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1- Introduction

This document shows the prolog database of facts that I used to test the implemented algorithm; furthermore, the considerations made regarding the probability of contagion are reported.

2- Table of possible places of contact between people

The table shows the possible places of contact between people; I found Place_ID from Google Maps, There are 11 possible contact places.

Place	Lat	Long	Place_ID
Uni Ing	43.588575	13.515463	ChIJy9raR7x_LRMRRhJWkTxBE40
Uni Eco	43.6201975	13.5173496	ChIJXfPcGL1_LRMrm7vjV6MGgCg
31:12	43.6196546	13.5116121	ChIJ90A6ebt_LRM22wGC1GgkUo
ERDIS	43.6212457	13.5104647	ChIJyWoEGLt_LRMrvgzfLV2KsVQ
Rosa	43.618615	13.512438	ChIJDzXHbrx_LMRBg12WxxGvmw
Eurospin	43.5693012	13.5092219	ChIJb8qK2PuALMRdemoW7-hAxE
Aushan	43.5529356	13.5145473	ChIJ8wwSv_GALMRtit_eXXkC3A
Ugo Bassi	43.6033718	13.5070662	ChIJy93cCYV_LMRwOclHJ-VEg8
Aeroporto Bologna	44.5345216	11.2878593	ChIJy6FHwPrTf0cRe9b4ZQFDU1Y
Stazione Roma	41.9109666	12.5312697	ChIJD1dcv9djLxMRoKH4Aq6BoM
Stazione Ancona	43.6074488	13.4977387	ChIJcZ9iX51_LMRbCXew1l8lcw

3- Timetable and places of contact between the different people

In total I created a database of 20 people. The names of the people in red are those that tested positive; these are: Conte, Khaled, Vallese, Luffy, Luca.

The times are expressed in milliseconds (the corresponding values are also reported in dates (Month, Year, Day, hours, minutes and seconds) and have been calculated starting from the UNIX era.

Name	Start_Time	Latitude	Longitude	End_Time	Place_ID
Zagor	1581491705000 Feb 12 2020 08:15:05	43.6201975	13.5173496	1581498733000 Thu Feb 12 2020 10:12:13	ChIJXfPcGL1_LRMrm7vjV6MGgCg
Zagor	1583516110000 Mar 06 2020 18:35:10	43.6196546	13.5116121	1583516225000 Mar 06 2020 18:37:05	ChIJ90A6ebt_LRM22wGClGgkUo
Zagor	1583954404000 Mar 11 2020 20:20:04	43.618615	13.512438	1583956250000 Mar 11 2020 20:50:50	ChIJDzXHbrx_LRMRBg12WxxGvmw
Waqas	1582896321000 Feb 28 2020 14:25:21	43.588675	13.515457	1582906522000 Feb 28 2020 17:15:22	ChIJy9raR7x_LRMRRhJwkTxBE40
Waqas	1583480710000 Mar 06 2020 08:45:10	43.6201975	13.5173496	1583514320000 Mar 06 2020 18:05:20	ChIJXfPcGL1_LRMrm7vjV6MGgCg
Vito	1583936177000 Mar 11 2020 15:16:17	43.6201975	13.5173496	1583943375000 Mar 11 2020 17:16:15	ChIJXfPcGL1_LRMrm7vjV6MGgCg
Goku	1584466215000 Mar 17 2020 18:30:15	43.6196546	13.5116121	1584483310000 Mar 17 2020 23:15:10	ChIJ90A6ebt_LRM22wGClGgkUo
Goku	1584089100000 Mar 13 2020 09:45:00	43.6212457	13.5104647	1584092700000 Mar 13 2020 10:45:00	ChIJyWoEGLt_LRMrvgzfLV2KsVQ
Vegeta	1584466215000 Mar 17 2020 18:30:15	43.6196546	13.5116121	1584483310000 Mar 17 2020 23:15:10	ChIJ90A6ebt_LRM22wGClGgkUo
Vegeta	1584984615000 Mar 23 2020 18:30:15	43.6196546	13.5116121	1585001710000 Mar 23 2020 23:15:10	ChIJ90A6ebt_LRM22wGClGgkUo
Piccolo	1584089100000 Mar 13 2020 09:45:00	43.6212457	13.5104647	1584092700000 Mar 13 2020 10:45:00	ChIJyWoEGLt_LRMrvgzfLV2KsVQ
Piccolo	1583078700000 Mar 01 2020 17:05:00	43.6074488	13.4977387	1583080240000 Mar 01 2020 17:30:40	ChIJcZ9iX51_LRMrbCxeW118lcw
Gohan	1583755200000 Mar 09 2020 13:00:00	43.6212457	13.5104647	1583762400000 Mar 09 2020 15:00:00	ChIJyWoEGLt_LRMrvgzfLV2KsVQ
Rufy	1582204088000 Feb 20 2020 14:08:08	41.9109666	12.5312697	1582205405000 Feb 20 2020 14:30:05	ChIJD1dcv9djLxMRoKH4Aq6BoM
Rufy	1582992300000 Feb 29 2020 17:05:00	43.6074488	13.4977387	1582994130000 Feb 29 2020 17:35:30	ChIJcZ9iX51_LRMrbCxeW118lcw
Zoro	1577840400000 Jan 01 2020 02:00:00	44.5345216	11.2878593	1577851205000 Jan 01 2020 05:00:05	ChIJy6FHWPrTf0cRe9b4ZQFDU1Y
Conte	1583514601000 Mar 06 2020 18:10:01	43.5693012	13.5092219	1583515505000 Mar 06 2020 18:25:05	ChIJb8qK2PuALRMrdemoW7-hAxE
Conte	1580563708000 Feb 01 2020 14:28:28	43.5529356	13.5145473	1580565006000 Feb 01 2020 14:50:06	ChIJ8wwSv_GALRMrtit_eXXkC3A
Scara	1583933288000 Mar 11 2020 14:28:08	43.6034718	13.5071662	1583934606000 Mar 11 2020 14:50:06	ChIJy93cCYV_LRMw0c1HJ-VEg8
Scara	1582204088000 Feb 20 2020 14:08:08	41.9109999	12.5312999	1582205405000 Feb 20 2020 14:30:05	ChIJD1dcv9djLxMRoKH4Aq6BoM
Luca	1582883130000 Feb 28 2020 10:45:30	43.588575	13.515463	1582911024000 Feb 28 2020 18:30:24	ChIJy9raR7x_LRMRRhJwkTxBE40
Luca	1583478910000 Mar 06 2020 08:15:10	43.588575	13.515463	1583522130000 Mar 06 2020 20:15:30	ChIJy9raR7x_LRMRRhJwkTxBE40
Luca	1577984700000 Jan 02 2020 18:05:00	43.5529356	13.5145473	1577986550000 an 02 2020 18:35:50	ChIJ8wwSv_GALRMrtit_eXXkC3A
Fabio	1583484330000 Mar 06 2020 09:45:30	43.588575	13.515463	1583516710000 Mar 06 2020 18:45:10	ChIJy9raR7x_LRMRRhJwkTxBE40
Fabio	1583954103000 Mar 11 2020 20:15:03	43.618615	13.512438	1583955905000 Mar 11 2020 20:45:05	ChIJDzXHbrx_LRMRBg12WxxGvmw

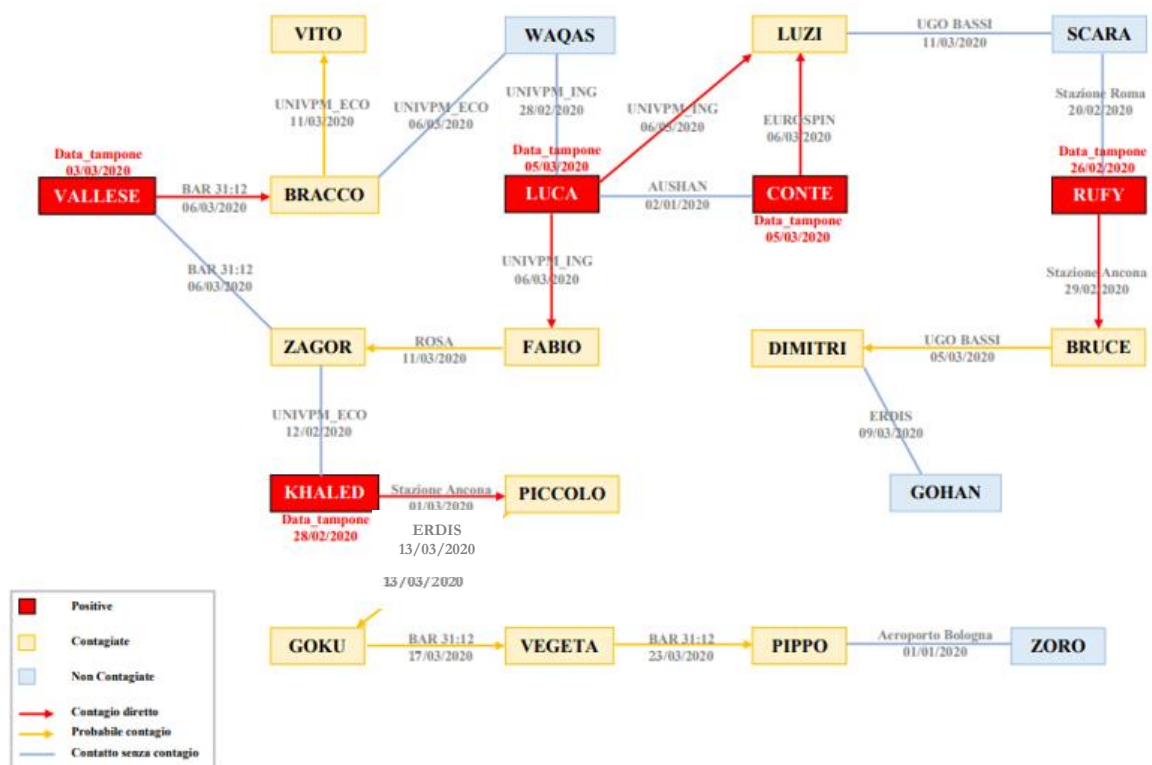
Bracco	1583485511000 Mar 06 2020 10:05:11	43.6201975	13.5173496	1583489411000 Mar 06 2020 11:10:11	ChIJXfPcGL1_LRMrm7vjV6MGgCg
Bracco	1583939420000 Mar 11 2020 16:10:20	43.6201975	13.5173496	1583943300000 Mar 11 2020 17:15:00	ChIJXfPcGL1_LRMrm7vjV6MGgCg
Bracco	1583515830000 Mar 06 2020 18:30:30	43.6196546	13.5116121	1583532310000 Mar 06 2020 23:05:10	ChIJ90A6ebt_LRM22wGClGgkUo
Luzi	1583484620000 Mar 06 2020 09:50:20	43.588575	13.515463	1583495410000 Mar 06 2020 12:50:10	ChIJy9raR7x_LRMRRhJWkTxBE40
Luzi	1583514300000 Mar 06 2020 18:05:00	43.5693012	13.5092219	1583516155000 Mar 06 2020 18:35:55	ChIJb8qK2PuALMRdemoW7-hAxE
Luzi	1583932088000 Mar 11 2020 14:08:08	43.6033718	13.5070662	1583933405000 Mar 11 2020 14:30:05	ChIJy93cCYV_LRMrw0c1HJ-VEg8
Vallese	1583515830000 Mar 06 2020 18:30:30	43.6196546	13.5116121	1583532310000 Mar 06 2020 23:05:10	ChIJ90A6ebt_LRM22wGClGgkUo
Khaled	1581491700000 Feb 12 2020 08:15:00	43.6201975	13.5173496	1581498000000 Feb 12 2020 10:00:00	ChIJXfPcGL1_LRMrm7vjV6MGgCg
Khaled	1583078700000 Mar 01 17:05:00	43.6074488	13.4977387	1583080240000 Mar 01 2020 17:30:40	ChIJcZ9iX51_LRMrbCxeW118lCW
Dimitri	1583743500000 Mar 09 2020 09:45:00	43.6212457	13.5104647	1583747100000 Mar 09 2020 10:45:00	ChIJyWoEGLt_LRMrvzgZfLV2KsVQ
Dimitri	1583414888000 Mar 05 2020 14:28:08	43.6033718	13.5070662	1583416206000 Mar 05 2020 14:50:06	ChIJy93cCYV_LRMrw0c1HJ-VEg8
Bruce	1583414888000 Mar 05 2020 14:28:08	43.6033718	13.5070662	1583416206000 Mar 05 2020 14:50:06	ChIJy93cCYV_LRMrw0c1HJ-VEg8
Bruce	1582992300000 Feb 29 2020 17:05:00	43.6074488	13.4977387	1582994130000 Feb 29 2020 17:35:30	ChIJcZ9iX51_LRMrbCxeW118lCW
Pippo	1584984615000 Mar 23 2020 18:30:15	43.6196546	13.5116121	1585001710000 Mar 23 2020 23:15:10	ChIJ90A6ebt_LRM22wGClGgkUo
Pippo	1577840400000 Jan 01 2020 02:00:00	44.5345216	11.2878593	1577851205000 Jan 01 2020 05:00:05	ChIJy6FHwPrTf0cRe9b4ZQFDU1Y

4- Swab Date of people tested positive.

Name	Swab Date (YYYY/ MM/DD hh:mm:ss)	Date in Milliseconds
Conte	2020/03/05 00:00:00	1583362800000
Khaled	2020/02/28 00:00:00	1582844400000
Luca	2020/03/05 00:00:00	1583362800000
Rufy	2020/02/26 00:00:00	1582671600000
Vallese	2020/03/03 00:00:00	1583190000000

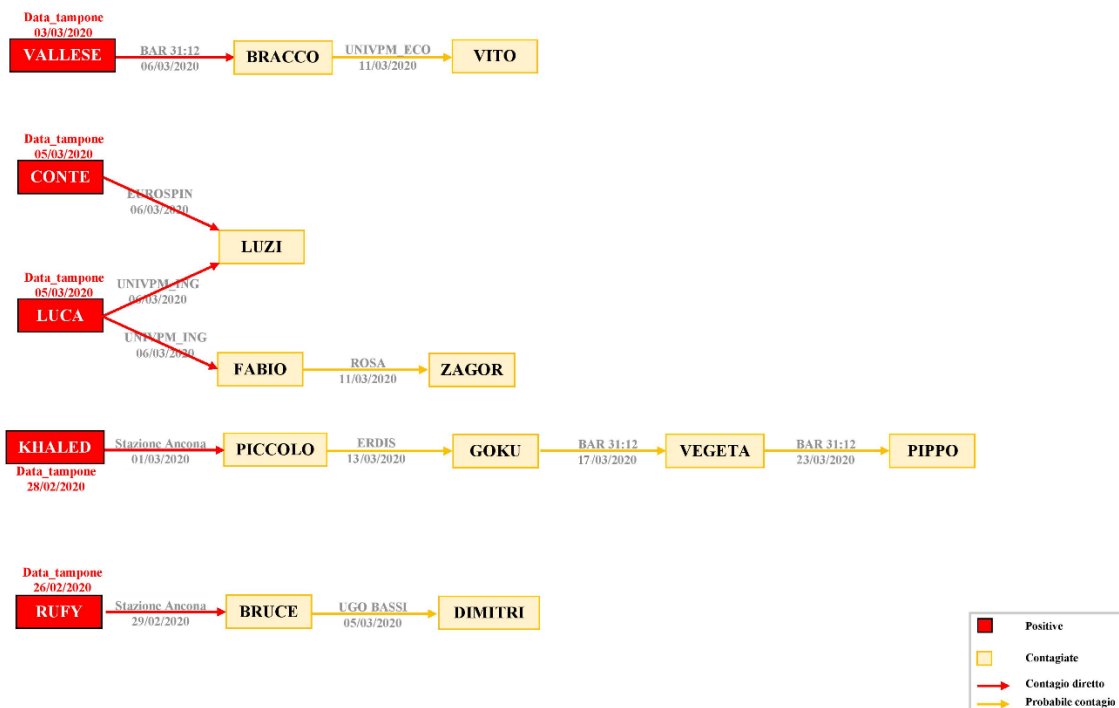
5- Maps of contacts between people

Below is a map of the contacts between the fictitious people considered



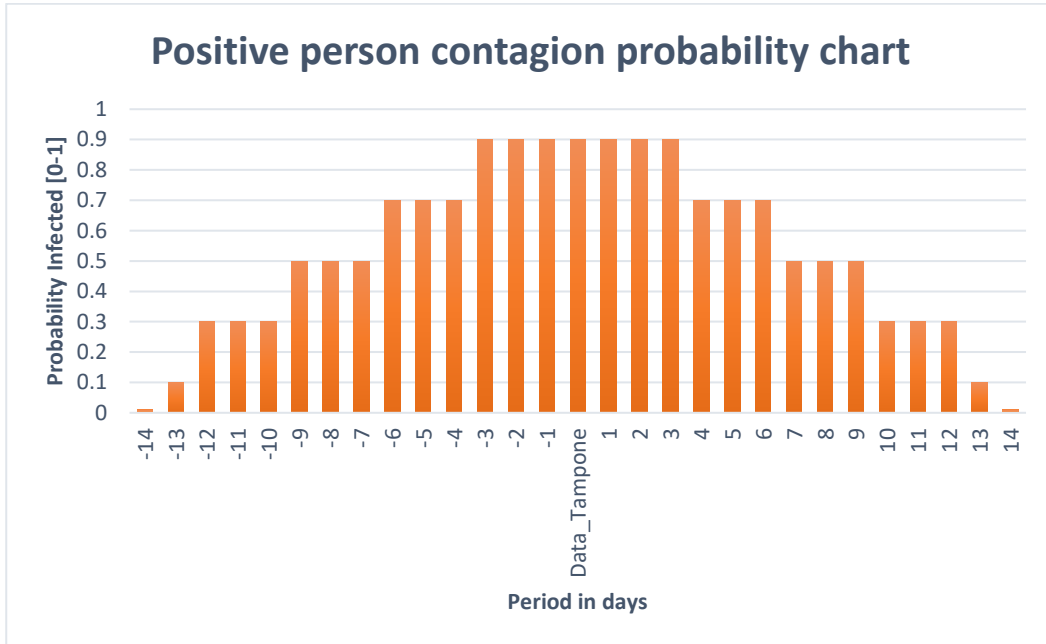
6- Map of the infected

Here I report the result that I would like to obtain after executing the code.

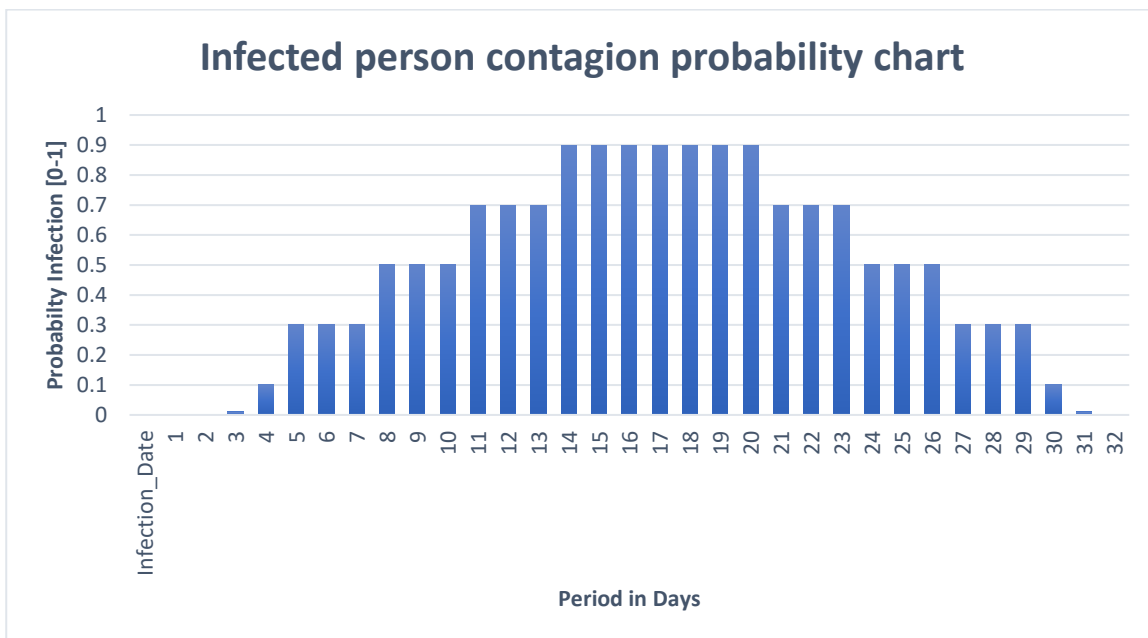


7- Calculation of the probability of contagion

Not having the necessary data to calculate the actual probability of a person infecting a second person, I thought of attributing a Gaussian pattern to the probability of contagion, as shown in the following figures.



As for the probability of contagion of a person who has tested positive, the period of contagion lasts from 14 days before the date on which the swab was performed, then positive, up to 14 days after that date, with a maximum probability of contagion reached on the date of execution of the tampon.



For an infected person who has not yet taken the swab, therefore not positive, the duration extends from 2 days after being infected up to a total of 29 days (about a month), with a maximum probability of contagion reached during the course the second week after being infected.