파이썬프로그래밍및실습

Infectious Disease Infection Probability Notification Program

Progress Report : 1

Date : 2023.12.10

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1. Introduction

1) Background

As the COVID pandemic breaks out, people's worries about the epidemic grow. It is necessary to provide information on various infectious diseases. In order to solve this problem, a program is needed to calculate the probability of infection for various infectious diseases and let users know if there is an overlapping movement with the infected person by receiving activity records.

2) Project goal

It aims to compare the input user's activity records with the activity records of infected people of various infectious diseases to find the probability of infection according to the contact time if there is an overlapping movement, and if the probability is high, it is judged as a preliminary infected person and to create a program to warn other users who have come into contact with preliminary infected people other than the infected person.

3) Differences from existing programs

In the case of existing COVID-19 emergency disaster texts, people are simply informed of the time when the confirmed person overlaps with the route, so the judgment on the COVID-19 test is determined according to their condition, and if it is an incubation period, it may not be tested, which may cause the spread to

repeat again. We are different from existing programs in that we find the probability of infection by considering the contact time of each disease, and we repeat the process of dividing users with high probability into preliminary infections and comparing them with other users to prevent resurgence.

2. Functional Requirement

1) Function 1 Register travel routes

- The ability to receive and store the user's travel path by the hour

(1) Detailed function 1 Enter the name of the place that was in hourly increments

- Enter the place where you moved from 8 a.m. to 10 p.m. and the time you stayed.

2) Function 2 Check for infectious diseases

- The ability to ask for the presence or absence of three infectious diseases (flu, corona, and tuberculosis) and receive input as o,x

3) Function 3 Notify others

- The function of calculating the probability of transmission according to the overlapping time by comparing the travel route of a user infected with an infectious disease one day before with other users and informing users

(1) Detailed function 1 The time overlapping with the travel route of a user infected with an infectious disease one day ago is calculated, and the probability of infection is set as 30% for 1 hour, 60% for 2 hours, and 90% for 3 hours, respectively. (There is no accurate information on the correlation between contact time and infection probability, so the probability is arbitrarily set) Notify other users.

(2) Detailed function 2 In order to calculate the probability of secondary infection,

a third party, not a user, seeks the time overlapping with the infected person,

Calculate the time when the third party and the user overlap. (20% per hour was calculated)

3. Progress

1) Functional implementation

(1) Notify others

(1) Detailed function 1

- input: a list of travel routes for an infected person with any disease, a list of travel routes for a user

output: infection_percentage

- Comparing the two lists, increasing the 'conflict_hour' if they are in the same place at the same time. Finally, the probability of infection is calculated. After calculating the probability of primary infection, notify the user if it exceeds 50%.

- class, list, loop, function

- code screen shot

```python
# 각 질병에 대한 감염자 리스트
flu_list = [['e','e','e','e','c','c','c','f','f','d','b','b','a','a']] # 임의로 설정한 독감 감염자의 이동경로 리스트
corona_list = [['f','f','d','d','c','c','a','a','e','e','e','b','b','b']] #임의로 설정한 코로나 감염자의 이동경로 리스트
tuber_list = [['b','b','e','e','e','d','a','a','a','a','c','c','c','f']] # 임의로 설정한 결핵 감염자의 이동경로 리스트

def calculate_percentage(infection, disease_list):
    conflict_hour = 0 # 겹치는 시간
    infection_percentage = 0 # 감염확률
    for infecter in disease_list:
        for j in range(14):
            if infection[j] == infecter[j]: # 이용자와 각 감염자의 같은 시간의 이동경로를 비교
                conflict_hour += 1
    infection_percentage += conflict_hour * 0.3 #확률계산
    print(infection_percentage)
    return infection_percentage
```

```python
#function 3-1 1차 감염에 대한 출력
if flu_answer == "x":
    infection_percentage = calculate_percentage(infection, flu_list)
    if infection_percentage > 0.5:
        infect_percent = round(infection_percentage*100)
        print("독감에 감염되었을 확률이", infect_percent, "%입니다. 가까운 병원에 들러 검사받는걸 추천합니다.")
if corona_answer == "x":
    infection_percentage = calculate_percentage(infection, corona_list)
    if infection_percentage > 0.5:
        infect_percent = infection_percentage*100
        print("코로나에 감염되었을 확률이", infect_percent, "%입니다. 가까운 병원에 들러 검사받는걸 추천합니다." )
if tuber_answer == "x":
    infection_percentage = calculate_percentage(infection, tuber_list)
    if infection_percentage > 0.5:
        infect_percent = infection_percentage*100
        print("결핵에 감염되었을 확률이", infect_percent, "%입니다. 가까운 병원에 들러 검사받는걸 추천합니다." )
```

```python
# 질병에 걸린 상태일 경우 감염자 리스트에 추가
if flu_answer == "o":
    flu_list.append(infection)
if corona_answer == "o":
    corona_list.append(infection)
if tuber_answer == "o":
    tuber_list.append(infection)

print(flu_list)
print(corona_list)
print(tuber_list)
```

2) Test Results

(1) Detailed function 1

- If user answer 'o' for each disease, add it to the list of infected people, and find the probability for other diseases other than the infected disease. Establish an arbitrary path of infection for each disease, The probability of primary infection is calculated by comparing it with the movement path input by the user. After calculating the probability of primary infection, notify the user if it exceeds 50%.

- test result screen shot

```
지금부터 전염병(독감, 코로나, 결핵)의 감염 확률을 계산하기 위한 프로그램을 실행합니다.
장소와 시간순으로 입력하며 시간은 한시간 단위로 입력해 주세요.
입력은 오전 8시부터 시작하여 오후 10시까지 가능합니다.
본인이 있었던 장소를 입력하세요: a
머무른 시간을 입력하세요: 3
본인이 있었던 장소를 입력하세요: b
머무른 시간을 입력하세요: 2
본인이 있었던 장소를 입력하세요: c
머무른 시간을 입력하세요: 4
본인이 있었던 장소를 입력하세요: d
머무른 시간을 입력하세요: 1
본인이 있었던 장소를 입력하세요: e
머무른 시간을 입력하세요: 3
본인이 있었던 장소를 입력하세요: f
머무른 시간을 입력하세요: 2
오후 10시 이후의 장소와 시간은 삭제합니다.
15
['a', 'a', 'a', 'b', 'b', 'c', 'c', 'c', 'c', 'd', 'e', 'e', 'e', 'f', 'f']
['a', 'a', 'a', 'b', 'b', 'c', 'c', 'c', 'c', 'd', 'e', 'e', 'e', 'f']
다음 질문에 o,x로 대답해 주세요.
독감에 걸린 상태입니까?: x
코로나에 걸린 상태입니까?: o
결핵에 걸린 상태입니까?: x
x o x
[['e', 'e', 'e', 'e', 'c', 'c', 'c', 'f', 'f', 'd', 'b', 'b', 'a', 'a']]
[['f', 'f', 'd', 'd', 'c', 'c', 'a', 'a', 'e', 'e', 'e', 'b', 'b', 'b'], ['a', 'a', 'a', 'b', 'b', 'c', 'c', 'c', 'c', 'd', 'e', 'e', 'e',
'f']]
[['b', 'b', 'e', 'e', 'e', 'd', 'a', 'a', 'a', 'a', 'c', 'c', 'c', 'f']]
0.8999999999999999
독감에 감염되었을 확률이 90 %입니다. 가까운 병원에 들러 검사받는걸 추천합니다.
0.3
```

4. Changes in Comparison to the Plan

The detailed functions of function 3 are divided into two, and the secondary infection is not only causing the user to infect others

In consideration of the possibility of infection of the user, it is modified so that it can be calculated for all users,

The calculation for the probability of secondary infection was slightly changed.

5. Schedule

Work		11/3	11/19	11/26	12/17	12/22
proposal		complete				
Function1	Detailed function1		complete			
Function2	Detailed function1			complete		
Function3	Detailed function1				complete	
	Detailed function1				-------->	
Final source files and Rinal report						------->