

Mobile data collection methods

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Mobility Lab

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Mobility

- **Spatial**
- Social
- Virtual

Forms of spatial mobility

- **Daily mobility** => day, week
- **Travel, tourism** => month
- **Residential mobility** => year
- **Migration** => year, life

Data collection

- Counting (number of people, cars *etc*)
 - Visual
 - Observing
 - Following
 - Car plate counting
 - Automatic,
 - Electronic
- Smart transportation card
- Questionnaires & interviews
 - Face to face
 - Mail, E-mail
 - Online
- Self reporting
 - Travel diary
 - (Smart) Mobile phone

Modern data collection: Tracking

- **Mobile phone**
 - CDR
 - GPS
- Bluetooth
- ...

Mobile positioning

- Finding location of mobile telephone with radio waves.


Memory files of Mobile Network Operators:

- Call detail records (CDR) –location and time of call and number of respondent (user id, location, time)
- Passive mobile positioning

Data table

ID	event	time	Cell ID	Resiever ID	Reciever Cell ID
246513389	call	07.04.2014 12:15:11	6547	246513389	3257

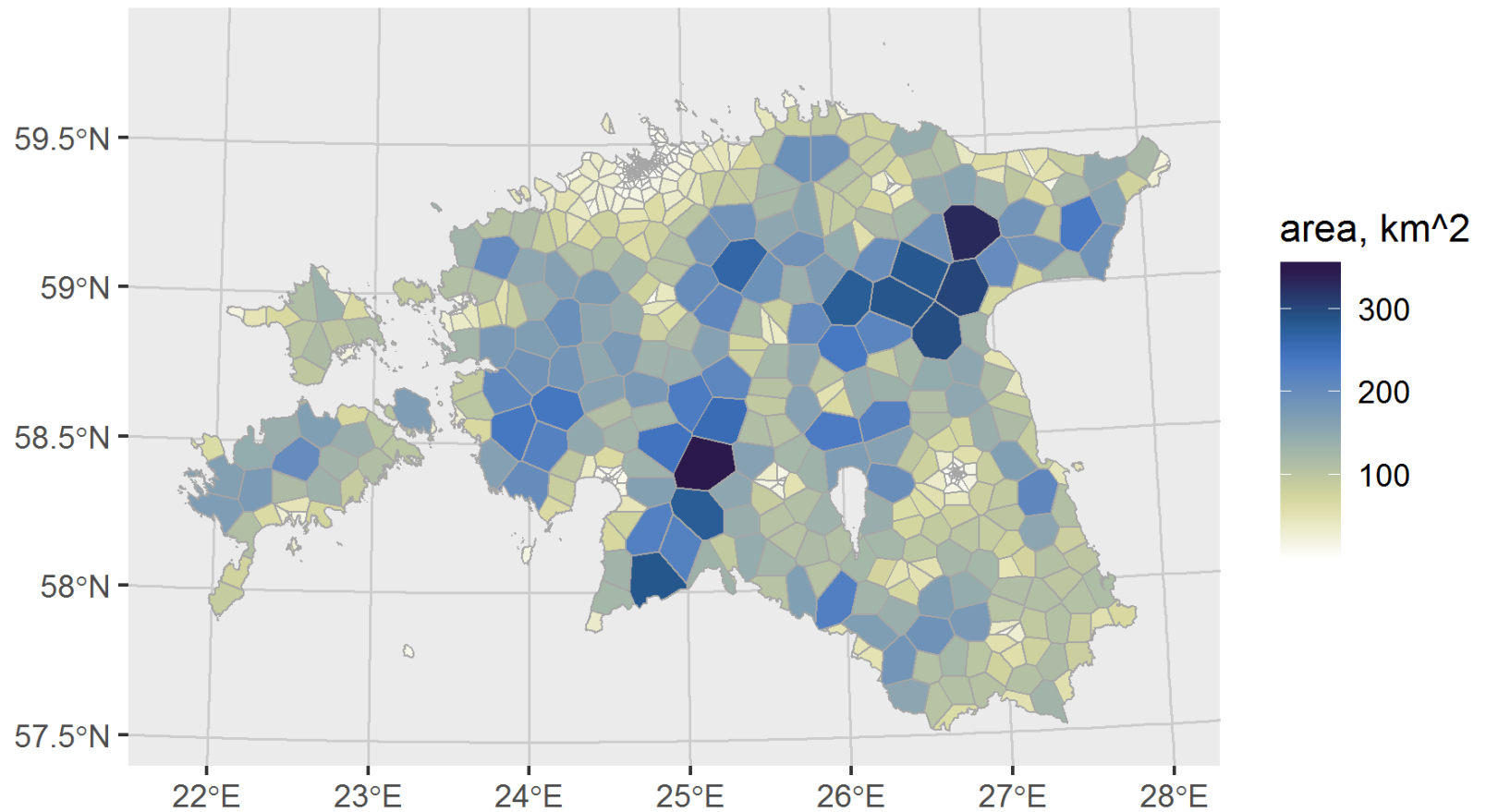
Geography



Cell ID	Site ID	long	Lat
6547	123	25.80527	58.34998

Spatial resolution of CDR

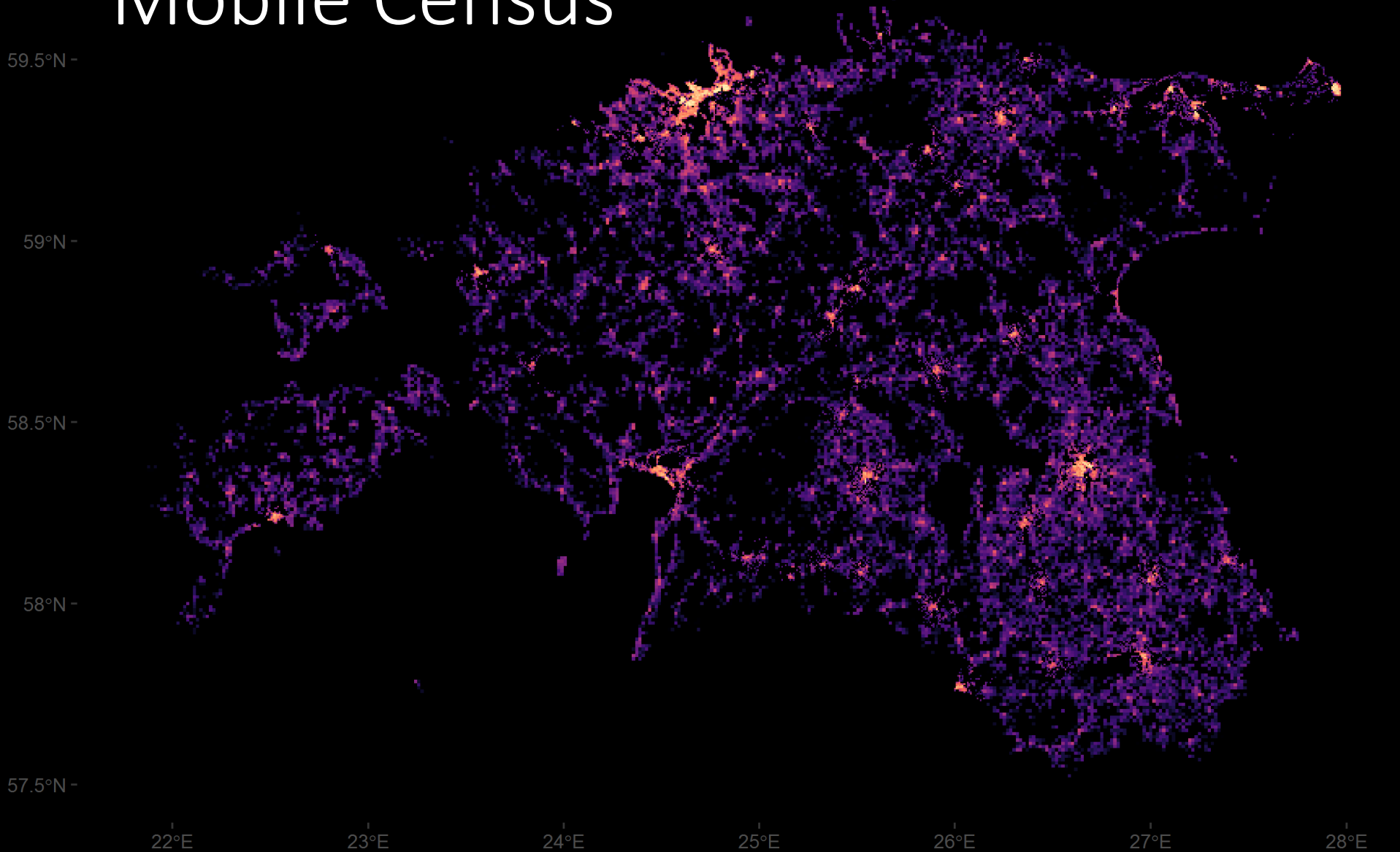
Voronoi diagram of antennas



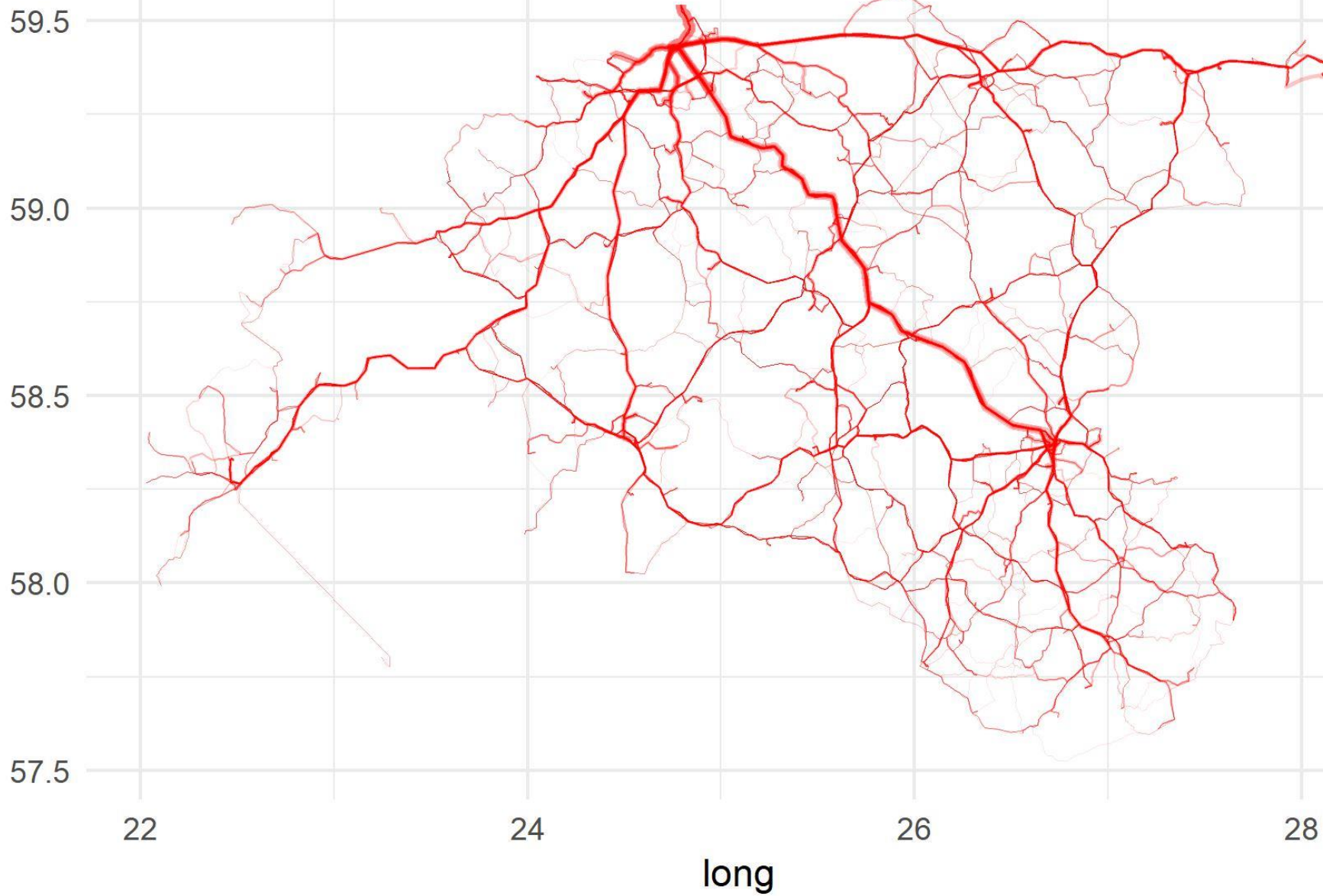
Mobile positioning (CDR) in mobility studies

- Population statistics
 - Census
 - Migration
 - Commuting
- Central places & catchment areas
- Tourism statistics

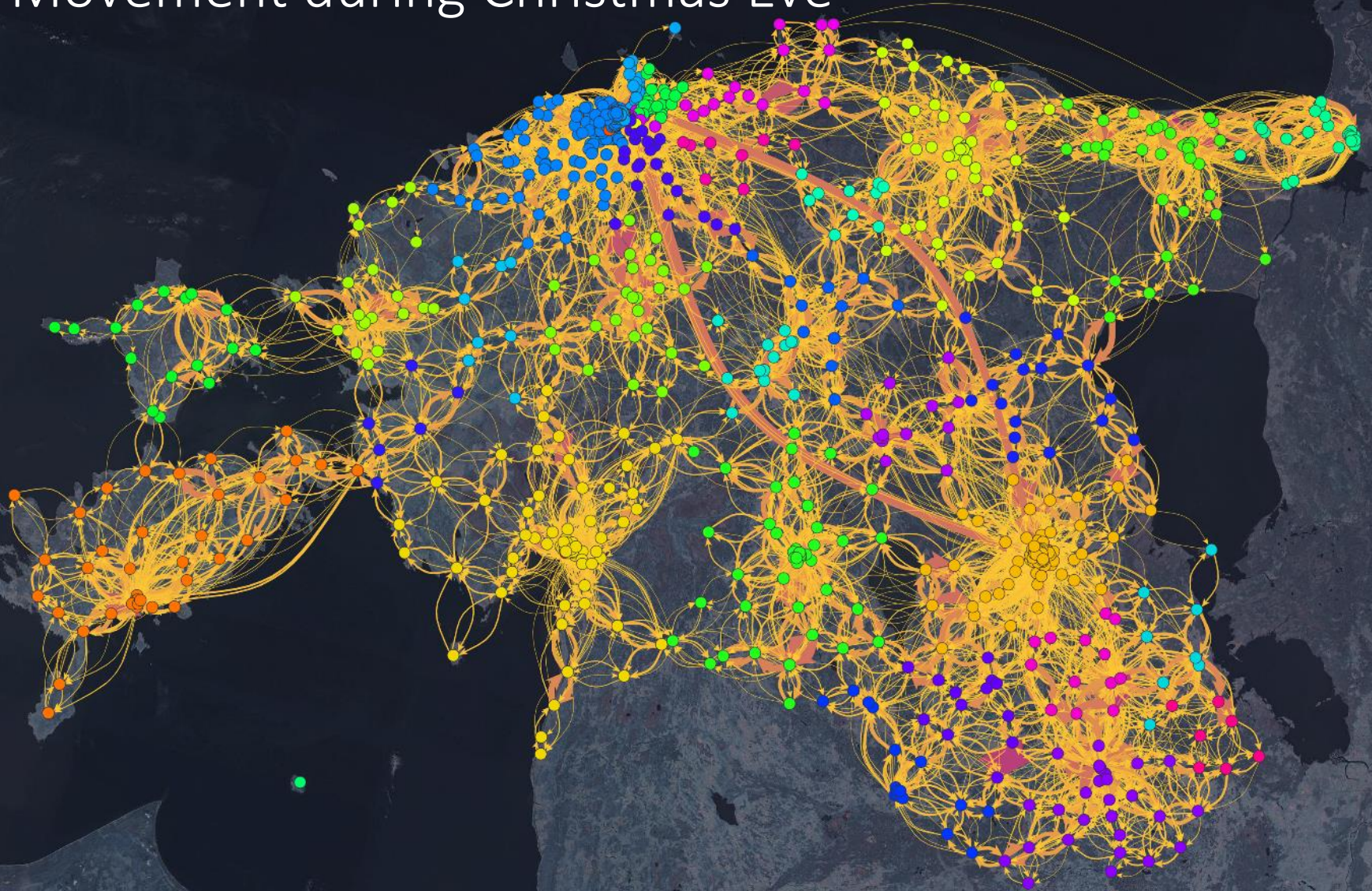
Mobile Census



Routing



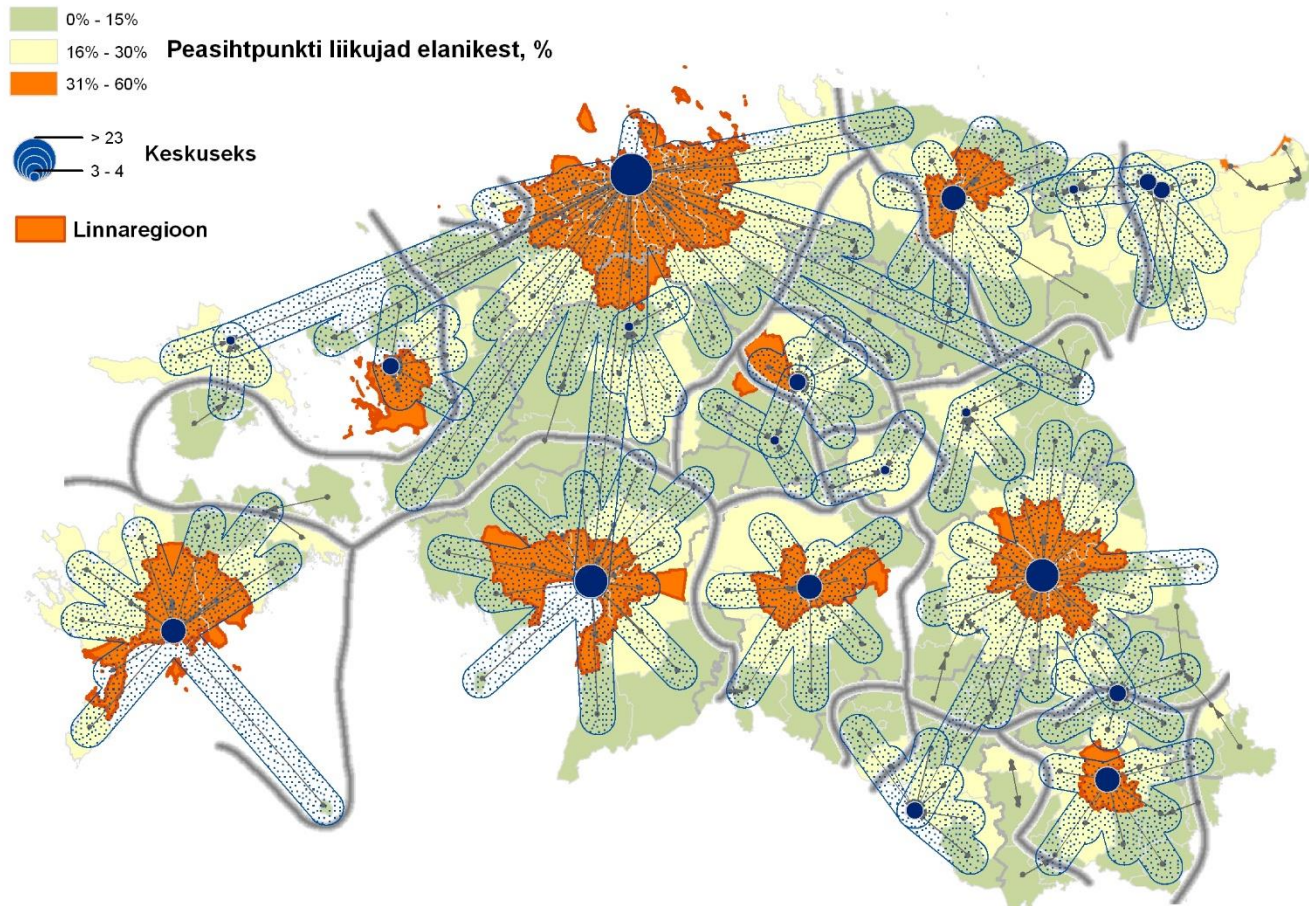
Movement during Christmas Eve



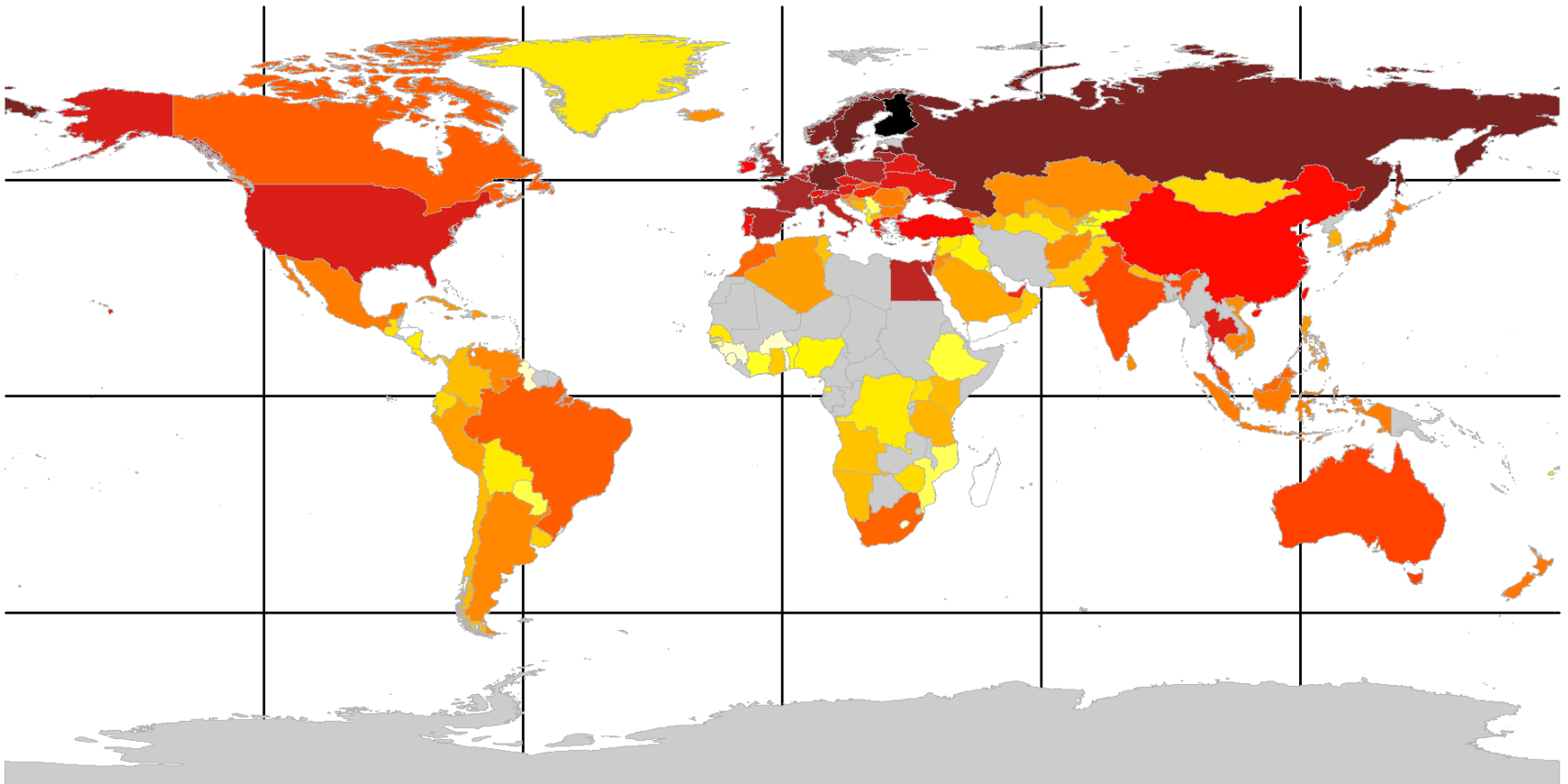
Migration



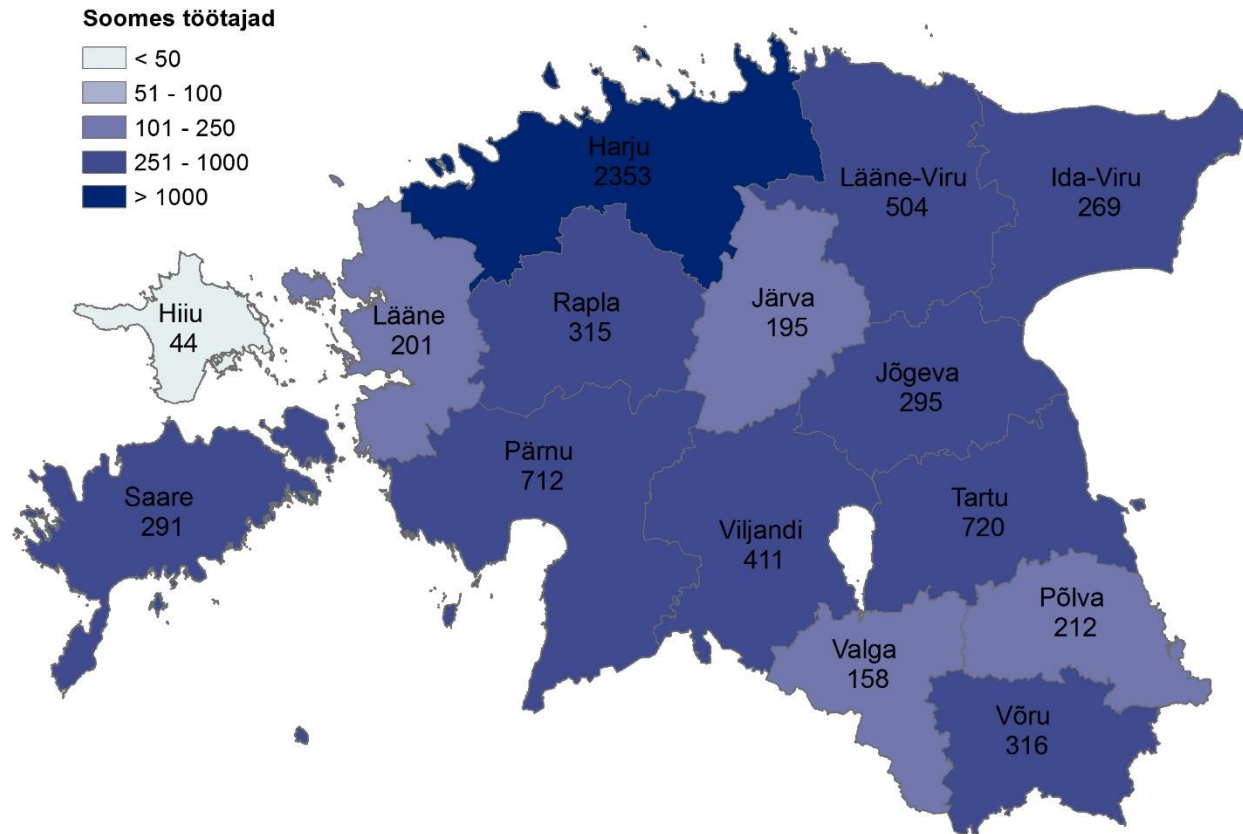
Central places & hinterlands (commuting)



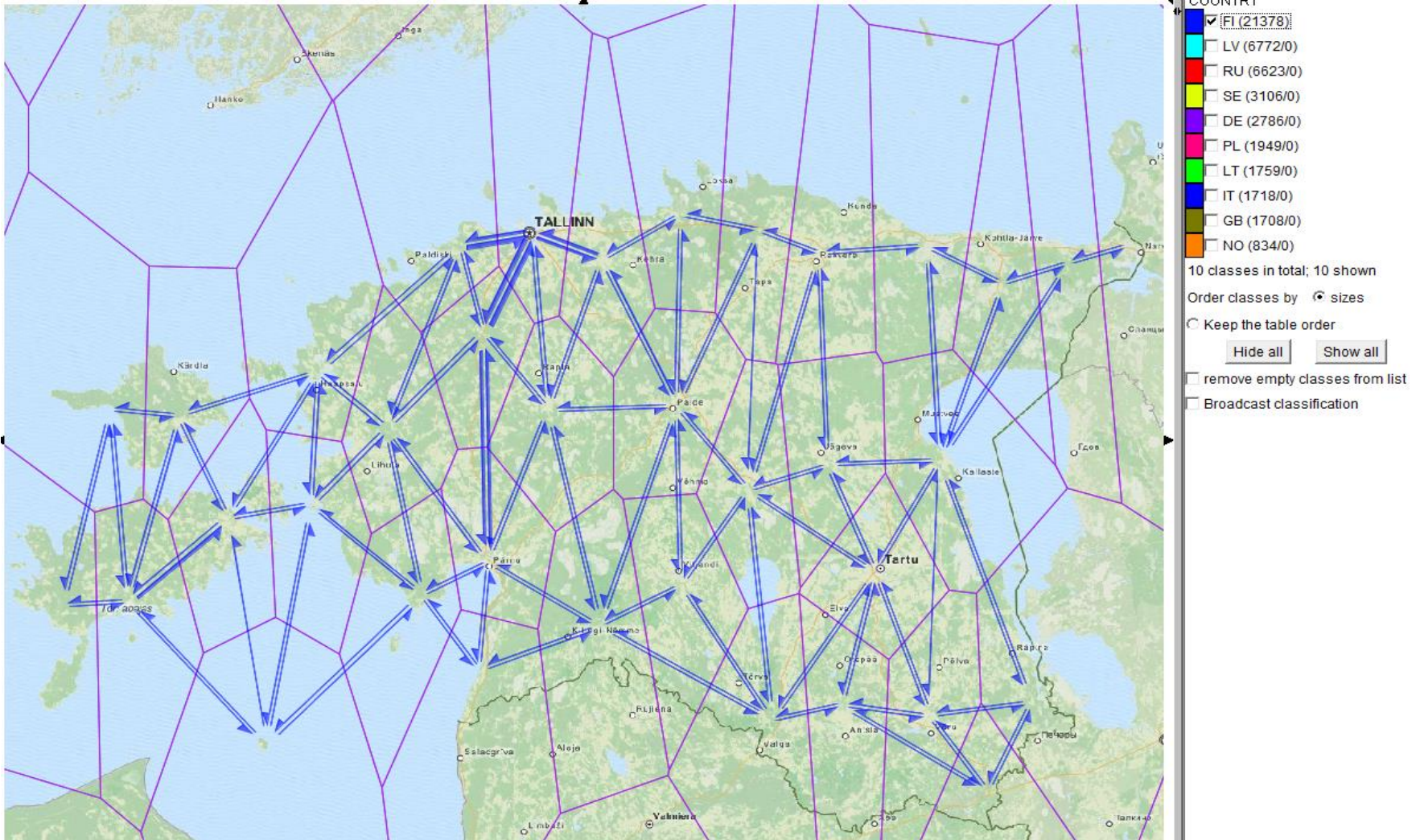
Estonians abroad



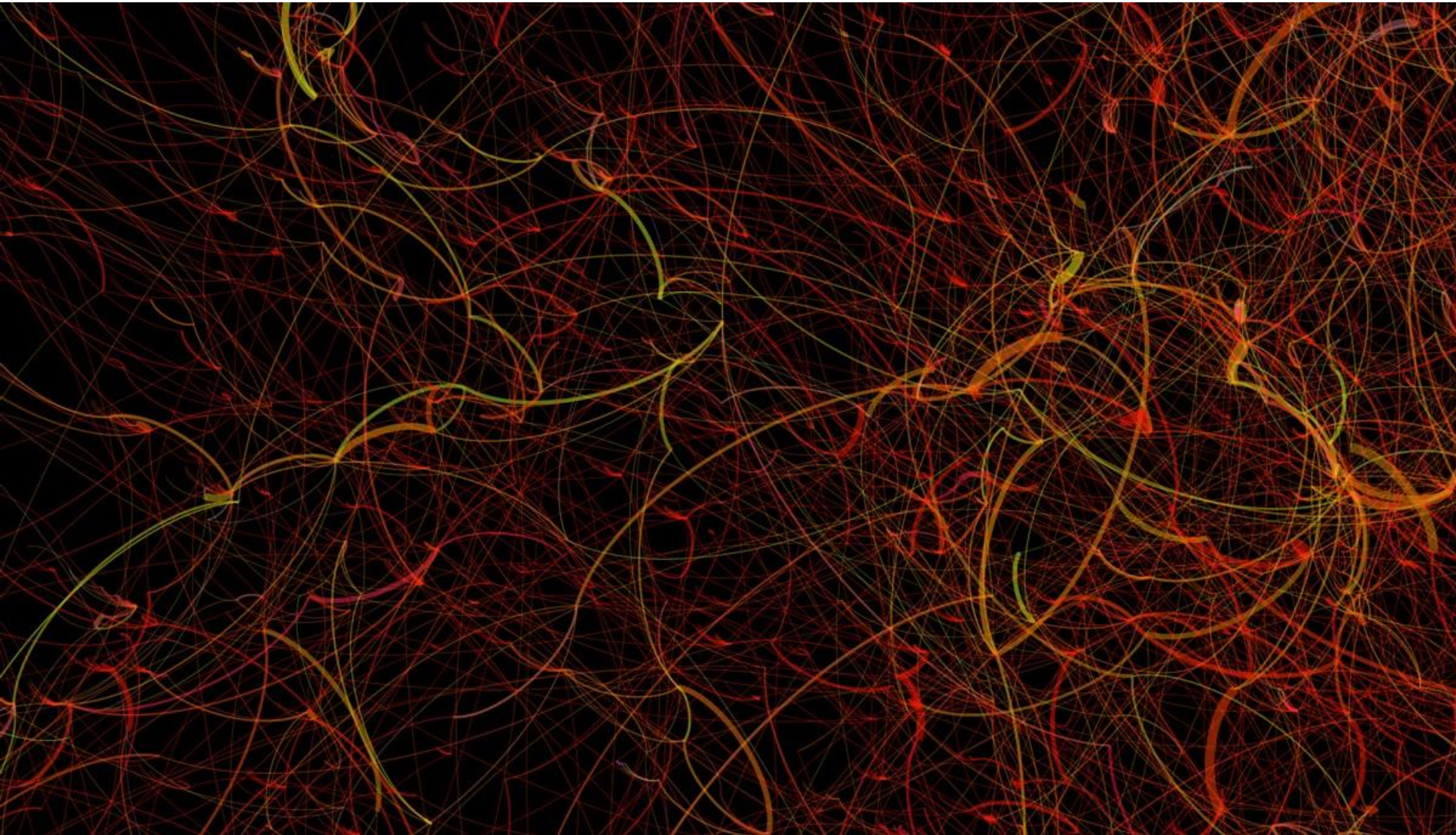
Estonians working in Finland



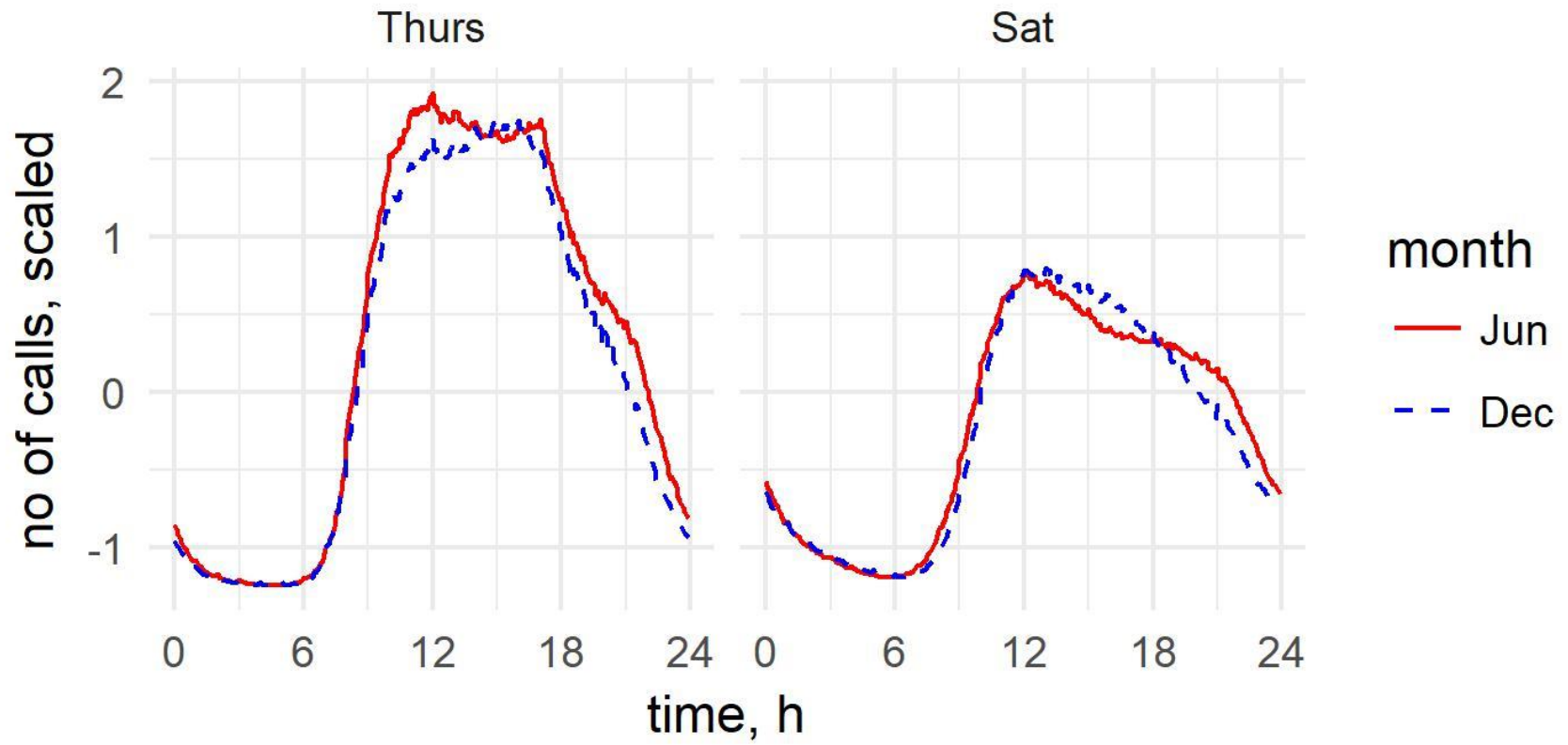
Finnish people in Estonia



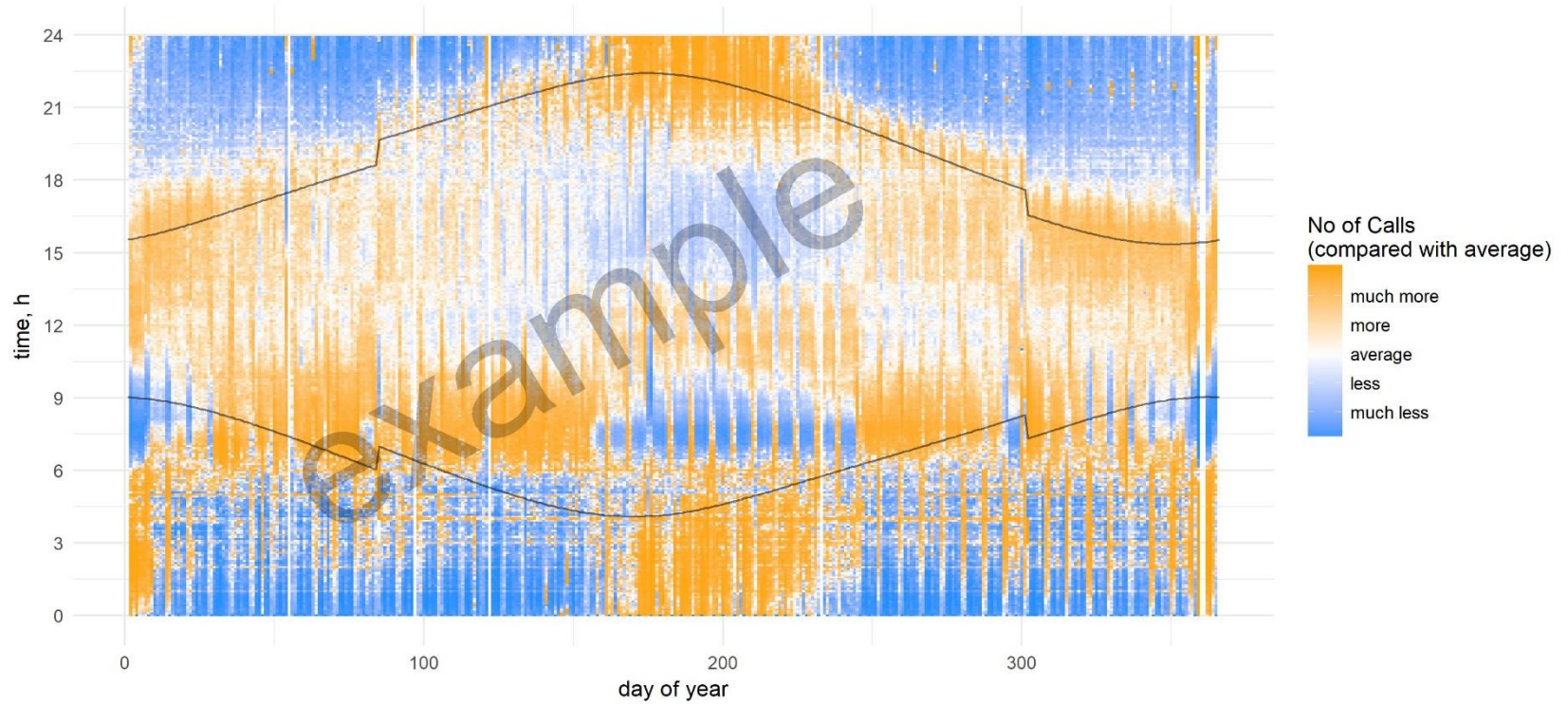
Social networks



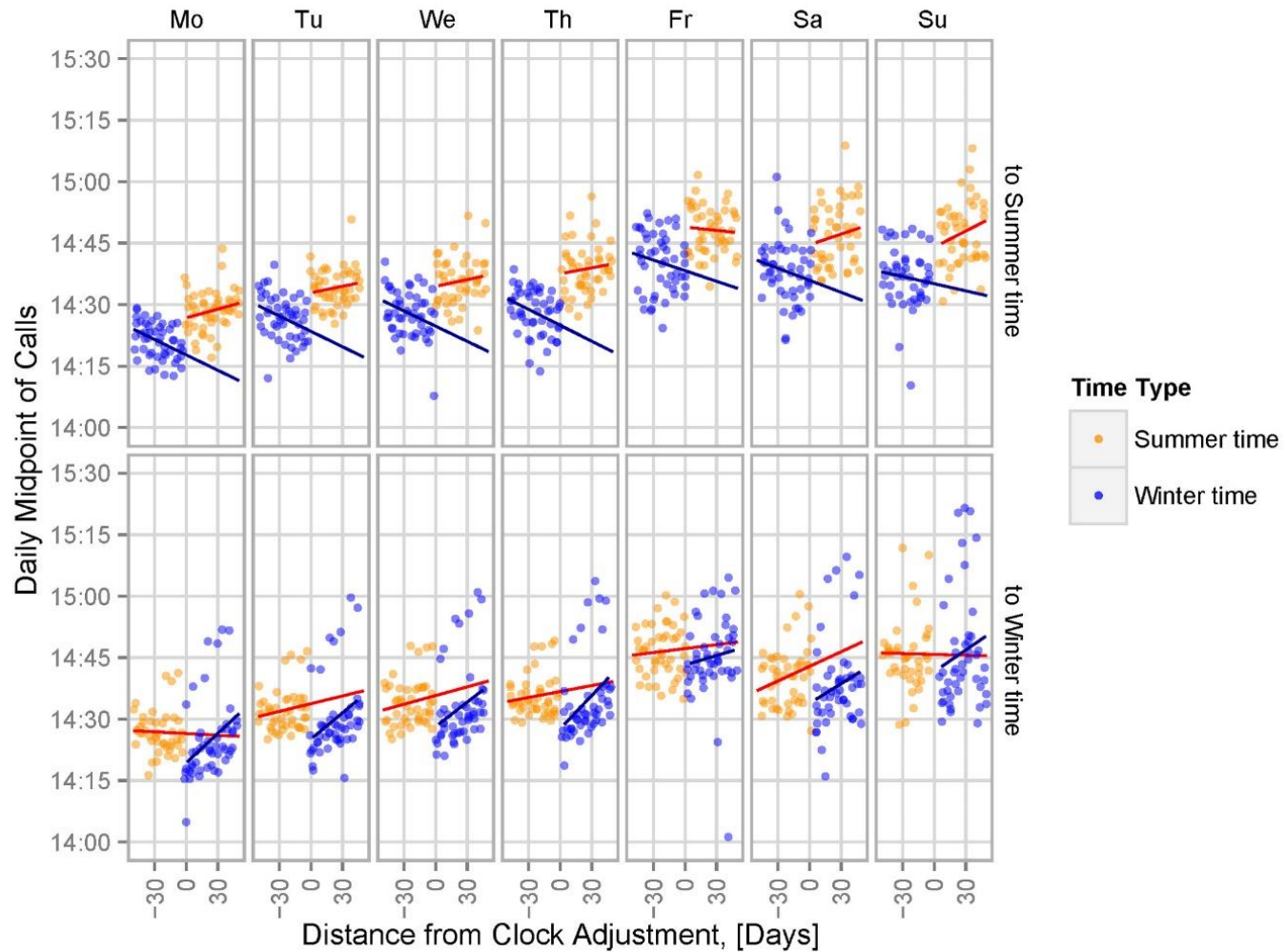
Diurnal rhythm



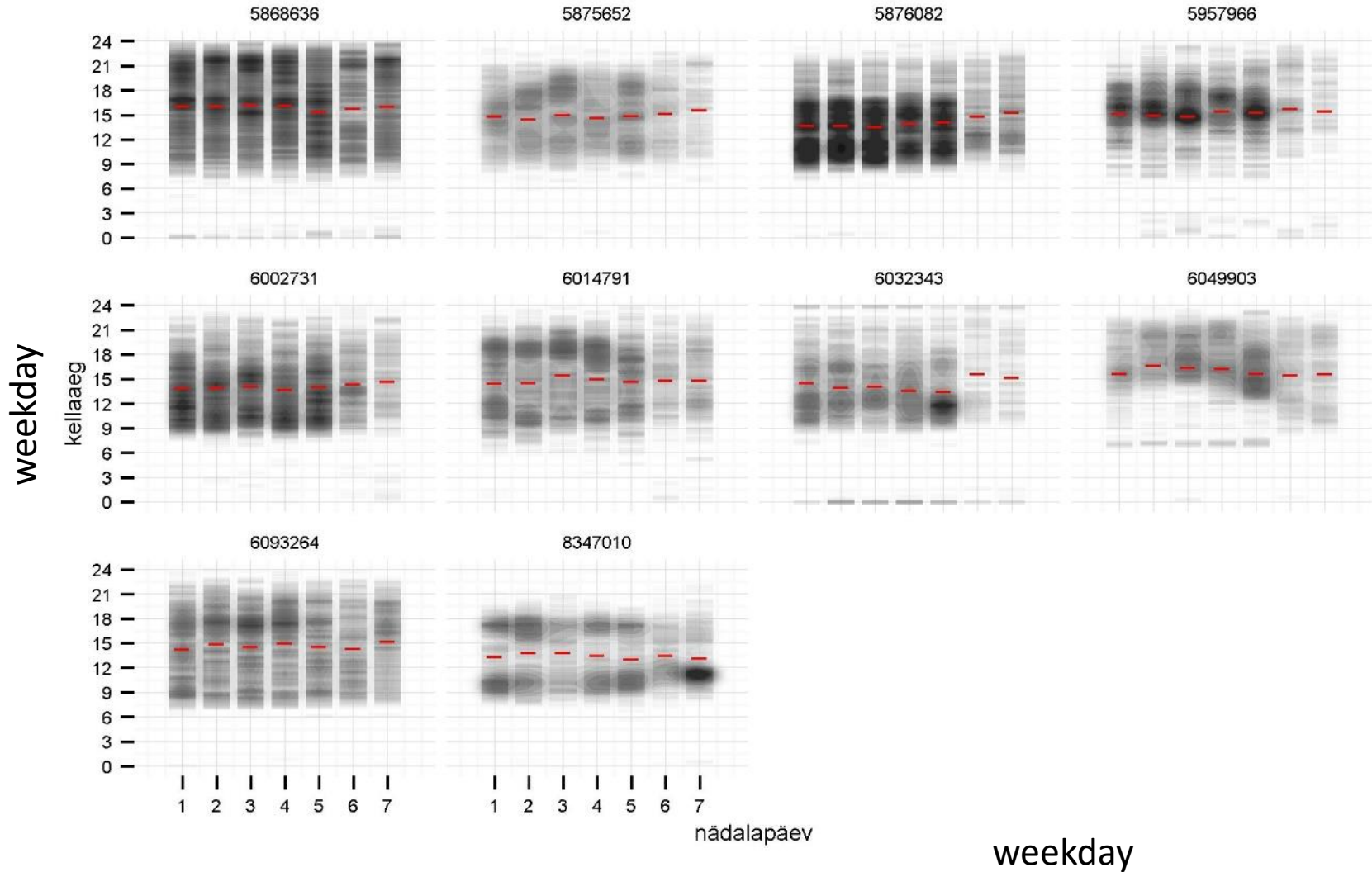
Seasonality of diurnal rhythm



Wintertime vs summertime

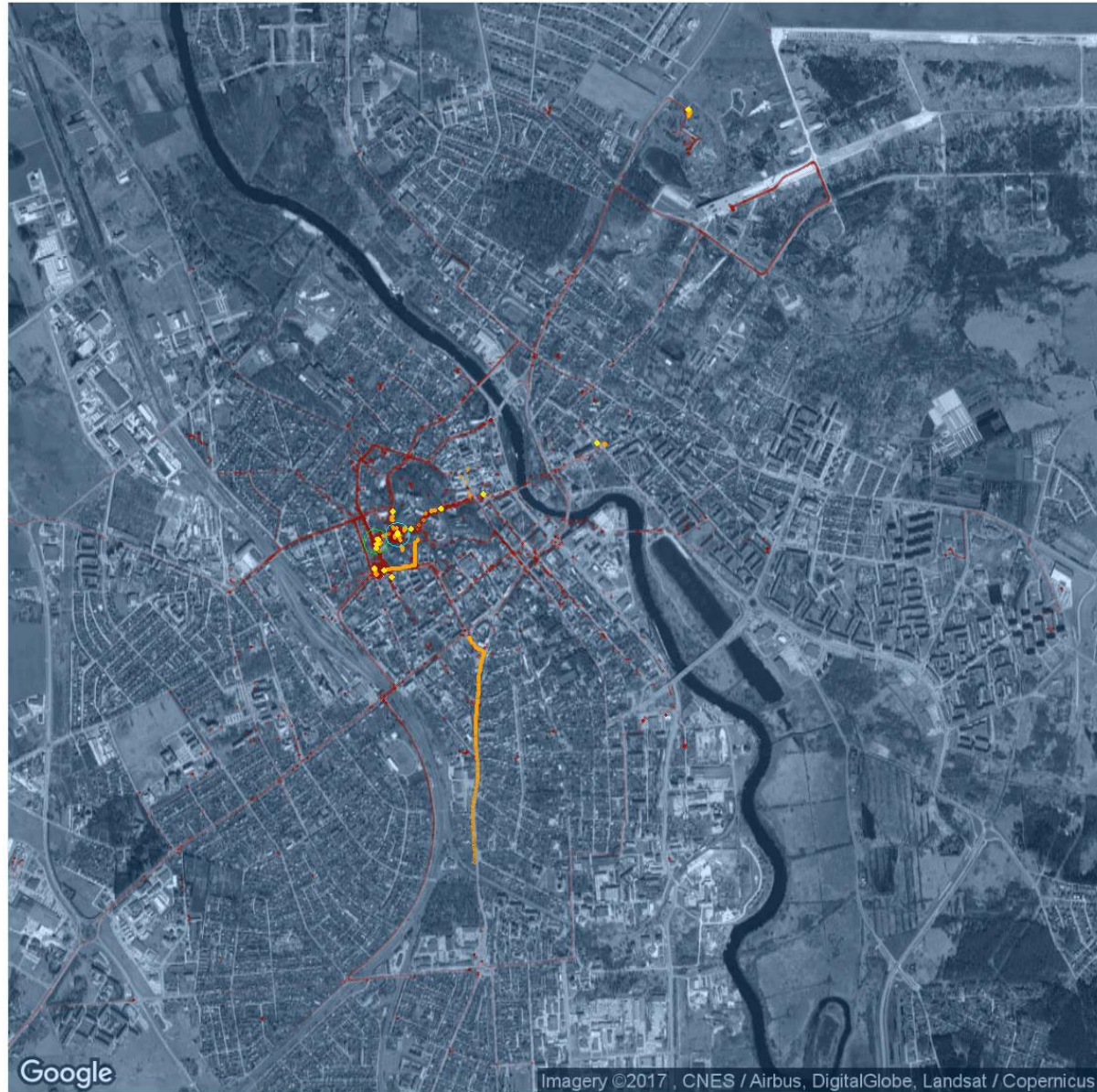


Chronotypes

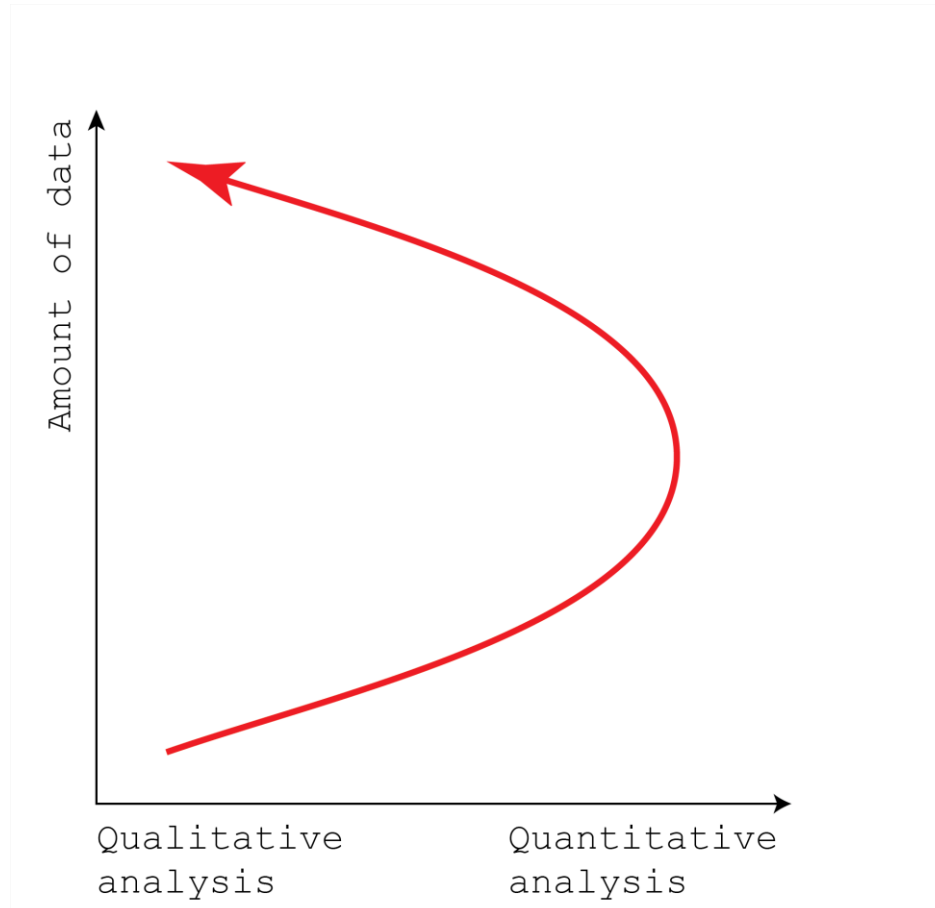


12:00:09

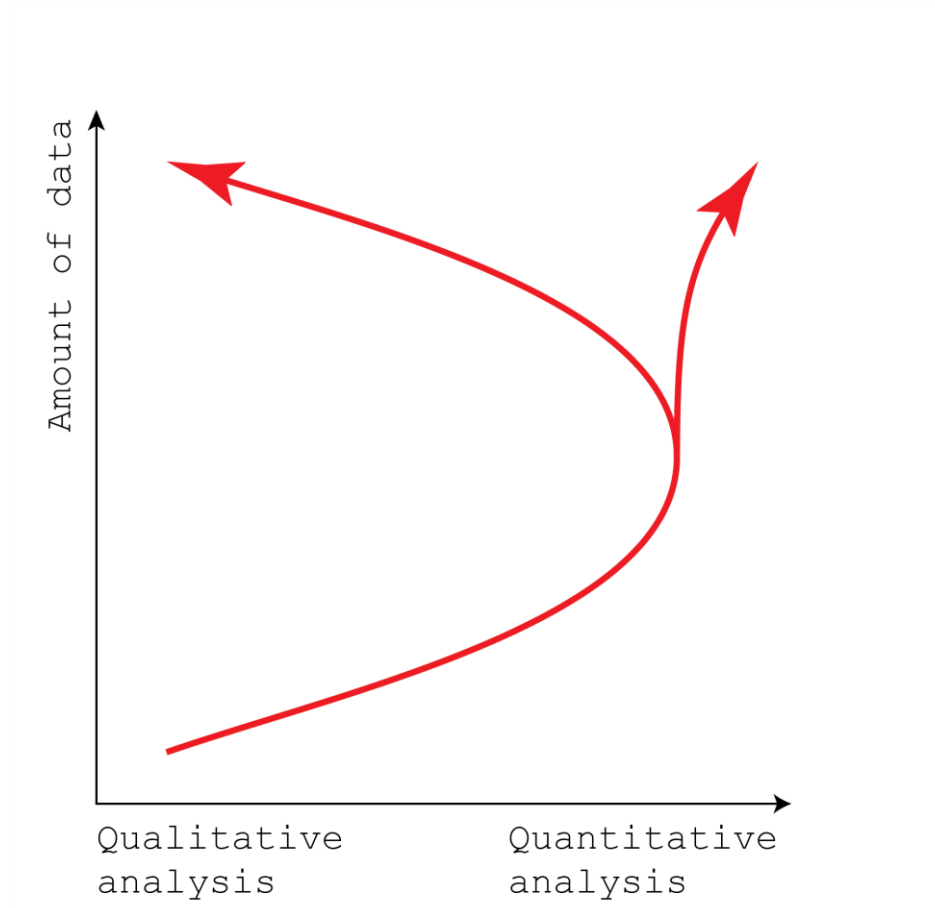
GPS:



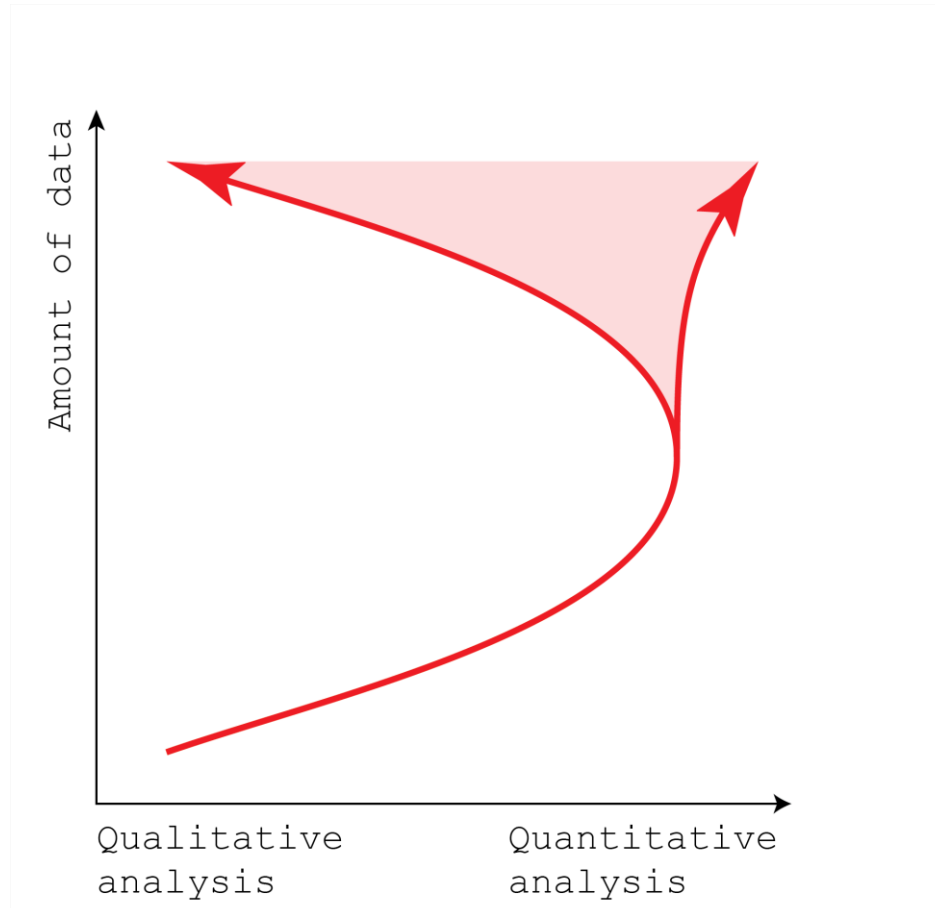
Richness of big data



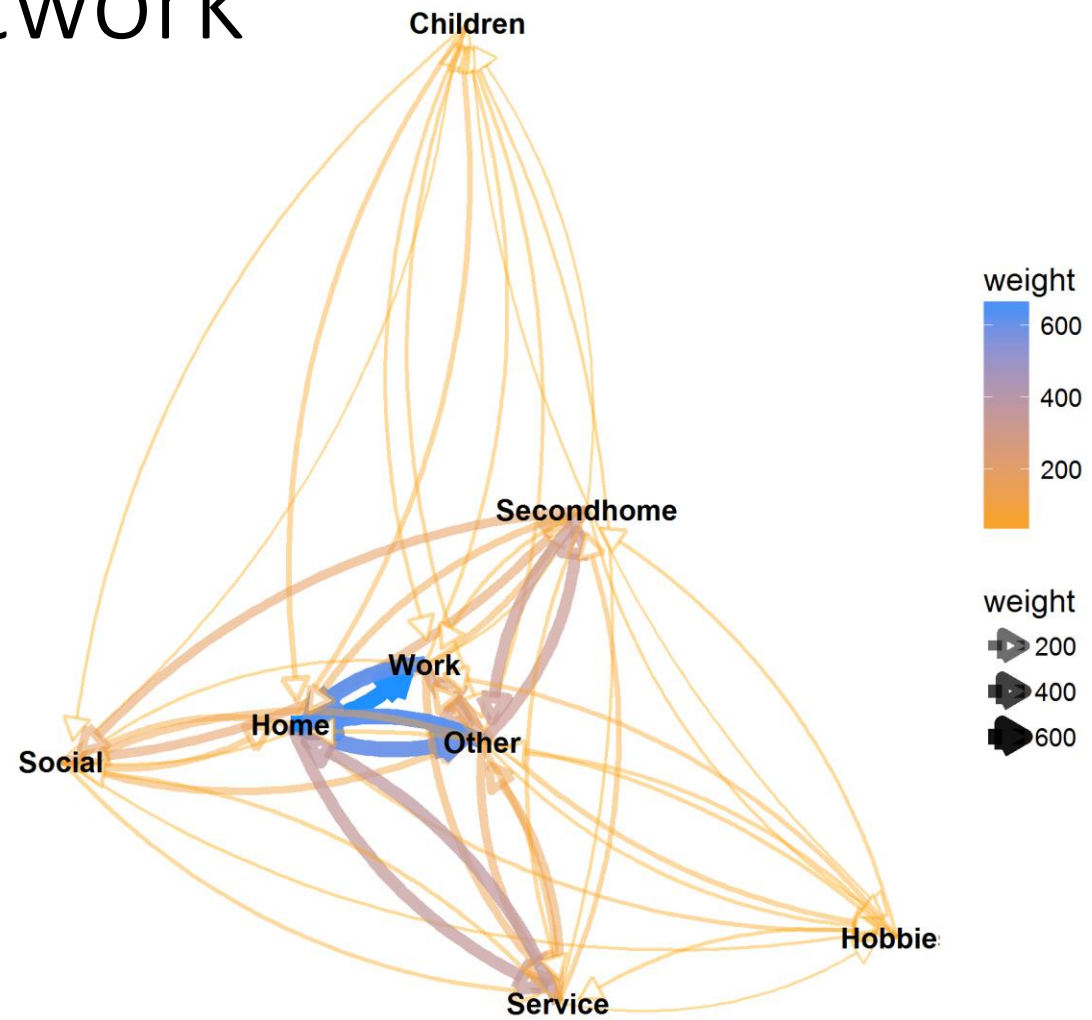
Richness of big data



Richness of big data



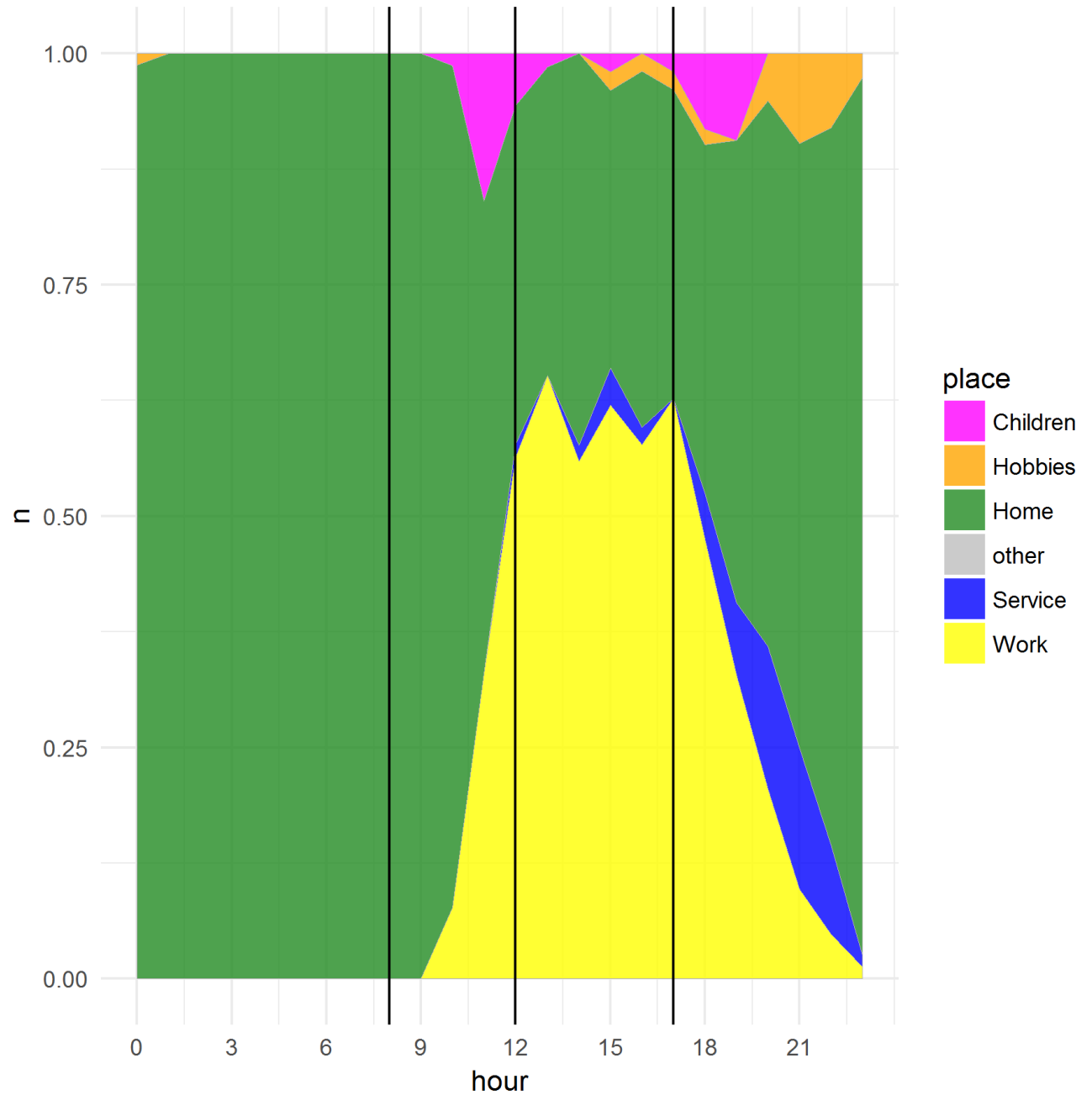
Social network



Routine...



GPS: Time budget



<http://aasa.ut.ee/digitalMethods>

- File => New File => R Script
 - run the command: CTRL + ENTER
 - comment: #
- Set working Directory: `setwd()`
- TAB-key
 - call commands, objects
 - ('C:/...')- import address (if not in working dir)
- Graph export
 - `png()`
 - `plot`
 - `dev.off()`