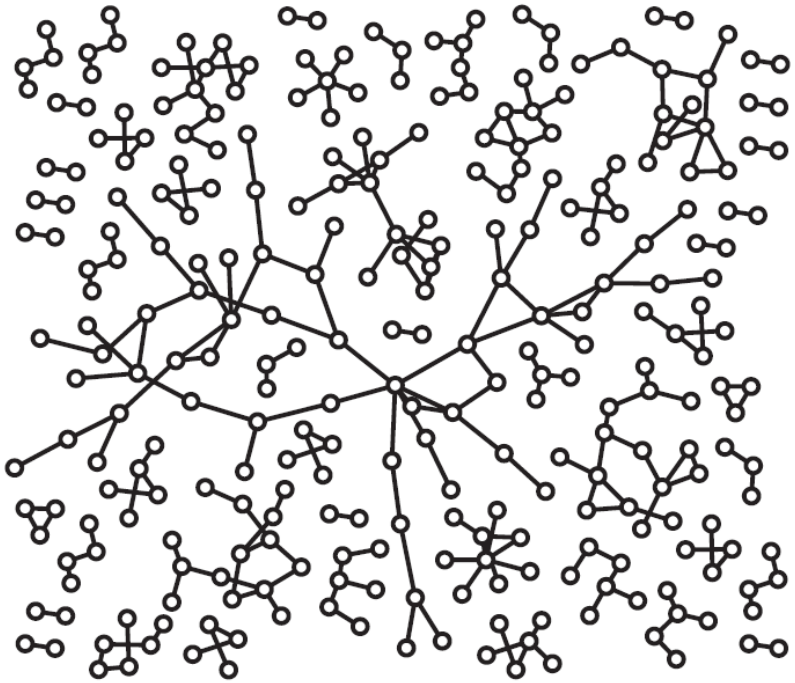
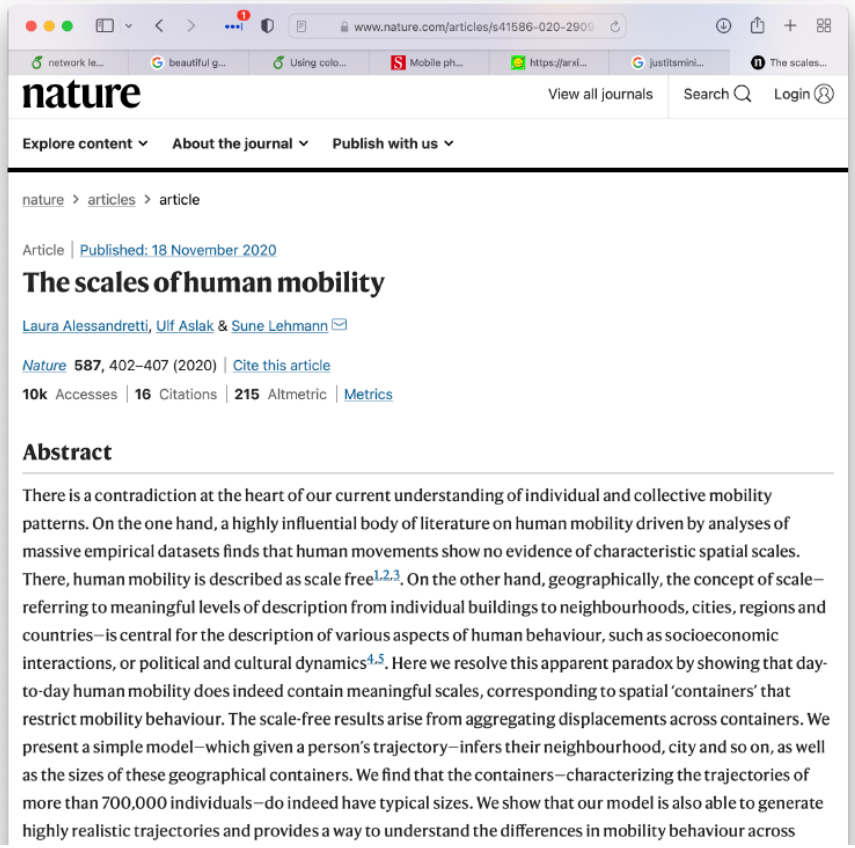
Hvem er ham Sune?





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Article | Published: 18 November 2020

The scales of human mobility

Laura Alessandretti, Ulf Aslak & Sune Lehmann

Nature **587**, 402–407 (2020) | Cite this article

10k Accesses | **16** Citations | **215** Altmetric | Metrics

Abstract

There is a contradiction at the heart of our current understanding of individual and collective mobility patterns. On the one hand, a highly influential body of literature on human mobility driven by analyses of massive empirical datasets finds that human movements show no evidence of characteristic spatial scales. There, human mobility is described as scale free[1,2,3]. On the other hand, geographically, the concept of scale—referring to meaningful levels of description from individual buildings to neighbourhoods, cities, regions and countries—is central for the description of various aspects of human behaviour, such as socioeconomic interactions, or political and cultural dynamics[4,5]. Here we resolve this apparent paradox by showing that day-to-day human mobility does indeed contain meaningful scales, corresponding to spatial 'containers' that restrict mobility behaviour. The scale-free results arise from aggregating displacements across containers. We present a simple model—which given a person's trajectory—infers their neighbourhood, city and so on, as well as the sizes of these geographical containers. We find that the containers—characterizing the trajectories of more than 700,000 individuals—do indeed have typical sizes. We show that our model is also able to generate highly realistic trajectories and provides a way to understand the differences in mobility behaviour across

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EDITORIAL | CORONAVIRUS

Mobile phone data for informing public health actions across the COVID-19 pandemic life cycle

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The coronavirus 2019–2020 pandemic (COVID-19) poses unprecedented challenges for governments and societies around the world (*1*). Nonpharmaceutical interventions have proven to be critical for delaying and containing the COVID-19 pandemic (2–6). These include testing and tracing, bans on large gatherings, nonessential business and school and university closures, international and domestic mobility restrictions and physical isolation, and total lockdowns of regions and countries. Decision-making and evaluation or such interventions during all stages of the pandemic life cycle require specific, reliable, and timely data not only about infections but also about human behavior, especially mobility and physical copresence. We argue that mobile phone data, when used properly and carefully, represents a critical arsenal of tools for supporting public health actions across early-, middle-, and late-stage phases of the COVID-19 pandemic.

Table 1. Examples of questions by areas of inquiry.

Situational awareness	Cause and effect
• What are the most common mobility flows within and between COVID-19–affected cities and regions?	• What are variables that determine the success of social distancing approaches?
• Which areas are spreading the epidemics acting as origin nodes in a mobility network and thus could be placed under mobility restrictions?	• How do local mobility patterns affect the burden on the medical system?
• Are people continuing to travel or congregate after social distancing and travel restrictions were put into place?	• Are business' social distancing recommendations resulting in more workers working from home?
• Are there hotspots at higher risk of contamination (due to a higher level of mobility and higher concentration of population)?	• In what sectors are people working most from home?
• What are the key entry points, locations, and movements of roamers or tourists?	• What are the social and economic consequences of movement restriction measures?
Predictive analysis	**Impact**
• How are certain human mobility patterns likely to affect the spread of the coronavirus? And what is the likely spread of COVID-19, based on existing disease models and up-to-date mobility data?	• How have travel restrictions affected human mobility behavior and likely disease transmission?
• What are the likely effects of mobility restrictions on children's education outcomes?	• What is the potential of various restriction measures to avert infection cases and save lives?
• What are likely to be the economic consequences of restricted mobility for businesses?	• What is the effect of mandatory social distancing measures, including closure of schools?
	• How has the dissemination of public safety information and voluntary guidance affected human mobility behavior and disease spread?

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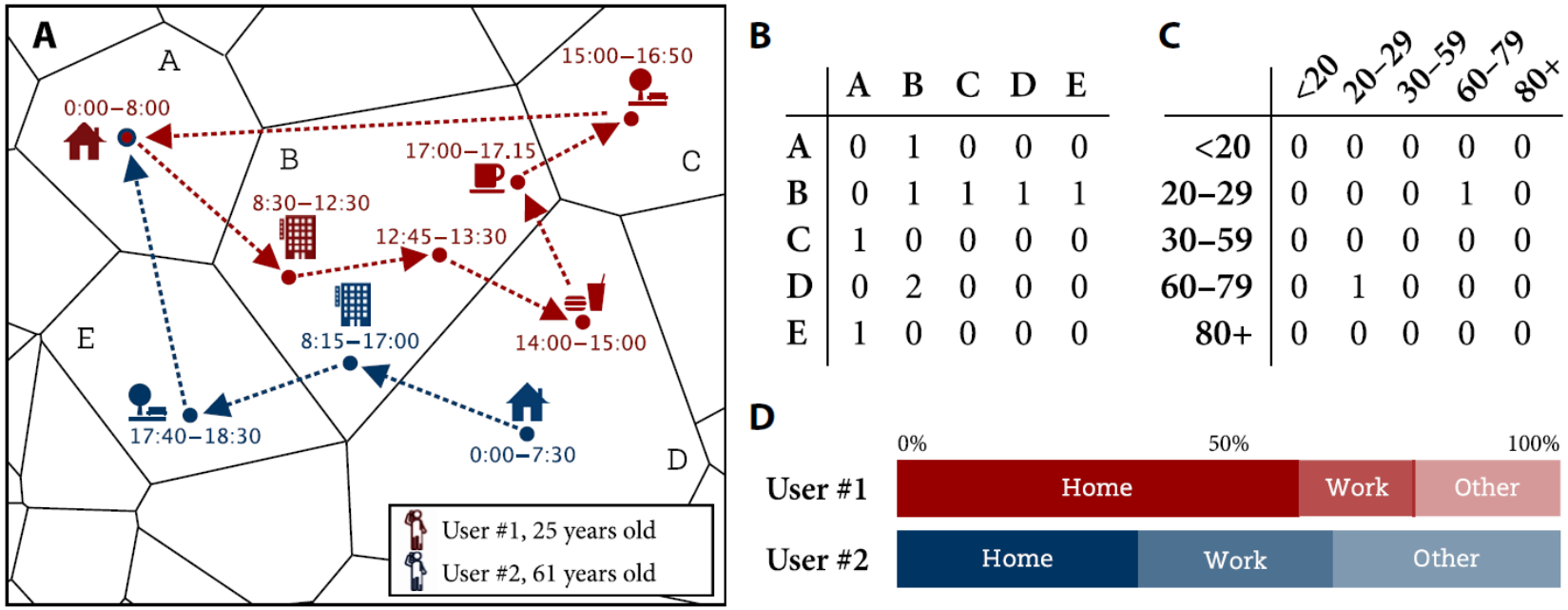
Hvordan forestillede vi os man kunne anonymisere i praksis?



B

	A	B	C	D	E
A	0	1	0	0	0
B	0	1	1	1	1
C	1	0	0	0	0
D	0	2	0	0	0
E	1	0	0	0	0

C

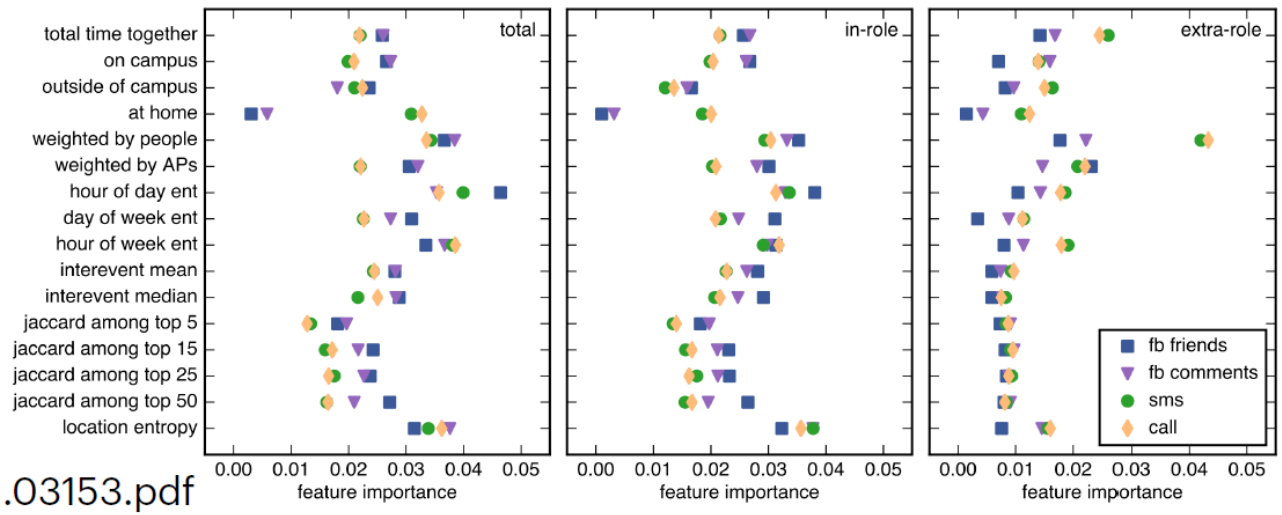
	<20	20–29	30–59	60–79	80+
<20	0	0	0	0	0
20–29	0	0	0	1	0
30–59	0	0	0	0	0
60–79	0	1	0	0	0
80+	0	0	0	0	0

D

Fig. 2. Extraction of aggregated metrics from mobile phone data. (**A**) Raw data representing 1-day mobility of two users. In this example, the area B is a hotspot, as it shows a high concentration of people. (**B**) OD matrix of five different areas, counting the number of trips from one area (rows) to another area (columns). (**C**) Contact matrix counting the number of potential face-to-face interactions between age groups. (**D**) Percentage of time spent at home, work, and other locations.

Sunes vanvittige ide!

- Vi bruger maste-data til at danne et netværk over alle danskere
- Det kan vi gøre ved at trække på information hen over tid
- Og når vi så har netværket kan vi estimere møder i real-time
- Og så kan vi rapportere møderne aggregeret, fx pr geografi, osv.



https://arxiv.org/pdf/1811.03153.pdf

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