



Asymptomatic COVID-19 tracking

Alexander Fred-Ojala
alexander@predli.com

Marcus Zethraeus
marcus@predli.com

Asymptomatic Covid-19 tracking

Problem:

1/3 of retirement homes in Sweden report Covid-19, despite having strict restrictions and health checks

Objective:

Identify and flag potential Covid-19 carriers in retirement homes quicker

Inputs:

1. Visit logs for caretakers
2. Infected risk patients / elderly

Output(s):

1. Probability of asymptomatic carrier
- (2. Probability of future infected patients)

Steps to obtain a list of likely covid-19 carriers

Inputs



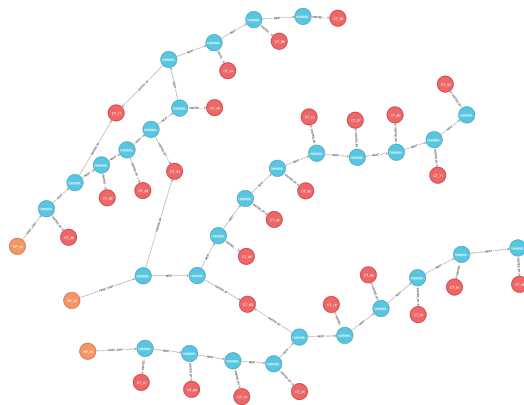
Visit logs for
patients and/or
caretakers



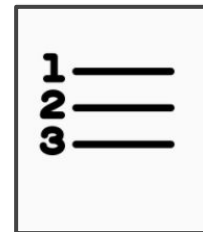
Confirmed and
suspected covid-19 cases



Algorithms running on a graph



Output



A list of caretakers who are most
likely to be asymptomatic
Covid-19 carriers

Approach: Fraud detection algorithms

In the same way to detect skimmed credit card terminals, we think of the problem in terms of:

Credit card transactions



Patient visits

Skimmed terminals



Asymptotic carriers

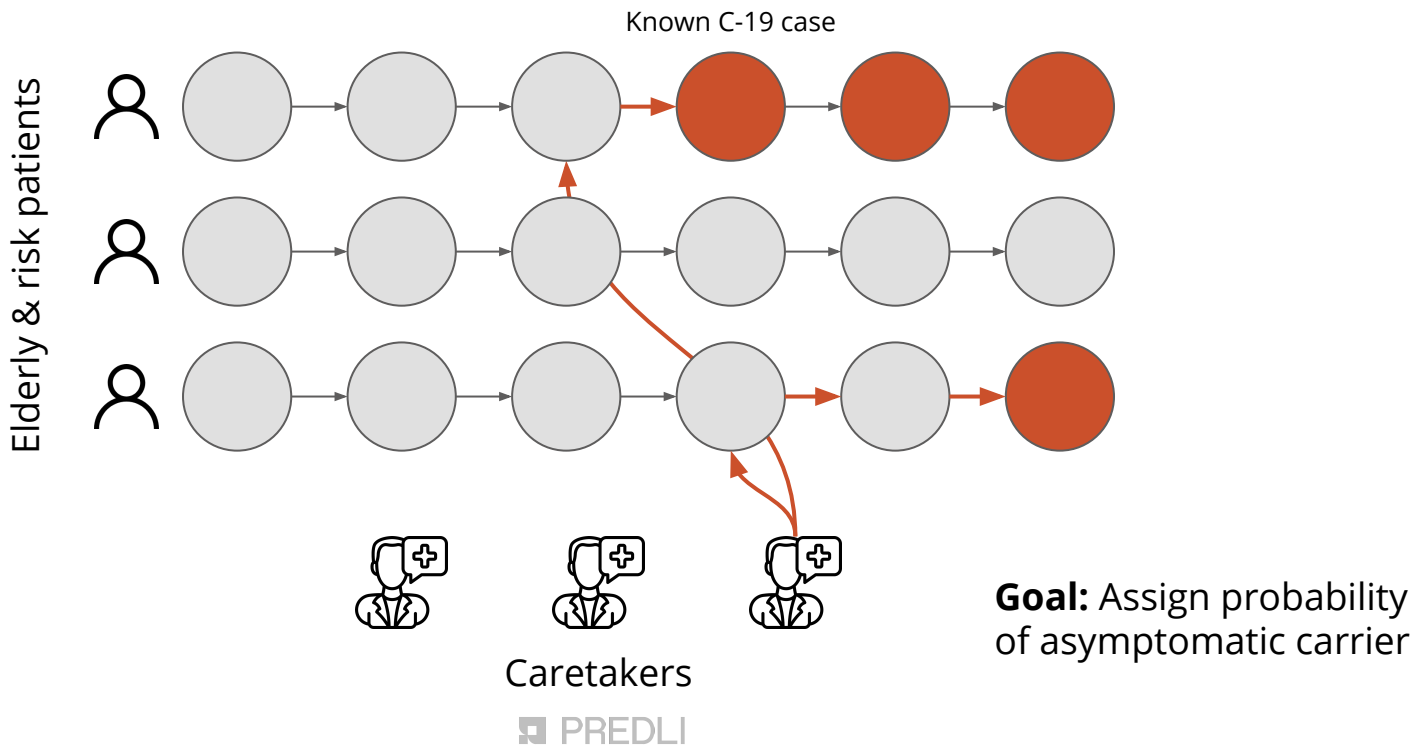
Detected fraud



Infected patients

Given the patient visit history & known cases:

- who are potential asymptomatic carriers?



Proof-of-concept built with simulated data

Example variables

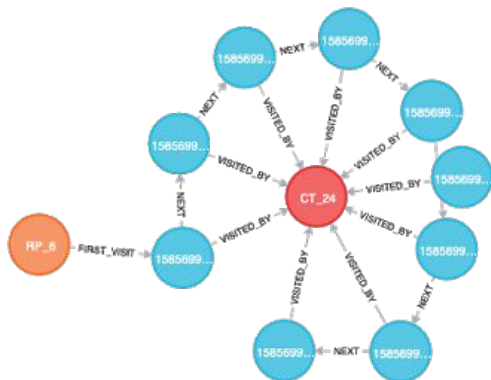
Patient population	Fixed	1000
Caretakers	Fixed	100
Visits per patient	Fixed	10
Visit sequence for individual patient	Single caretaker or random	50% of visits by random employee 50% by single primary caretaker
Asymptomatic carriers	Fixed	5 infected caretakers
Transmission	Random	50% probability to transmit
Incubation time	Fixed/Random	2 days

Example graphs from simulations

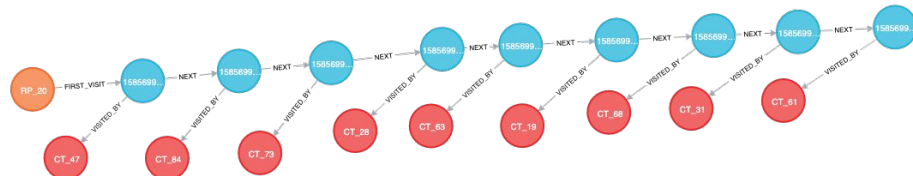
RiskPatient(1)

Visit(9)

CareTaker(9)







Patient visited 9 consecutive times by the same caretaker



Patient visited 9 consecutive times by the different caretakers

Example output from simulations show predictive power

Name	Score	Has Covid-19
Caretaker 23	12	
Caretaker 34	10	
Caretaker 12	10	
Caretaker 9	8	
Caretaker 5	7	
Caretaker 19	4	
Caretaker 22	3	
Caretaker 20	1	

Next steps

1. Team up with retirement homes to test on real data
2. Improve the model assumptions to better reflect reality

Note: This is a pro-bono project and if you want to contribute with any ideas or suggestions, feel free to reach out to mz@predli.com