Airport Network Analysis

Group A

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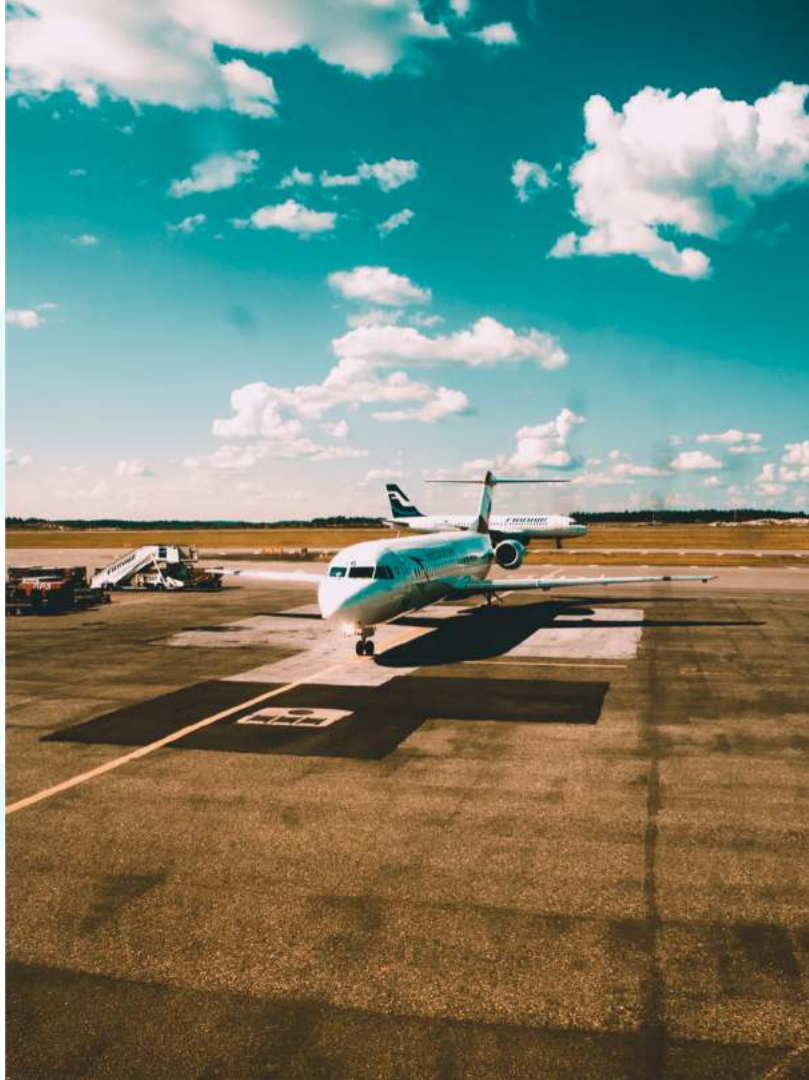
Madrid vs Barcelona, Which is Better?

Outline

1. Data Source and Initial Graphing
2. Centrality Measures
3. Community Detection
4. Insights & Analysis



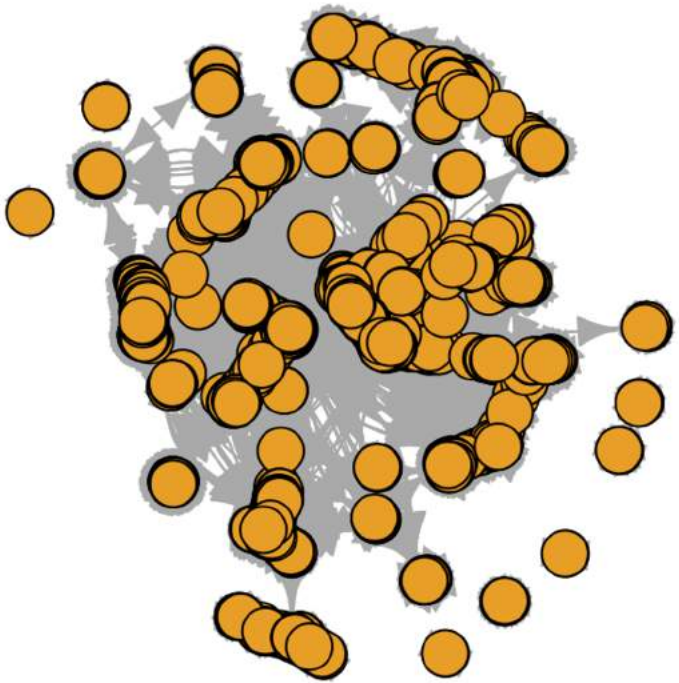
Data Source and Initial Graphing

Data Source

In our analysis, we've used two data sets:

- Routes
  - Last updated in 2014, contains information of source and destination airports, airlines...etc.
- Airports
  - Last updated in 2017, contains information about latitude, longitude of the airport, the country and city where the airport locates, time zones... etc.

Both are from openflights.org



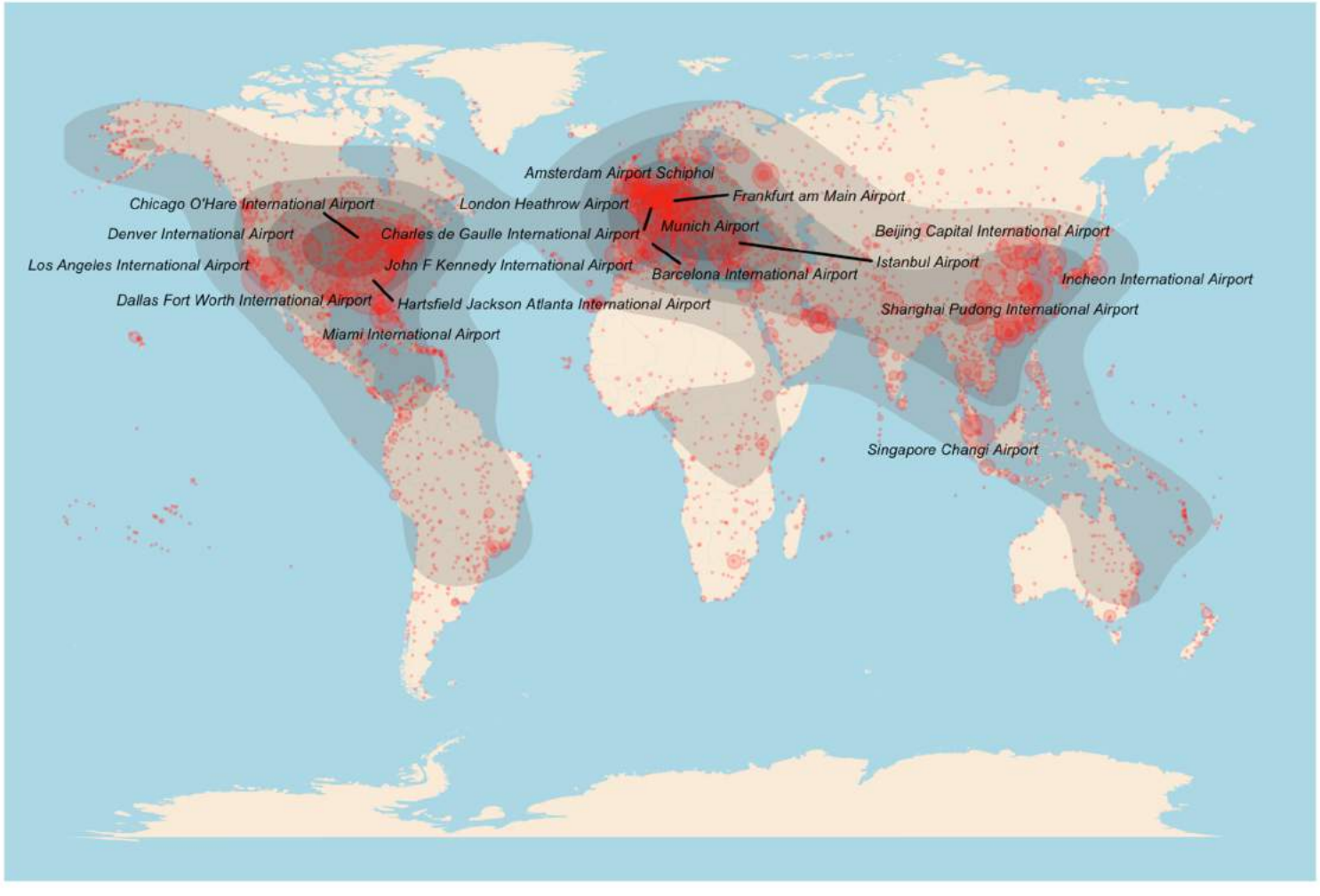
Initial Graphing

Characteristic of the graph:

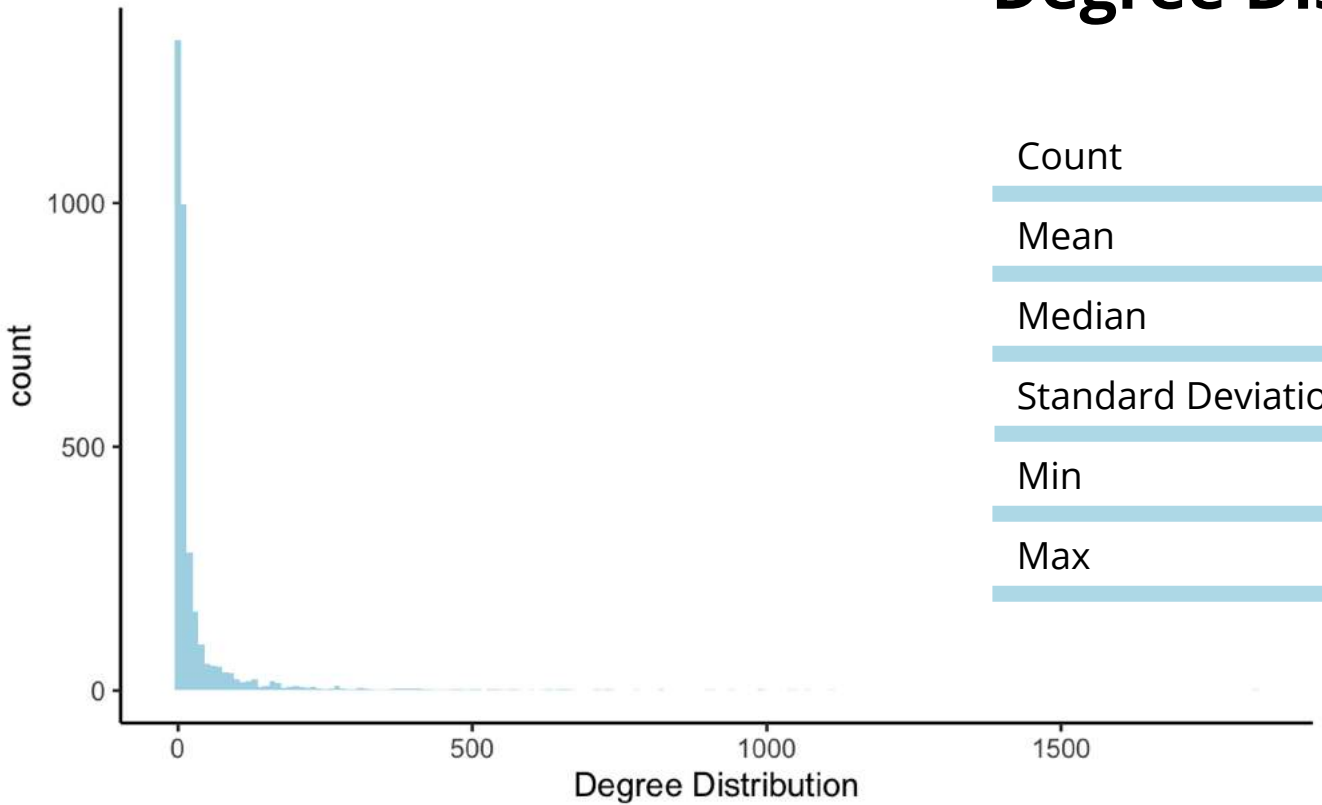
- 67,663 edges
- 3,425 vertexes
- Directed graph
- Weighted

Centrality Measures

Degree Centrality

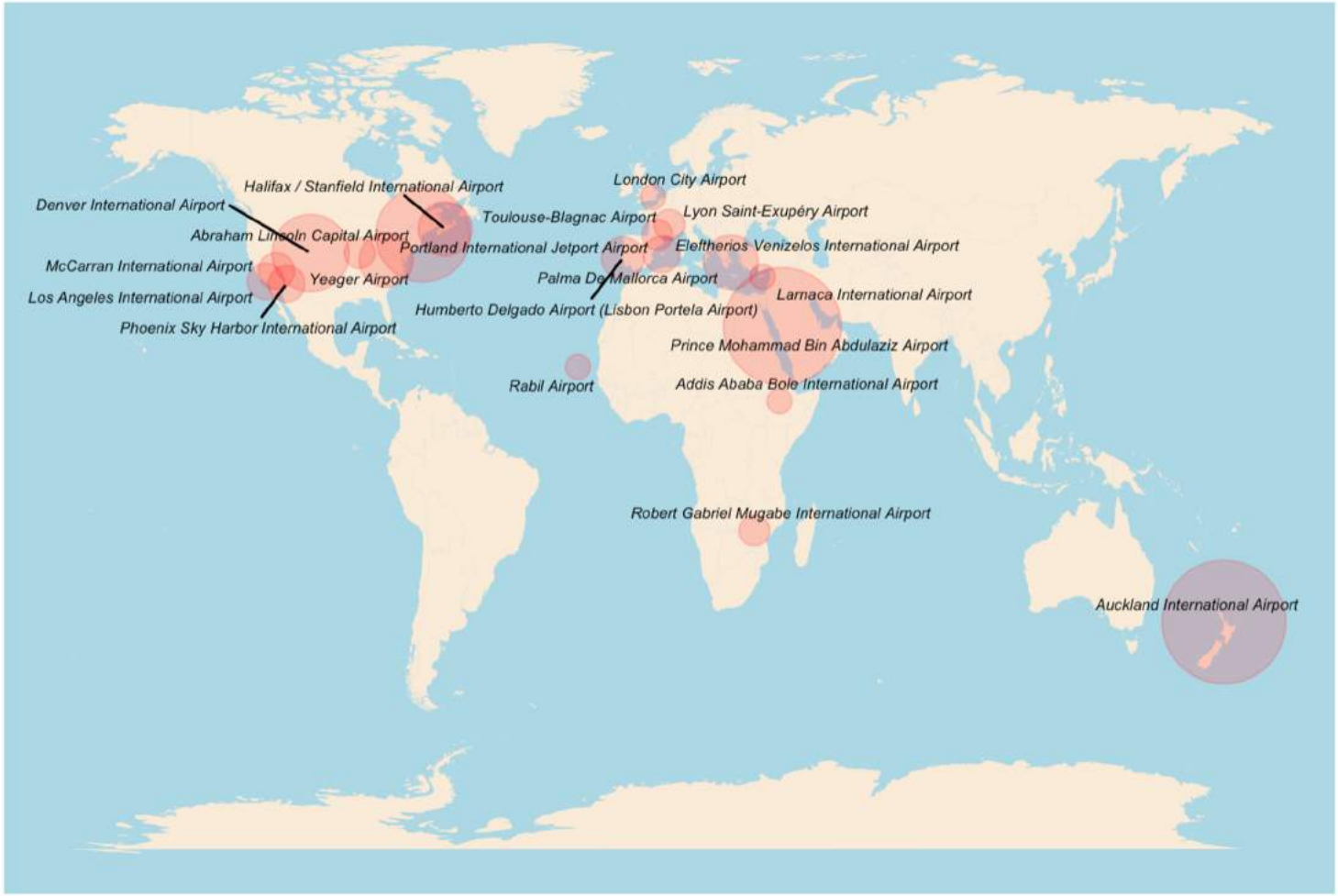


Degree Distribution

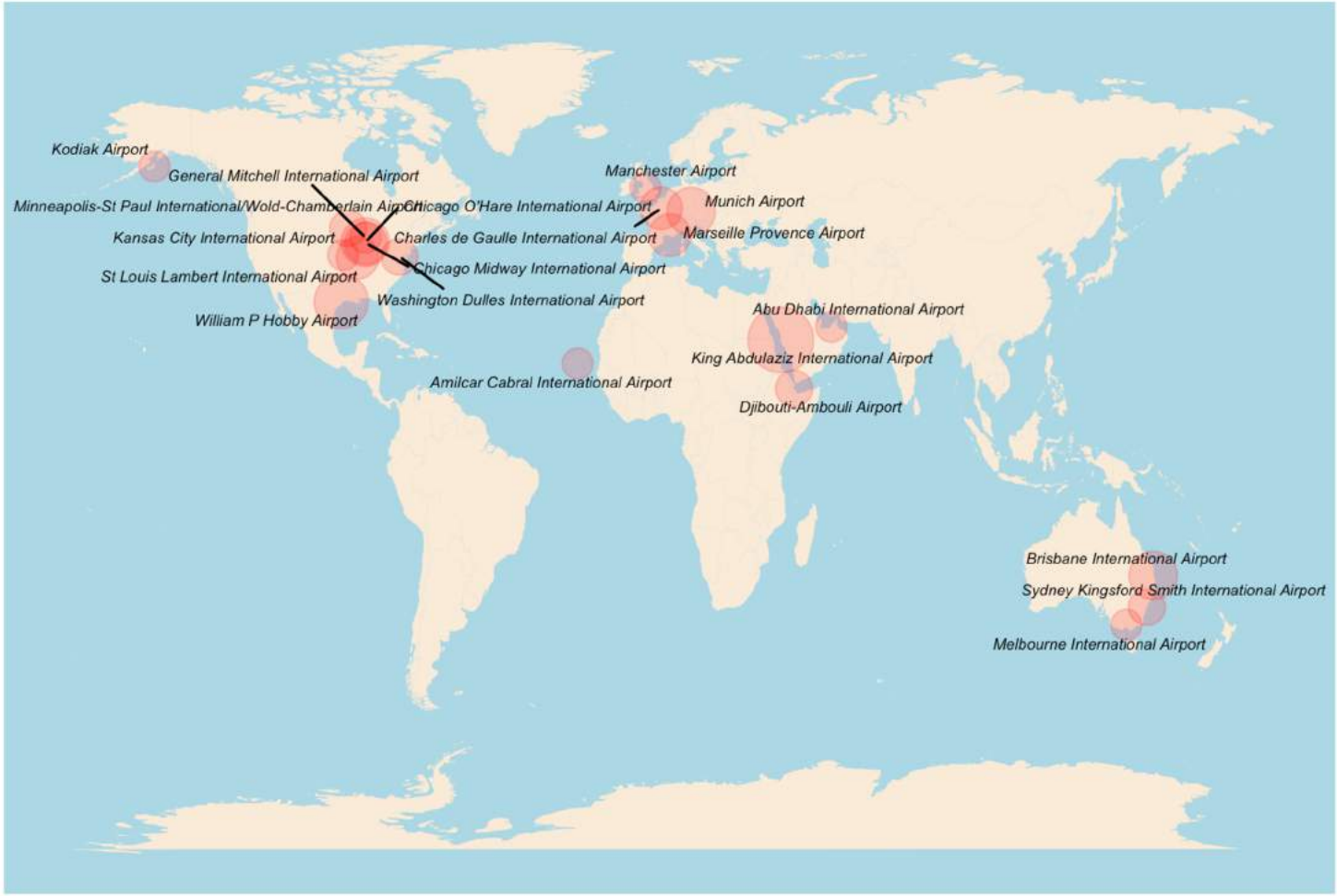


Count	3,425
Mean	39.15
Median	8
Standard Deviation	106.72
Min	1
Max	1,826

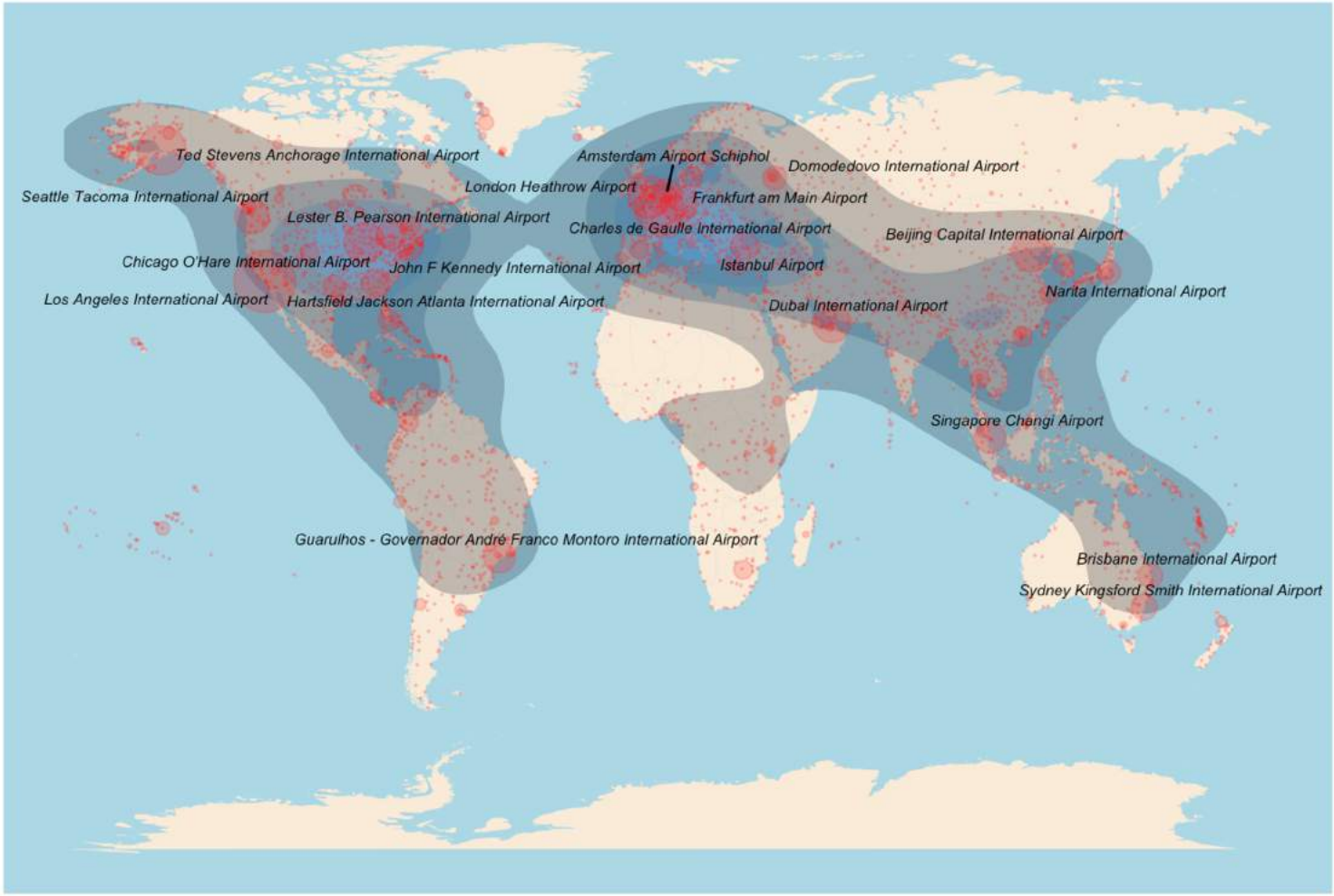
Most Incoming Airports



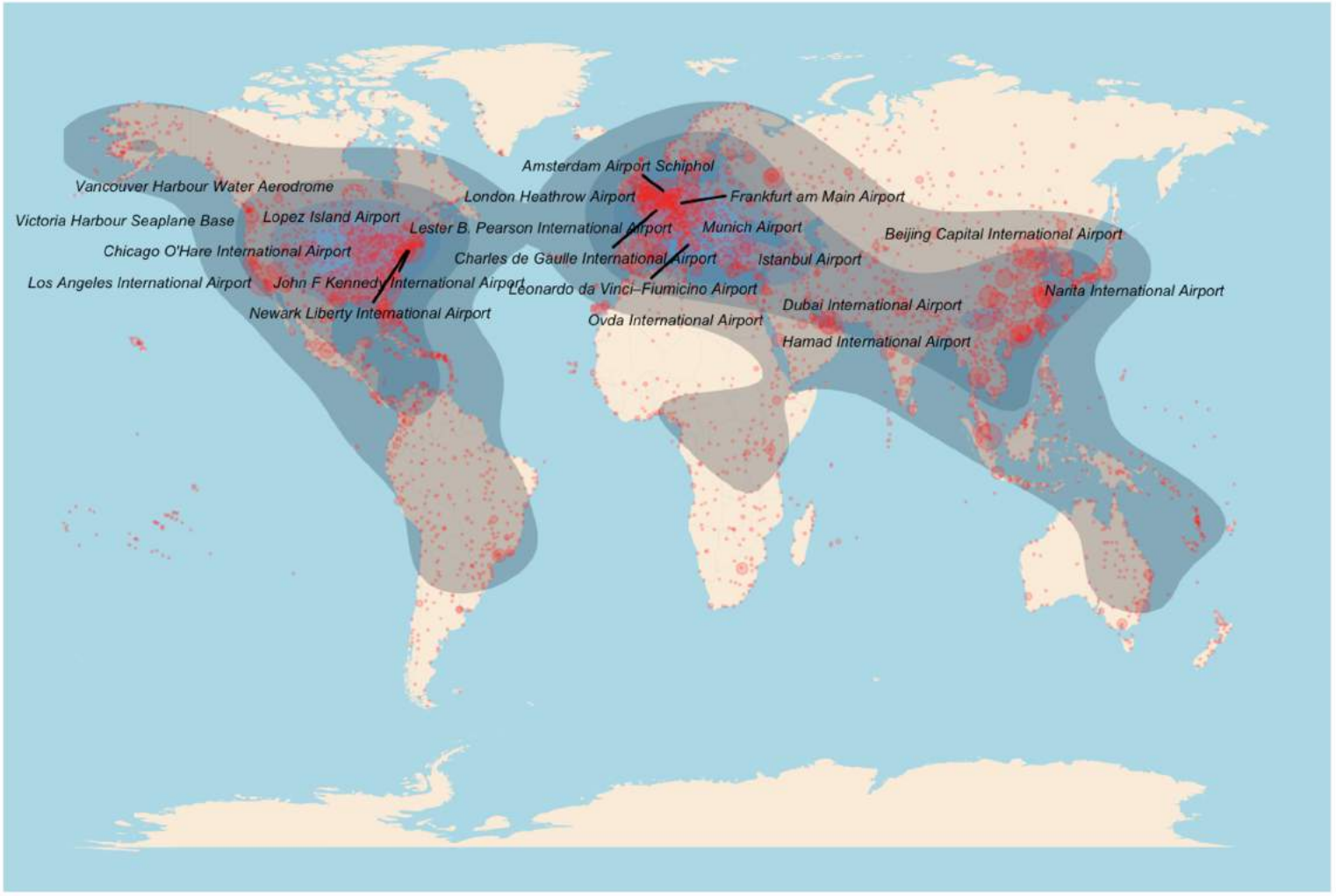
Most Outgoing Airports



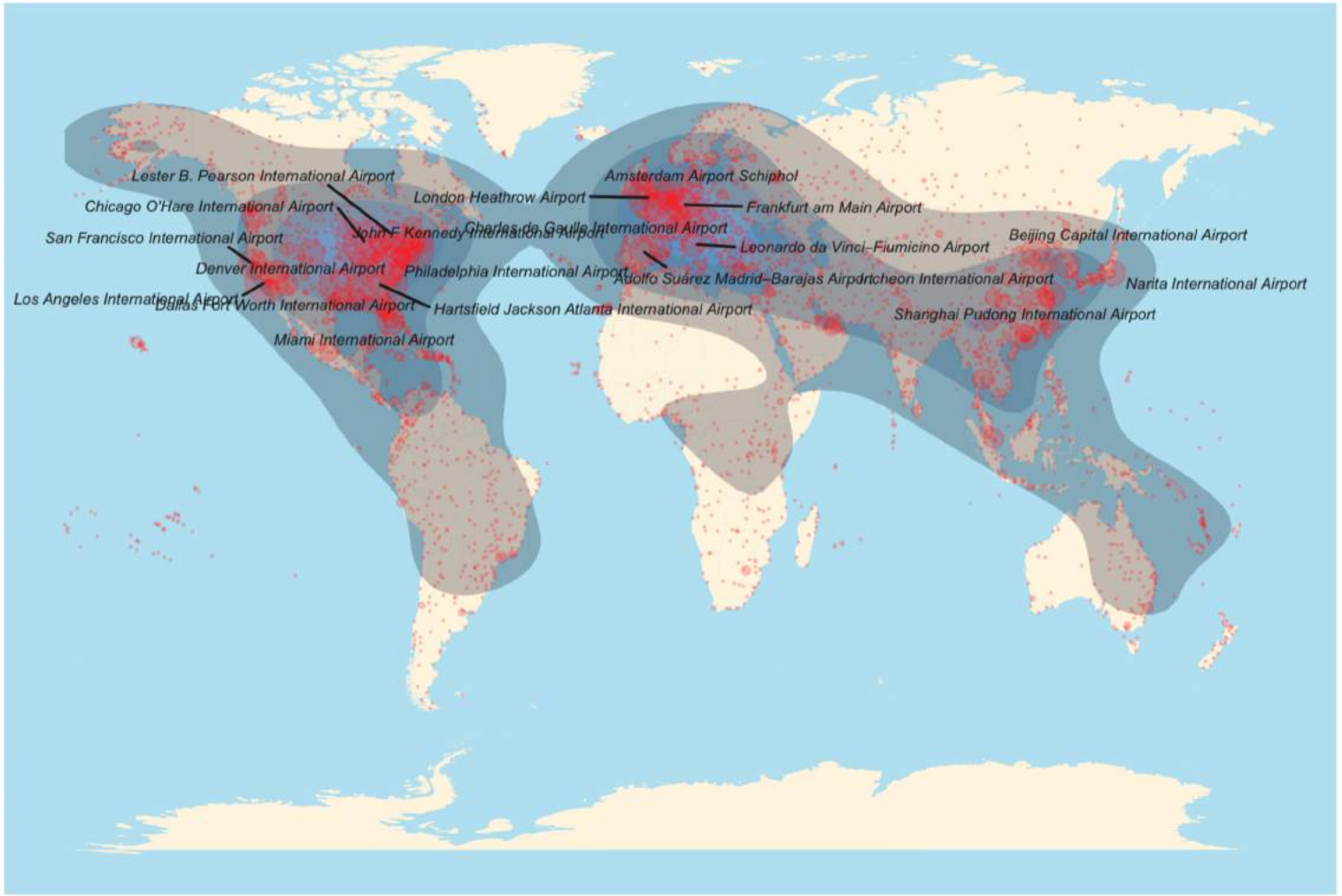
Betweenness Centrality



Closeness Centrality



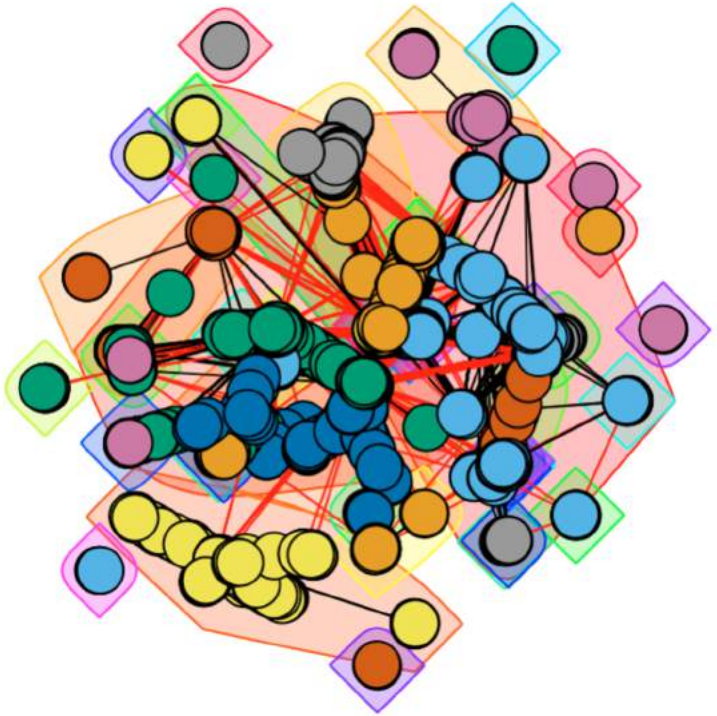
Eigenvector Centrality



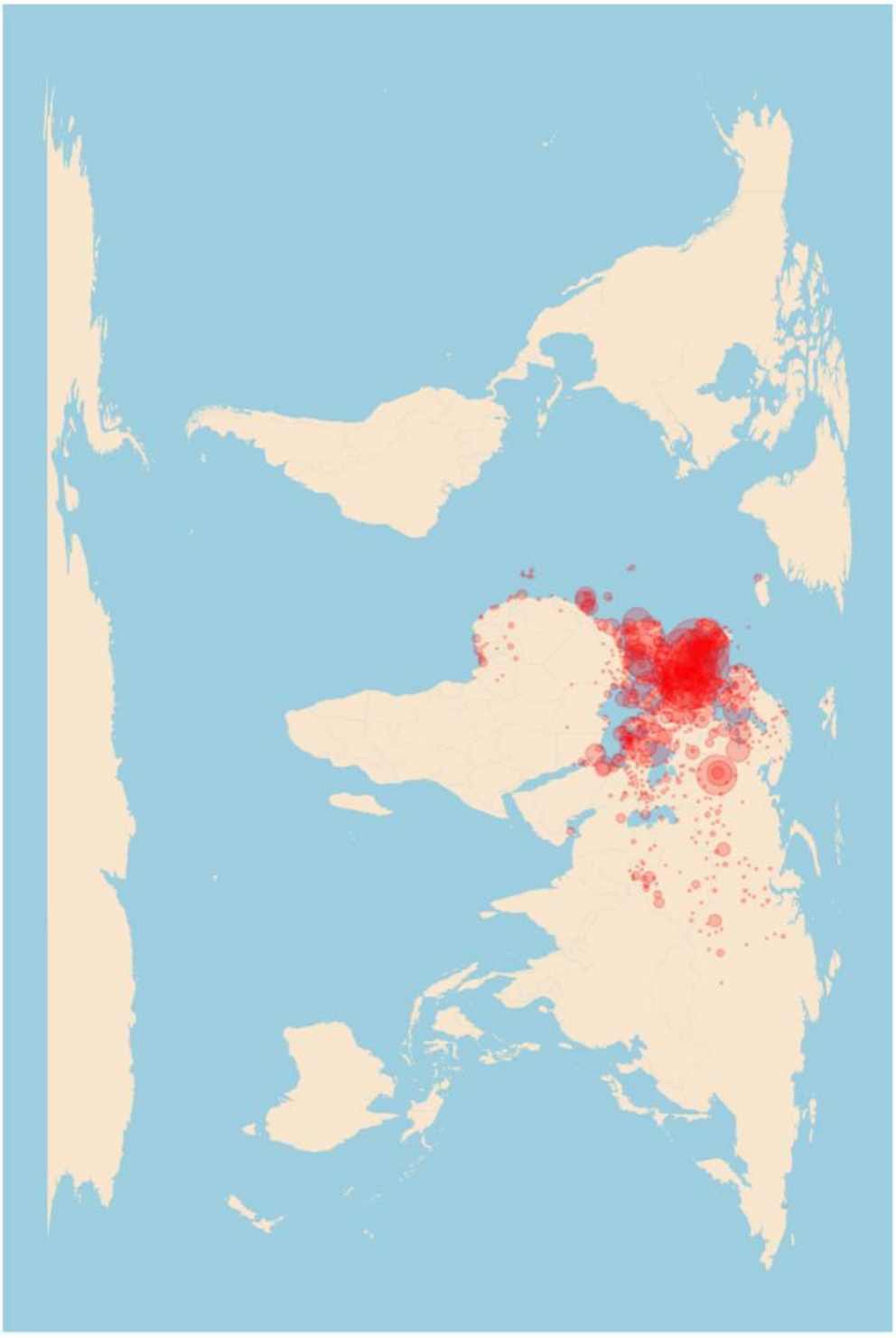
Community Detection

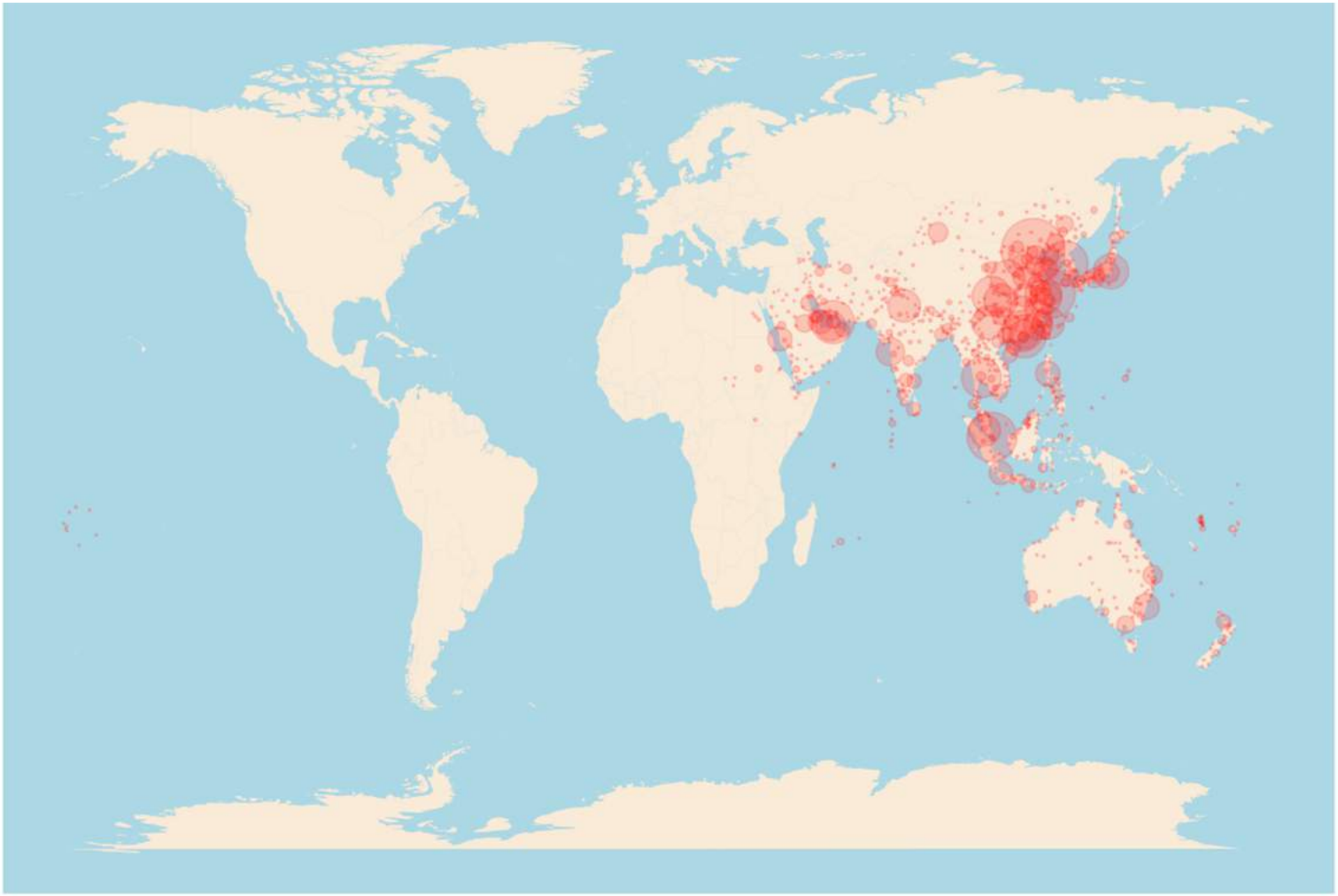
Community Detection

- Method
  - Fastgreedy
    - Computationally economic
  - Simplify Graph
  - Remove Direction
- Result
  - 49 communities
  - The biggest communities in terms of size are community 1, 2, 3 and 4



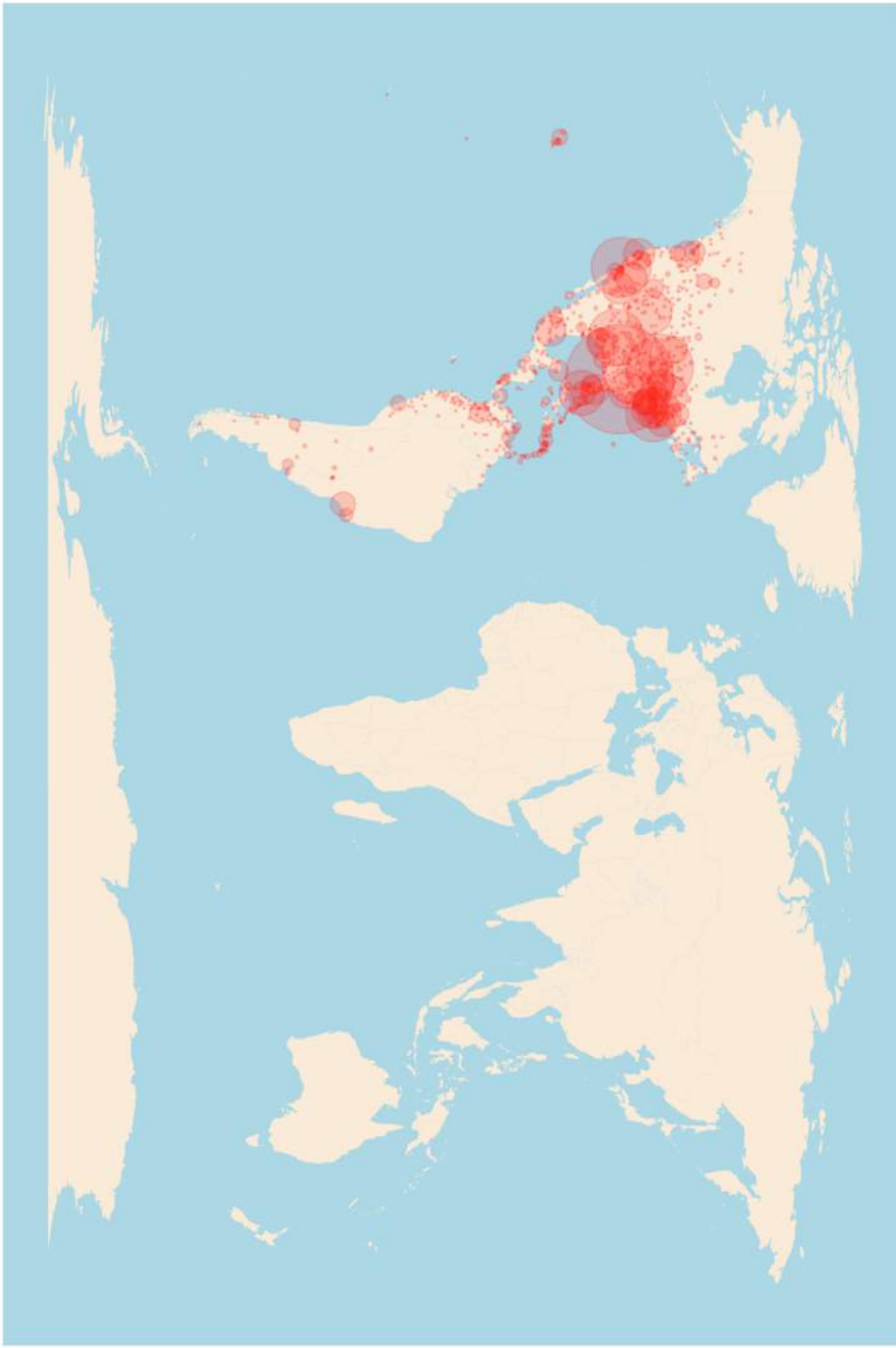
Community 1





Community 2

Community 3



Community 4

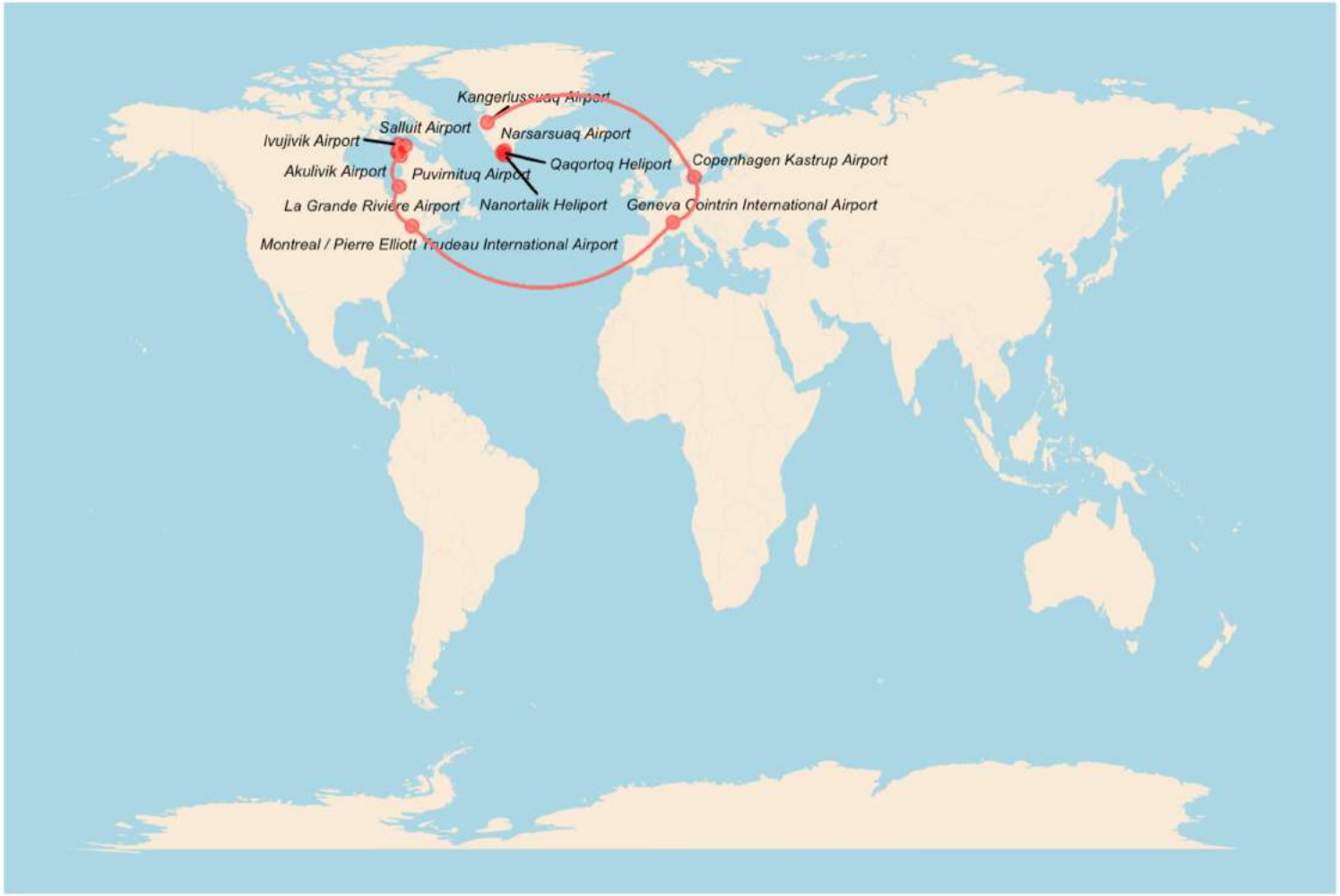
Insights and Analysis

Where are they flying from and to?

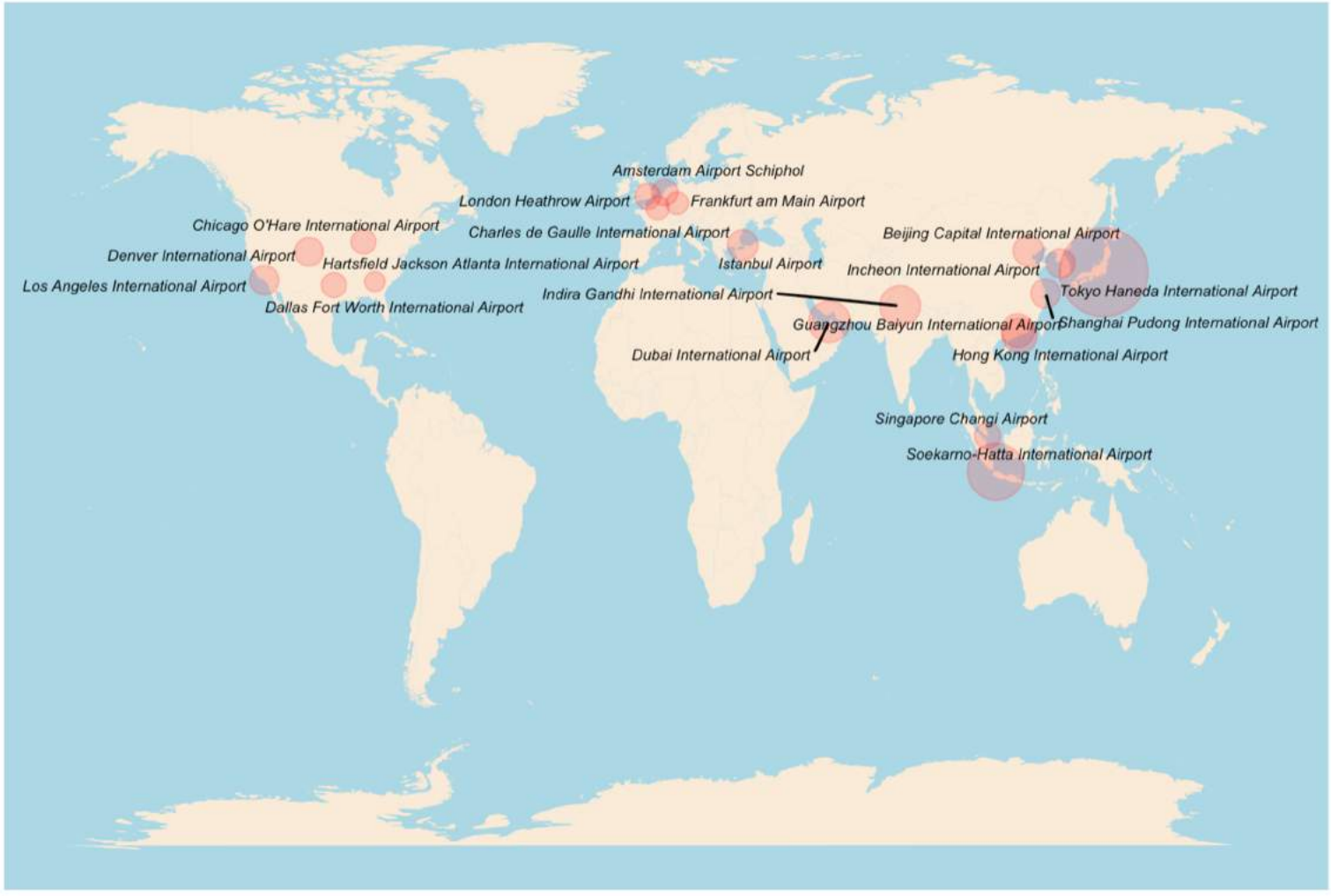
Rank	From	To	No. of Routes
1	US	US	10,518
2	China	China	6,877
3	Brazil	Brazil	1,195
4	Canada	Canada	1,167
5	India	India	1,057
6	Russia	Russia	964
7	Australia	Australia	776
8	Japan	Japan	623

Rank	From	To	No. of Routes
9	Indonesia	Indonesia	611
10	Spain	Spain	579
11	Mexico	Mexico	577
12	UK	Spain	518
13	Spain	UK	512
14	France	France	483
15	Italy	Italy	425
16	Mexico	US	373

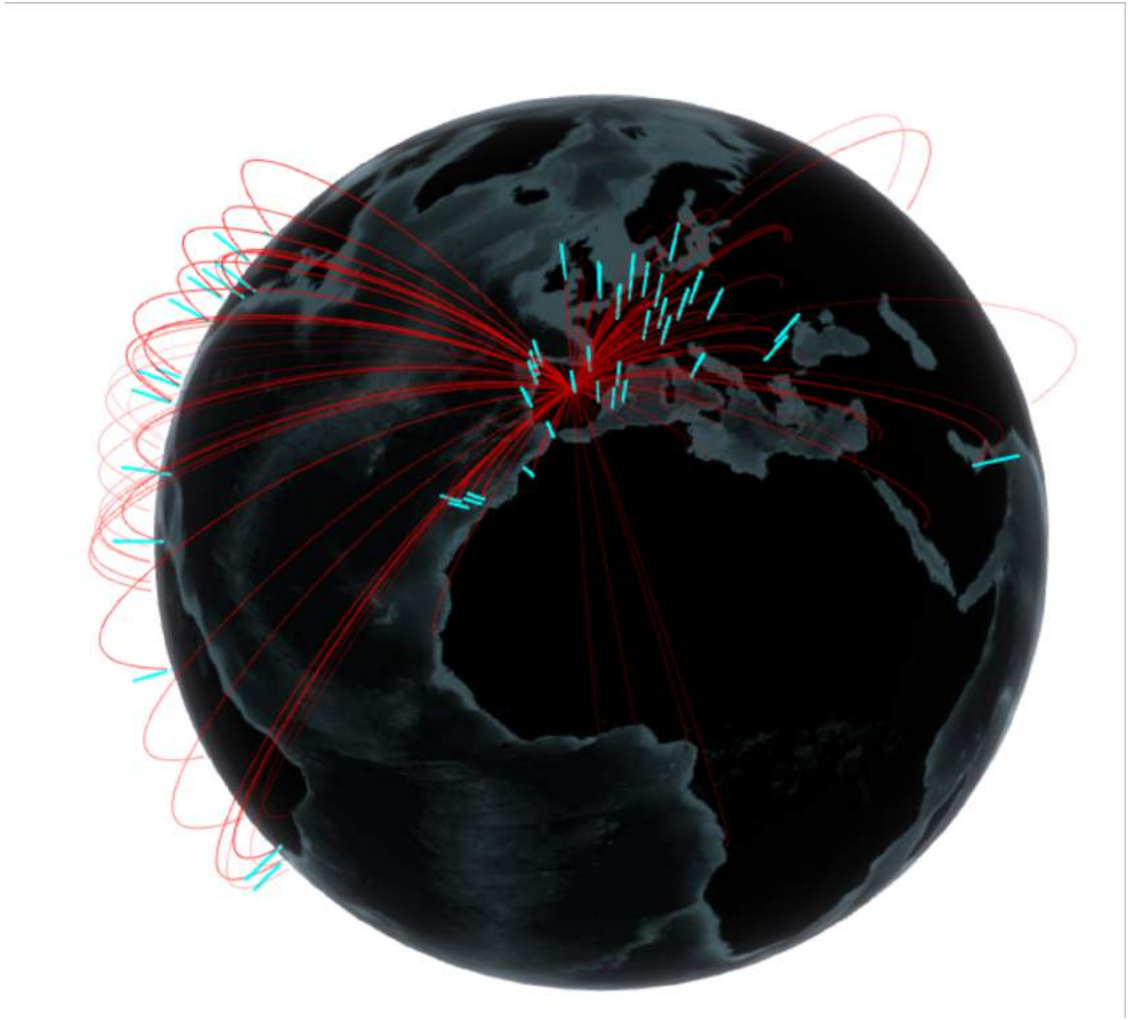
Diameter Path



Top 20 Passenger Airport



Zoom in to Madrid



Thank You

And Hope We Could All Travel Soon Again!