

University of Ottawa
School of Electrical Engineering and Computer Science
CSI4142 Fundamentals of Data Science
Project Phase 1: Conceptual Design - Dimensional Model

Instructions:

This is a team assignment. Submit your conceptual design using your group locker in Bright Space. Your uploaded document should be in PDF format.

Project Description - Covid-19 Tracking and Lifestyle Trends Data Mart

Data science and artificial intelligence (AI) have been successfully used to study trends in our behaviours over time. However, our daily routines changed abruptly with the onset of the COVID-19 pandemic. In Canada, and many other countries, lockdown procedures were implemented, thus leaving citizens with little choice to adapt their lifestyles accordingly. For instance, people increasingly turned to online shopping, while participation in outdoor activities increased. Many non-essential businesses, notably in the hospitality sector, also adapted by offering only delivery or curbside pickup, leading to changes in consumer behaviour and traffic patterns.

The current shift in Canadians' habits, especially while tracking the ebb and flow in the number of Covid-19 cases, warrants further study. Indeed, it is important to explore change in behaviours, to assess the impact of the pandemic and to plan for our future.

Suppose that your team was hired to design and to implement a data mart to map not only the details of individuals who tested positive for Covid-19, but also to assess lifestyle changes of Canadians during the Covid-19 pandemic.

As a proof of concept, you decide to focus on two major cities in Canada using historic data from 2020. As a first step, you aim to complete a conceptual design for a Covid-19 tracking and lifestyle trends data mart.

Specifically, your data mart should be designed to answer the following questions:

1. What were the trends, in terms of the number of cases, over time? (Our aim is obtaining profiles of individuals, by age and gender, who tested positive for Covid-19; distinguishing between travel-related and other cases (if known); tracking outbreaks; exploring the types and availability of testing facilities; etc.)
2. Was there any interplay between special events (e.g., Thanksgiving or Canada Day) and the number of cases? (It should be noted that there is typically a delay between increased social interactions and an upsurge in positive Covid-19 tests.)
3. How did lockdown measures, such as stay at home orders or school closures, affect the number of cases? Did specific government announcements or restrictions lead to downward trends in the number of cases? (The effectiveness of specific government measures on the outbreak is of importance here. It should again be noted that there is typically a delay between restrictions and a decreased in positive Covid-19 tests.)
4. What were the trends in behaviours, in terms of the locations people visited and the duration they stayed? Did the weather have any impact on these trends? For instance, studies suggested that many Canadians started bicycling, walking, or visiting parks during the summer. (This question speaks to the mapping of potential changes in citizens' lifestyles. Note that mobility data are available online from e.g., the google mobility repository and that weather data may be obtained from Environment and Climate Change Canada.)

Deliverables:

Create a dimensional model detailing your initial design of the **Covid-19 tracking and lifestyle trends data mart**.

Your PDF document should include the following details.

1. Declare the grain of your data mart.
2. Detail all the dimensions and dimensional attributes. You should list the domains and show sample values. (e.g., *Age: integer, minimum = 0 and maximum = 130, Sample value = 35*).
3. Detail all the measures/facts. You should list the domains and sample values. (e.g., *Age: integer, minimum = 0 and maximum = 130, Sample value = 35*).
4. Remember to detail all your assumptions.
5. Submit a page summarizing your work plan, including the times and dates you met and how you divided the work.

Some useful links:

Below find some useful links to Open Data and other resources. Note that this list is not complete and that you are encouraged to expand your search.

Data as collected by Ontario: <https://data.ontario.ca/dataset?q=covid-19>

Daily data for Ontario: <https://data.ontario.ca/dataset/confirmed-positive-cases-of-covid-19-in-ontario/resource/455fd63b-603d-4608-8216-7d8647f43350>

Individual cases in British Columbia: <http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data>

Google mobility data: <https://www.google.com/covid19/mobility/>

Weather data:

https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

Canadian Covid-19 resources and data: <https://resources-covid19canada.hub.arcgis.com/>

Government of Canada: <https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19.html>

News sources: <https://www.covid-19canada.com/> or <https://www.cbc.ca/news/covid-19> (many more)