Алматы қаласы
Цифрландыру
Басқармасы

HABIDATUM

IN COOPERATION WITH IFC International Finance Corporation WORLD BANK GROUP

Public Map of Mobility Changes Monitoring in Almaty during the Pandemic, Part 1

Key words: GPS data, coronavirus, pandemic, monitoring

Digitalization Office in partnership with the World Bank / IFC and Habidatum launch a public map of mobility changes monitoring in Almaty during the pandemic

About the project

With a view to raise awareness and community engagement in urban development, as well as to disseminate spatial analytics tools, Habidatum in partnership with IFC and Almaty City publishes an interactive public map with data on changes in mobility of Almaty residents during COVID-19.

This monitoring will benefit both the municipality and businesses for their decision making based on data analysis and adjustment of their operations, and regular citizens for situation monitoring and analysis at the level of their neighborhood or entire city and, among other things, planning of daily activities, knowing the patterns over the analyzed period.

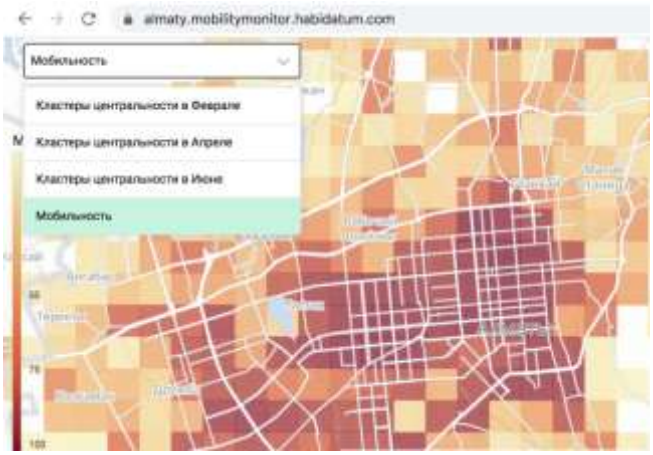
During COVID-19 pandemic, when citizen-space relations have drastically changed, this is extremely relevant – the tools allow viewing historical data on changes in mobility patterns. Reports based on the interactive map and data analysis can be used to produce insights for decision making on development of infrastructure, which is critical for sustainable urban development.

About the data

This project uses GPS data from mobile applications, whose users agreed to transmit their geolocation data. The data are collected by data brokers with software combining GPS signals, Wi-Fi connections and cellular signals, and then transmitted in aggregated form to Habidatum.

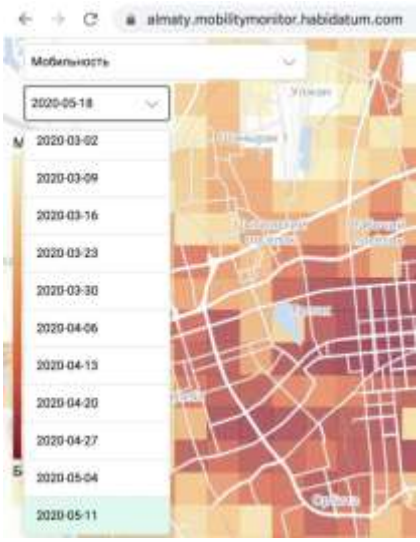
GPS data have unique level of spatial detailing (accuracy to geolocation) and are continuous in time. Their main advantage is global nature that allows comparisons between cities and countries.

Processing of GPS data for Mobility Monitor follows all required confidentiality standards. The interactive map uses only aggregated data, thereby guaranteeing the anonymity – the data are not identifiable even when comparing with other data sets. The service provides access to aggregated data to ensure security compliance.



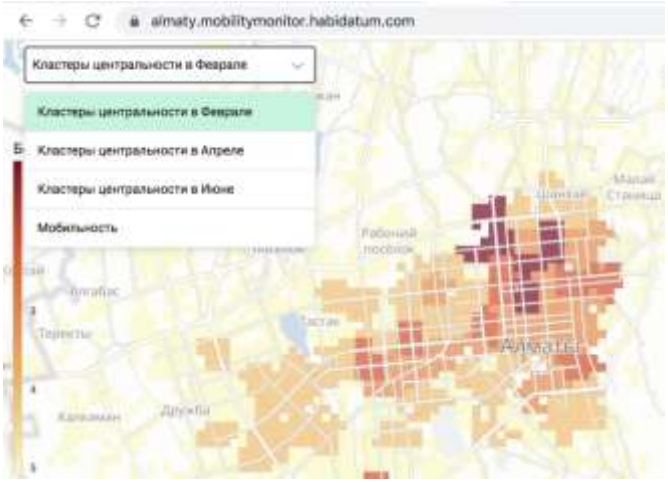
Data feeds

The interactive map presents two types of data. First type – mobility data – is contained in Mobility tab, with date choices in submenu:



Mobility in a node with 800 meter side is measured on the basis of the number of users of GPS active mobile applications. The higher the number of users in a node is, the higher the value is (highest 100). Mobility is measured every day and averaged over a week. This metric allows researching how streams of people changed from March through August 2020, see for specific week (e.g. during the lockdown) in which locations of the city there were more people, or fewer people.

Second type of data –centrality level – is contained in the first three tabs:



Centrality level 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).

Data sets presented on the map can be downloaded as zip archive, where each layer can be found in *.geojson or *.csv formats.

1. Mobility data (number of users in a node) are in
rank_layer.geojson file (geolinked format).

This file contains information about node ranking, from 0 to 100, for each week. Column *node_id* - identification number of a node. Also, the file contains *lat* and *lon* columns, with geographical coordinates of center of each node, then 25 columns with starting date of the week, for which data is provided, in 2020–03–02 format. Each of these columns contains numbers – node activity rank, from 0 to 100, with 100 being the most active node in a week, and 0 – the least active. Column *geometry* – geographical description of each node with data.

2. Centrality data for different months (February, April and June) are in a separate folder *«centralities»*, in three respective files:
centralities_february.geojson,
centralities_april.geojson,
centralities_june.geojson.

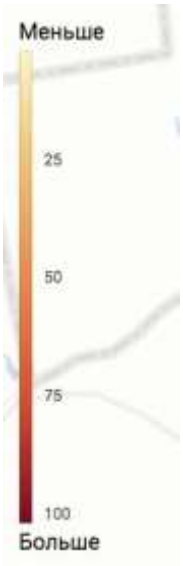
The files contain information with centrality cluster ID (column *geoid*), centrality level from 1 to 5 (*self_centrality_level*), where 1 is the most central cluster, and 5 is the least central cluster. Column *geometry* – geographical description of each cluster.

For centrality layers, there is a scale, where dark color is the highest centrality rank (1), and light color is the lowest centrality rank (5).

How to use the map

Besides switches of data layers described above, each layer has a legend.

For mobility layer, it is distribution from light to dark and respectively from 0 to 100.



The lighter the legend color is and the lower the value is, the lower mobility is (fewer users) in a specific section of the city, and vice versa the darker the legend color is and the higher the value is, the higher the mobility is (more users).

All data sets can be downloaded by clicking button ‘Скачать датасеты’ (download datasets) under description of the layer.