Pandemic Information System Model

SYSTEMS AND METHODS FOR BIG AND UNSTRUCTURED DATA

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FIRST DELIVERY
NEO4J PROJECT

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add personal codes

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Todo list

1 Introduction

1.1 Problem Specification

We represented a population of XXX people in the USA.
The database receives data coming from tracing applications that use sensor in smartphones, wearable objects or other devices to understand whether two people had a contact; data includes date and time of the contact.
Some places, like restaurants, theaters and hospitals, collect date and name of visiting people.
The idea is to use this database so that, if a person gets positive, we can understand who are all people who had a contact with him/her. Contacts are of different types: in family (since people from the same family are always in contact), in a location (if someone is positive, we alert people who were in the same location on the same day) or are given by an application using sensors. Data are recorded from 02/2020 and can be used for analytical purposes.

fill with population size

1.2 Hypoteses

Vaccine date, *date of the last contagion*, *date of the last negative test* and *healing date* are optional fields.
A person is considered either *infected* if they have a contagion date, *healed* if they have an healing date and a contagion date or neither if they have none yet.
We assumed that people can do tests without being infected (or after healing) and that people can decide not to get the vaccine but vaccinated people can still get infected.
We also assumed that people can get covid at most once (realistic if we consider perfect antibodies), in this way it's easier to store and retrieve data in order to build statistics.
Members of a family are assumed to be all the people who live together, relatives who see each other very often or roommates. Obviously, all members of a family live in the same city and are considered "always in contact".
When adding data about people going places, we do not consider distances between the city where they live in and the location they go to, so they can exist in different places at the same time.
Regarding the places we have: people who got covid after 18/10 went to places from 18/09/2021 to 17/10/2021, since we assume that later they are in quarantine; all the others went to visit locations from 18/09/2021 to 17/11/2021. If a person becomes positive, we alert all people who were in the same location in a 4 hour span of time centered on the time of arrival of the infected person.
For simplicity, for people who are in hospital date of hospitalization and contagion coincide; we also assume they leave the hospital on the healing date.
In order to populate the database, we imposed that every person visits from 6 to 10 locations.

check if accesses from the same person can be generated at the same time

is this still true?

is this still true?

we could add more

2 Database

2.1 ER Diagram

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2.2 Dataset description

We used three types of nodes: Person, Location and City. People are characterized by their name and surname, birthdate, city, email, social security number, vaccine date, date of the last contagion, date of the last negative test and healing date. People can be linked by family relationships. Locations have a name and a type (restaurant, theater, hospital); type is used so that the dataset can be easily expanded with new types of location. Possible relationships are:

- `WENT_TO` to track people who visited a location at a certain time;
- `IN_FAMILY` for family relationships;
- `IS_IN` between locations and cities;
- `LIVES_IN` to link people to the city they live in;
- `HAS_MET` to indicate contacts between people using tracing app or devices;
- `IS_HOSPITALIZED_IN` to indicate people who are/were hospitalized for covid reasons.

2.3 Queries

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2.4 Commands

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3 Application

3.1 Description

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3.2 User Guide

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4 References and sources

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