



Public Map of Mobility Changes Monitoring in Almaty during the Pandemic, Part 3

Key words: GPS data, coronavirus, pandemic, monitoring

In earlier posts, we introduced the interactive map: discussed the project, data and technical features of the map. Also, in the second post we told how to use Mobility layer on the interactive map and Mobility layer data with other tools.

This time, we will tell what can be viewed with Centrality Clusters layers on the interactive map and how the data can be used if downloaded.

Centrality Clusters layers

Centrality level (by clusters) is an original metric developed by Habidatum. It is produced using combination of GPS data on user activity, density of commercial and social functions (shops, restaurants, polyclinics, schools, etc – data is sourced from open map services) and their variety (number of unique functions, e.g. if there are 5 restaurants and 3 grocery stores in a node, unique functions – restaurants and grocery – are equal to 2).

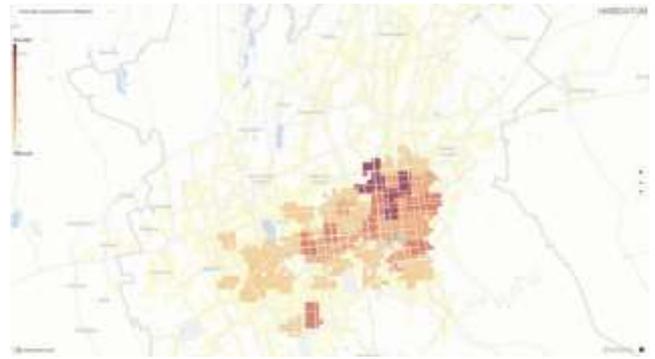
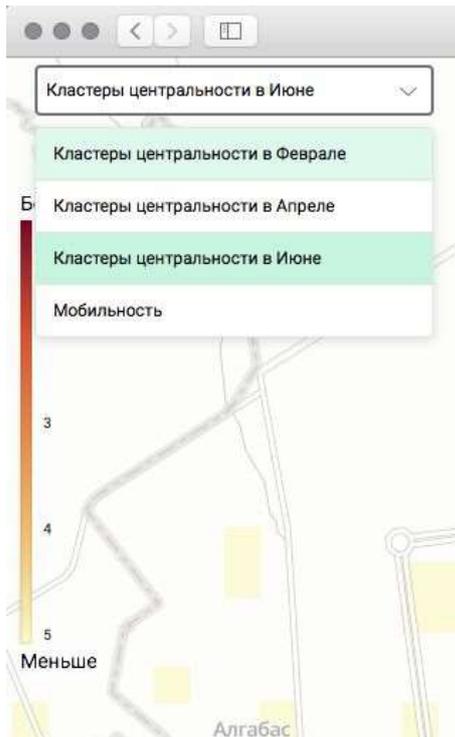
The lower the centrality ranking is the higher centrality is (1 – most central clusters, 5 – least central clusters). This means that 1 refers to locations with highest activity combined with highest density and variety of commercial and social facilities (cafe, pharmacies, restaurants, shops, polyclinics, etc), 5 refers to locations with lowest activity and density-variety of facilities.

For purpose of understanding the changes in centrality patterns, three cuts were made – February (before lockdown), April (peak of restrictive measures) and June (relaxing of restrictive measures).

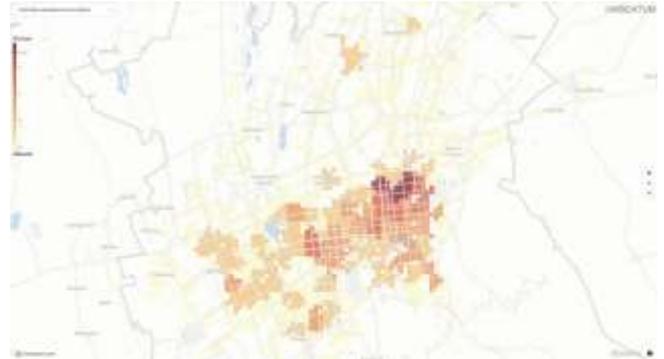
How to use the map with practical benefit

Let us take an example of using Centrality Clusters layer of the interactive map for analysis of most popular locations in Almaty by combining activity of people, density and variety of points of goods and services.

Main menu can be used to switch between different periods of calculated centralities – each of menu tabs has month in the end of the title.

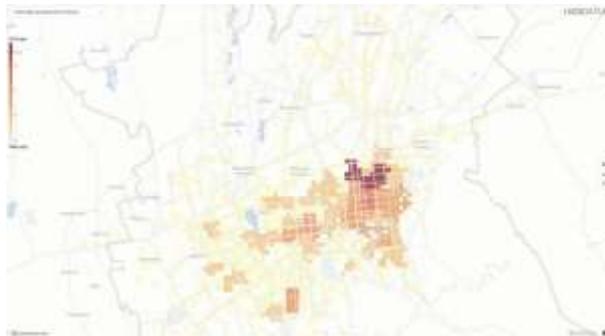


Centrality clusters in February



Centrality clusters in April

Let us have a look at three available cuts of centrality clusters – February, April and June.



Centrality clusters in June

Let us have a look at first-rank centrality cluster in February, near Almaly metro station. In April, it becomes a second-rank cluster and remains at the same level in June:

The darkest centrality clusters on the map – first rank clusters – are most active for the month by all parameters of the location. We can see that in all three time cuts, first rank centrality clusters are around metro stations Zhibek Zholy and Raimbek Batyr, and along Seifullin Street to the north of Gogol and Makatayev crossroad. When comparing the three cuts in different parts of the city, you can see various changes.



Almaly area in February



Almaly area in April

For more details examination, you can zoom in and view changes in specific locations in the city.



Almaly area in June

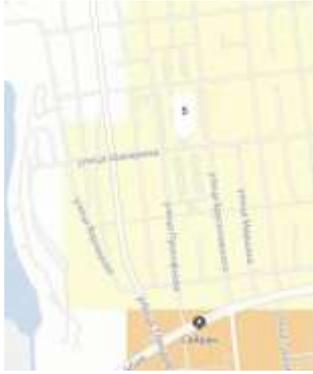
Second example – residential complex Altyn Bulak 1/2b, residential complex Manhattan and low-rise buildings nearby. In February, this area was a fifth-rank centrality cluster, in April it turned into fourth-rank cluster, i.e. the ranking increased, and in June returned to fifth rank. Having said so, we see that the cluster shape is always different, indicating varying activity of people month over month:



Residential complex Manhattan area in February



Residential complex Manhattan area in April



Residential complex Manhattan area in June

These changes can be driven by various parameters of surrounding environment, restrictive measures during the pandemic, and other factors, and we suggest you exploring the correlations therewith.

How to use the data for practical benefit

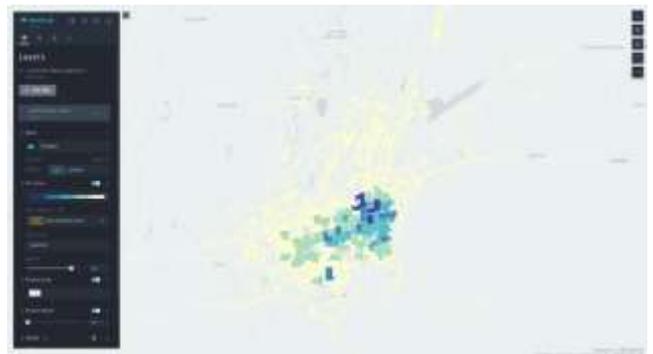
All data from the interactive map can be downloaded by clicking the button “Скачать датасеты» (download datasets) under description of the layer. In the downloaded file, you will find centrality cluster data for different months (February, April, June) in separate respective files: **centralities_february.geojson**, **centralities_april.geojson**, **centralities_june.geojson**.

Each file contains information about centrality cluster ID (column *geoid*), centrality level, from 1 to 5 (*self centrality level*), where 1 means most central cluster, 5 – least central cluster. Column *geometry* – geographical description of each node with data.

As an example, let us take geolinked file **centralities_february.geojson** and visualize it in <https://kepler.gl/demo>.

To do so, just drag the file to the page <https://kepler.gl/demo>, or open it via the menu. First, you can adjust colors in layer settings (down arrow to the right of the layer). Select *Fill color* → *Color based on* → and any column *self centrality level*, which refers to ranking of a centrality cluster.

For better visualization, let us adjust the background (map on the background) to be lighter. To do so, on the upper toolbar under



An advantage of kepler.gl specifically for these layers is the ability to download additional data layers and see in which clusters any given objects appear.

For advanced users, the dataset can be crossed with other layers in *QGIS*, *Python*, *javascript* and any other available methods, for example, by studying the dependence between nature of development and clusters of various ranks, density of points of attraction and activity and other types of research.

kepler.gl sign, click the right icon with switch images and select *Light*.

After these actions, we get the following map (you may choose other colors as well):