

alpha and b for the layers

- Minimize mean error between matrix of real p_{ij} and predicted p_{ij} based on

$$p_{ij} = \frac{1}{1 + [b^{-1}d(\mathbf{x}_i, \mathbf{x}_j)]^\alpha}$$

- Mean probability= $1.3e-5$

alpha and b for the layers

- So could not give a valuable value for alpha and b for the different layers
- The values that I got when minimizing the parameters are:
 - Household: 1.62 1.e-100, error \Rightarrow 9.47e-06
 - Family: 19.945, 0.57, error \Rightarrow 4.1e-3
 - Neighbours: 5.22e-2, 1e-100, error \Rightarrow 1.67e-05
 - Work/school: 19.396, 6.26e-05, error \Rightarrow 3.4e-5
- Took longer than expected because I tried different ways to get a lower error such that it is more valuable

Alternatives

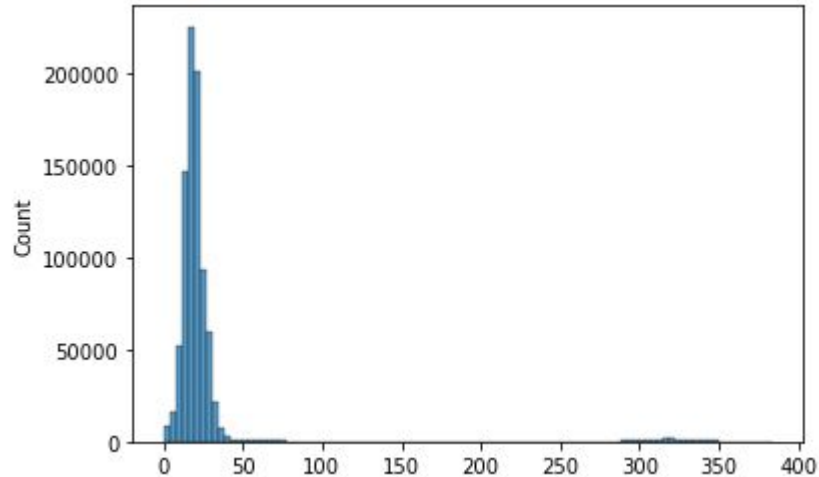
- Maybe it's still valuable to look at some alternatives:
 - Ei index
 - Blau's heterogeneity index
 -

Analysis so far on the networks with different properties

- I looked mainly at the:
 - Degree distribution
 - Reciprocity
 - Small world property \Rightarrow average shortest path
 - Assortativity degree
- Looked
- Didn't have enough time for a thorough analysis
- *Idea to make a local host or web server where all the graphs and statistics can be viewed*

Neighbours

- Degree distribution
- Other, male, 3, 20-30 has a lot of connections with itself
- Results in this distribution:

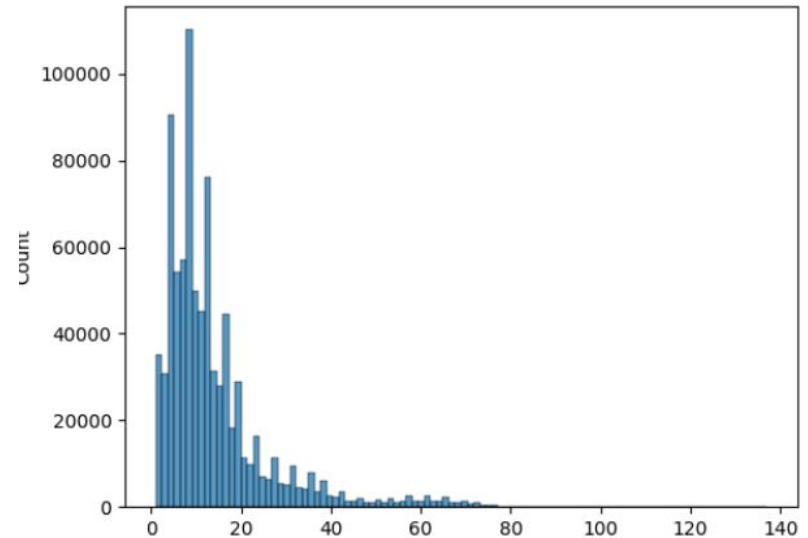


Neighbourhood

- More unfindable shortest paths with spatial data:
 - Logic as the neighborhood do not connect
- Shortest path is around 5
- 10000 are not connected
- High assortativity

Family

- Not a normal distribution
-

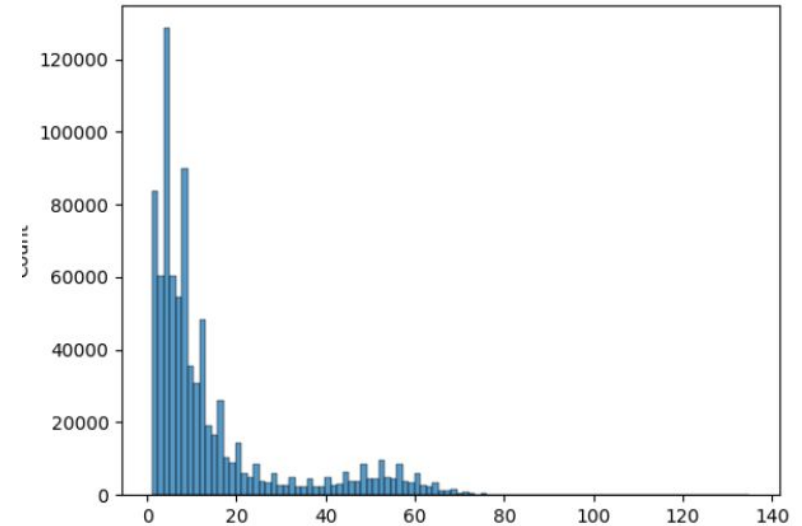


Family

- 849000 connected nodes
- Assortativity of around 0.6
- Shortest path around 5-6

Household

- Also not a normal distribution
- No shortest path
- Assortativity of 0.55



Workschool

- Lowest assortativity (around 0.16)
- High reciprocity results in shorter path

To do

- Finish analysis
- Make also analysis on multilayered
- Look at distributions
- Send probability matrix
- Log likelihood == > max entropy method
- Send email to Loes about
- Look at it as a classifier
- <https://steppi.github.io/2021/10/01/fermi-dirac.html>
- Modularity
- SA on parameters network

$$p_{ij} = \frac{a}{1 + (b^{-1}d)^{\alpha}}$$

for same group $d=0$

$$p_{ij} = \frac{a}{1 + (b^{-1}d)^{\alpha}}$$

for elements
in the same
group

