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Letter to the Editor

Application of Geographic Information System in Monitoring and Detecting the COVID-19 Outbreak

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Dear Editor-in-Chief

In December 2019, a novel type of Coronavirus (later named as COVID-19) started from China and after a while rapidly spread to other parts of the world (1-2). As of 19 April 2020, more than 2.245 million cases of COVID-19 have been reported in 213 countries (3). Despite of the unique and unknown characteristic of this Virus, it is a very high spread infectious disease. Therefore finding the geographic accuracy of the Virus spread is crucial for the epidemiologists and authorities in order to respond to the infection outbreak quickly and appropriately (4).

Pandemic monitoring is now based on the map activities, and is centralized on the potentials of geographic information system (GIS) (5). GIS offers several practical opportunities for the authorities to improve the quality of the controls over the pandemic. It is being done through the capabilities of GIS on providing an ease monitoring, and detecting routes, and also it can predict the place of the infected people (1,4,6). During the past 20 years, the World Health Organization (WHO) and other health organizations have consistently used mapping and spatial analysis to manage disease outbreaks (5). So far, there are successful experiences for monitoring and controlling some disease, such as SARS, Ebola, and Zika through the application of GIS systems (5).

Accordingly, based on the previous research and the experiences of managing disease outbreaks, the information about the location of the patient is highly significant in the process of controlling and decision making (4). Hence, applying such approaches, from the beginning of the novel Coronavirus outbreak, local authorities and health experts of some countries started to track and detect the infected people through GIS systems. Searching on the number of infected people and the rate of mortality (3), those countries which stared to identify and track the infected people at the early-stage have been more successful than other countries.

Nowadays South Korea is the best example in controlling COVID-19 outbreak thorough GIS application. Applying the abilities of GIS tools and mapping system, they designed a unique, accurate, and fast system of tracking, in order to identify, tracking and monitoring the infected people, and the places that each detected patient had visited before being detected, besides other controlling strategies (7). While many countries had quarantine policy, South Korea started to track the infected cases through a system, in which they specified the places that patients have visited and accordingly could detect those people who have been in direct contact.

Figure 1 shows one of the efficient map-based tracking systems that have been implemented by South Korea's authorities since the beginning of the COVID-19 outbreak in the country, designed and built by the students of Kyunghee University in Seoul (8). This web GIS map provides several information about the number and location of the confirmed cases, the history of their travelling, besides the number of mortality and recovered patients in all the affected regions. Therefore, the citizens were aware of the potentially infected locations.

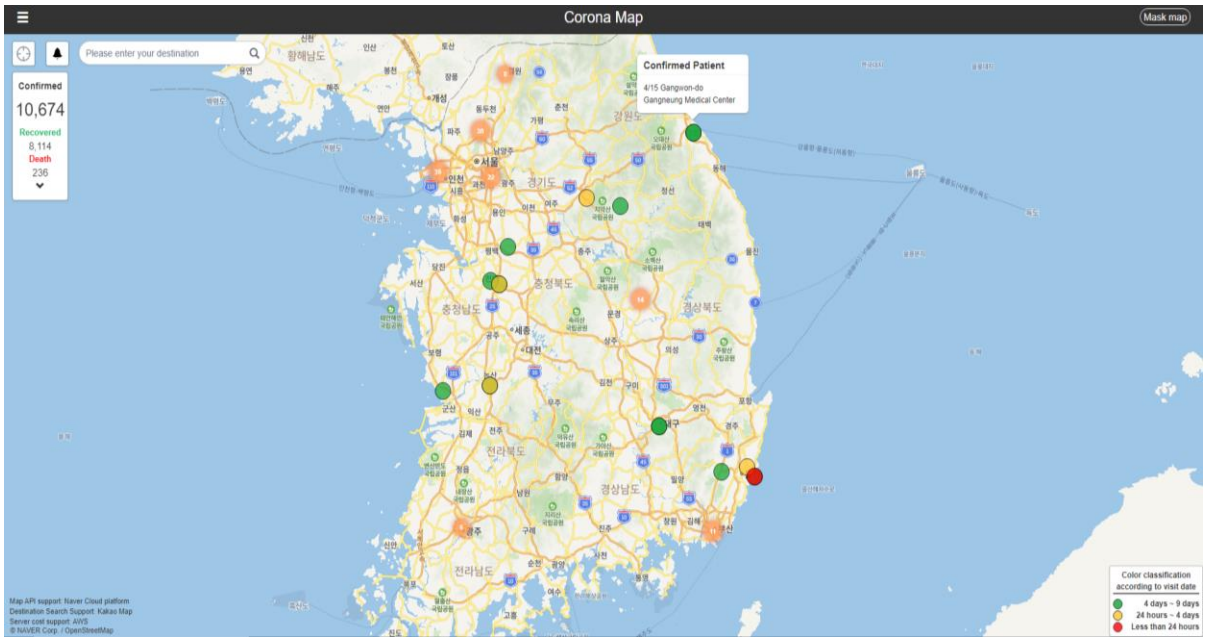

Fig. 1: Corona map detecting system (http://coronamap.site)

Through GIS system, South Korea's government provided the required 'transparency' which is critical at the time of the infection outbreak. This web-GIS system has provided beneficial information to the citizens, including the location of the detected patients, high risks location, and the infected area. Besides, it provides the information of the available medical facilities (the screen clinics for COVID-19 test, and the drugstores to find mask and sanitizer). This technology have offered several other advantages as well, for instance it enabled the authorities to make their decisions based on the updated and detailed information. Having access to such information, not only they could design the quarantine strategies, but they could manage the available or needed health-care resources in all the regions, accordingly.

To conclude, the critical contribution of GIS in the pandemics is seems to be providing accurate location-based information (5) to citizens, and also assist authorities, researchers and public health experts to make the best response strategies. Nevertheless, GIS maps would not be sufficient for controlling the spread of the infection at the time of the epidemic or pandemic, and other approaches are required. However this tool can enable the policy makers to manage the other approaches based on the very accurate and updated information.

Conflict of interest

The authors declare that there is no conflict of interest.

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