The effect of COVID-19 on mobility

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Context
The DANCE team is a joint team between Gipsa-lab and Inria, bi-located at the Inria Grenoble Rhône Alpes center in Montbonnot and at Gipsa-Lab. DANCE team’s research is focused on networked systems analysis and control. The main application of the team concerns traffic prediction and control. In this setting, together with the Metro of Grenoble and the DIR-CE, the team developed two traffic platforms for the collection and analysis of vehicular traffic in the city of Grenoble. The Grenoble Traffic Lab (GTL) and the GTL-Ville collect in real time traffic data and provide users with travel time prediction and traffic analysis on the South Ring of Grenoble and on the city center, respectively. The platform is currently constituted of a real time database, a show-room and traffic management software. The team’s expertise combines traffic modeling, control and statistics.

Topic description
With COVID-19, people’s mobility has changed. In fact, people prefer less crowded means of transportations, leaving behind public transportation to use single occupancy means like cars, bikes and scooters. Following this pattern, the city network is evolving to accommodate these alternative means of transportation. From a mobility management point of view these changes need to be understood. Traffic data can be used to determine macro-movements and origin/destination patterns of interest, to estimate the evolution of the pollution and the usage of the overall network. This information becomes of great importance in order to monitor and –when possible– adapt the traffic infrastructure to the traffic evolution.

This project focuses on understanding from real traffic data the different behavior of traffic pre and post COVID-19. The general approach is to learn traffic characteristics by statistical techniques, such as Bayesian approaches to (supervised) classification and (unsupervised) clustering in order to discover traffic patterns. The goal of this internship is to exploit modern tools of analysis of big data in order to extract from the huge amount of data available recursive patterns in the traffic evolution of the Grenoble traffic network during the COVID-19 pandemics. The intern will work on the data available from Grenoble Traffic Lab (GTL) and GTL-Ville and try to discover/define patterns in the daily evolution of traffic prior to the period of lockdown and consequent reopening. In particular, the aim of this project can be summarized in the following points:

- find recurring patterns in the traffic evolution of the urban network of Grenoble prior to the lockdown
- define typical behavior that can classify the traffic evolution
- find recurring patterns after the lockdown
- evaluate how traffic and mobility has evolved.

Skills required: Data science, machine learning, statistics (or adjacent fields such as signal processing, automatic control or applied mathematics); prior knowledge about traffic systems will be considered a plus.