

The Effectiveness of GIS Mobility based Pattern Recognition Approach in COVID19 Infection among Sabah Local Community

Ang Kean Hua^{1,*}

¹ Geography Programme Faculty of Social Sciences and Humanities Universiti Malaysia Sabah (UMS), Malaysia

ARTICLE INFO

Article history:

Received 3 April 2024
Received in revised form 23 May 2024
Accepted 15 June 2024
Available online 16 August 2024

Keywords:

GIS-mobility; buffering; live tracking system; prevention; human life

ABSTRACT

COVID19's medicine are yet undiscovered. Nevertheless, spread prevention are consider greater alternative to secure human life. This research study aim to apply GIS-based mobile in determine the pattern of people movement among Sabah local community. Secondary data of COVID19 are obtained from Ministry of Health, Malaysia, and GIS-based map from Google Earth Desktop. ArcGIS Version 10 software is applied to carry out descriptive and buffering analysis. The result indicates continuous increase in numbers of patients due to COVID19 in year 2021. Buffering analysis shows 5 metre for people who consider having medical condition or older people, while 1 metre for people that are not having any medical condition or not older people. Overlapping buffering will develop alert and notification to both users of GIS mobility based Apps. In conclusion, this technology using 'Live Tracking System' Apps could enhance the quality of human life by alert and notify the surrounding condition whenever staying outside of the house. Although scientists and researchers are working so hard to develop the medicine, human are also have responsible to stop and prevent the COVID19 from being continuously spreading within human being.

1. Introduction

Coronavirus disease, or well-known as COVID19, is an infectious disease caused by various type of virus [10]. In medical terms, the virus of COVID19 can be include Severe acute respiratory syndrome coronavirus (SARS-CoV), Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), Middle East respiratory syndrome coronavirus (MERS-CoV), and four human coronaviruses (OC43, NL63, HKU1 and 229E), respectively [4]. It is no joke that all this viruses can spread to anyone to cause sick with COVID19 and become seriously ill or die at any age. Based on the WHO (2022) [10] reported that majority people connected to this viruses would experience mild to moderate respiratory illness and could be recover without any need of special treatment.

Nevertheless, older people or even people with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness [10]

* Corresponding author.

E-mail address: angkeanhua@ums.edu.my

<https://doi.org/10.37934/jhqol.3.1.3339>

. This is because the viruses can be spread from an infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, sing or breathe [10]. Therefore, it is unavoidable to be easily get infected if the people are categorized under non-vaccinations (including the booster injections) unhygienic lifestyle (e.g. un-mask during outdoor activities, dislike using alcohol-based hand rub, against in covering mouth or nose when coughing or sneezing, etc.) unfavour to self-isolate when feel-unwell, etc [10] [2] . Hence, the COVID19 are considered as an endless virus disease that continuous spreading throughout worldwide until today.

There are difference approach in determine the COVID19 when involve with social sciences, whereby society and the human being [9], financial and economic [6], as well as political sciences [3] , plays an important role in defending the well-being of an individual life status. In other words, people need to go outdoor for job opportunities, which indirectly to enhance the financial income in feeding the family so-called home. When the outbreak of COVID19 begins and continuously spreads from east-to-west of the planet of Earth, the human quality of life started to 'fall-down' and suffered due to this viruses. Lot of people lost their job and leads to household crisis; children are unable to enter school; businesses are forced to resumed; hospitals, clinics and even pharmacies lost major facilities (e.g. medicine, breathing aids, etc.); and many more of issues and problems especially related to human health status [7,8][11].

The government had took various alternatives in ensuring the people are being withstand from being affected by the COVID19, including enforce the people to undergone the program of Malaysian Movement Control (MCO) from month to month until year to year. While implemented the program, the government also enforce the people to have vaccinated themselves before 'abolish' the MCO and allow the people to live their life as usual. However, this condition would not lower the possibility of the people to get infected and cause illness. The best way to reduce the infectious disease and 'break- the-chain' from continue spreading is by remain one (1) metre apart from others when stay outside of the house. Probably by apply the technologies like global positioning system (GPS) could help the user to be notify and aware on their surrounding people and ensuring distancing of 1 metre could be achieve. Therefore, this research study aim to apply GIS-based mobile in determine the pattern of people movement among Sabah local community.

2. Materials and Methods

2.1 Study Area

This research study focuses on the Sabah state, particularly in Kota Kinabalu (KK) area. Since KK is the state capital of Sabah, approximately 500 421 populations [5] (City Population Official Portal, 2020) are located at the city in obtaining job opportunities, education and hospitalities facilities, transportation services, etc. Strategically located on the northwest coast of Borneo facing the South China Sea, the city received average temperature range from 26 °C to 28 °C with the average annual rainfall around 2400 millimetres [1]. During rainy season, the people will prefer to stay indoor rather than outdoor activities.

2.2 Secondary Data and the Analytical Techniques Applied

In this study, only secondary data are apply to carry out the analysis, which obtain from the Ministry of Health, Malaysia, as well as Google Earth Desktop. Both categories of data are based on year 2021. In other words, the cases of COVID19 infections and the death rate due to viruses from Ministry of Health, Malaysia, are used to undergo the descriptive analysis techniques; while GIS-

based map from Google Earth Desktop is used to carry out the analysis of buffering techniques in ArcGIS Desktop. The software used to carry out the analysis is ArcGIS Desktop Version 10.

3. Results and Discussions

In descriptive analysis, the cases of COVID19 infections and the death rate due to viruses are obtain from the Ministry of Health, Malaysia, in year 2021 (Table 1). From the data, the result indicate continuously increase in number of population for both cases that infected (Figure 1) as well as death rate (Figure 2) due to the COVID19 viruses that spread in Sabah state. Since COVID19 are hardly to cure and therefore, the best way to avoid from being infected is by prevention through 1 metre distancing with other people. Application of GIS plus GPS will enhance the implementation of the '1 metre distancing' approach.

Table 1
The statistical data of COVID19 based on year 2021

Month	The Cases of COVID19	The Death Rate due to COVID-19
January	48869	324
February	52887	373
March	54768	392
April	58137	435
May	62245	470
June	69446	545
July	84722	634
August	147844	1163
September	197974	2221
October	217949	2522
November	233233	2683
December	240632	2783

Source: The Google News Official Portal (2021)

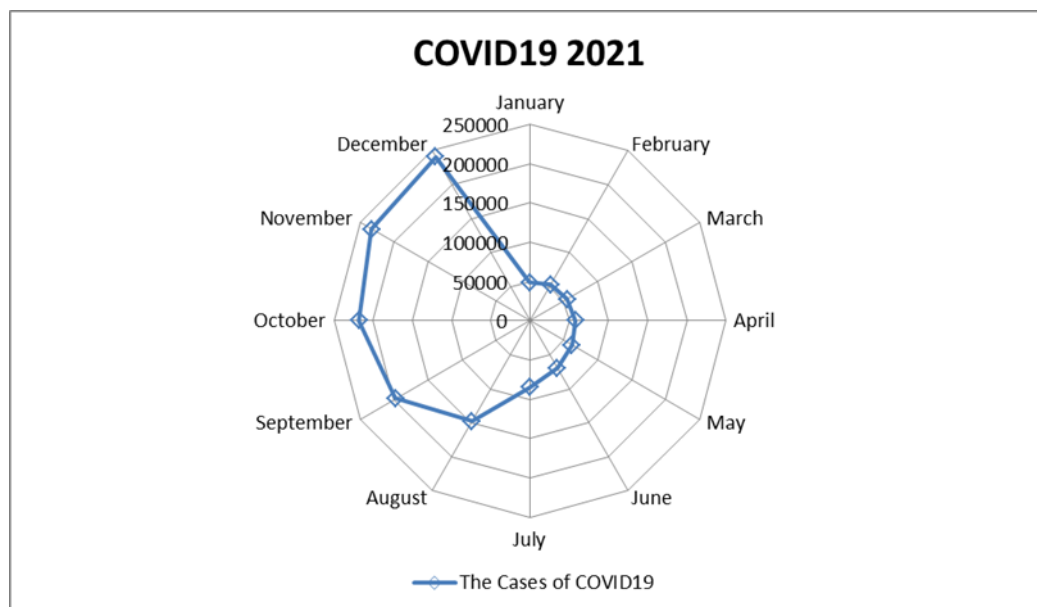


Fig. 1. The number of population infected by the COVID-19

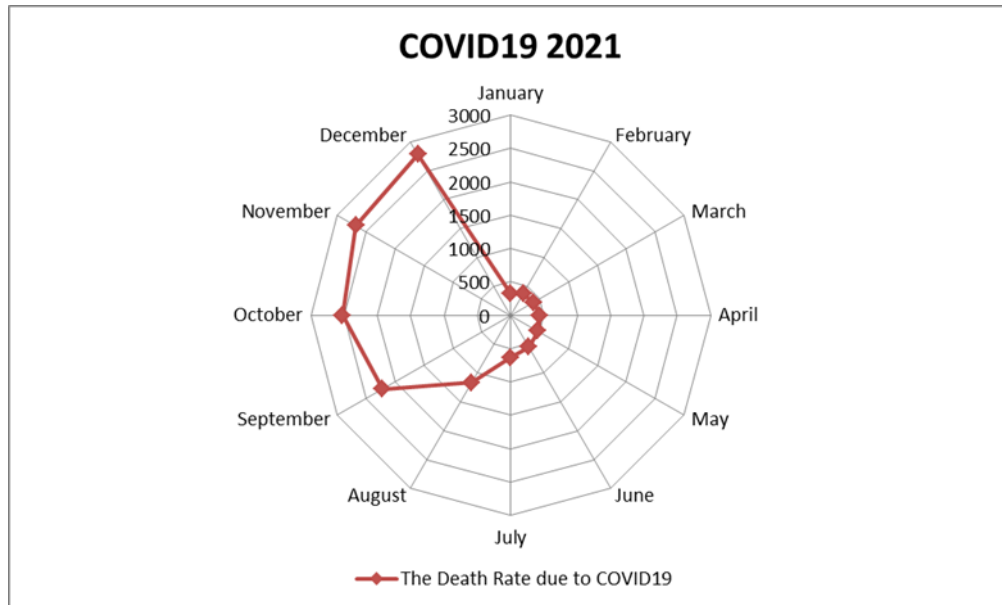
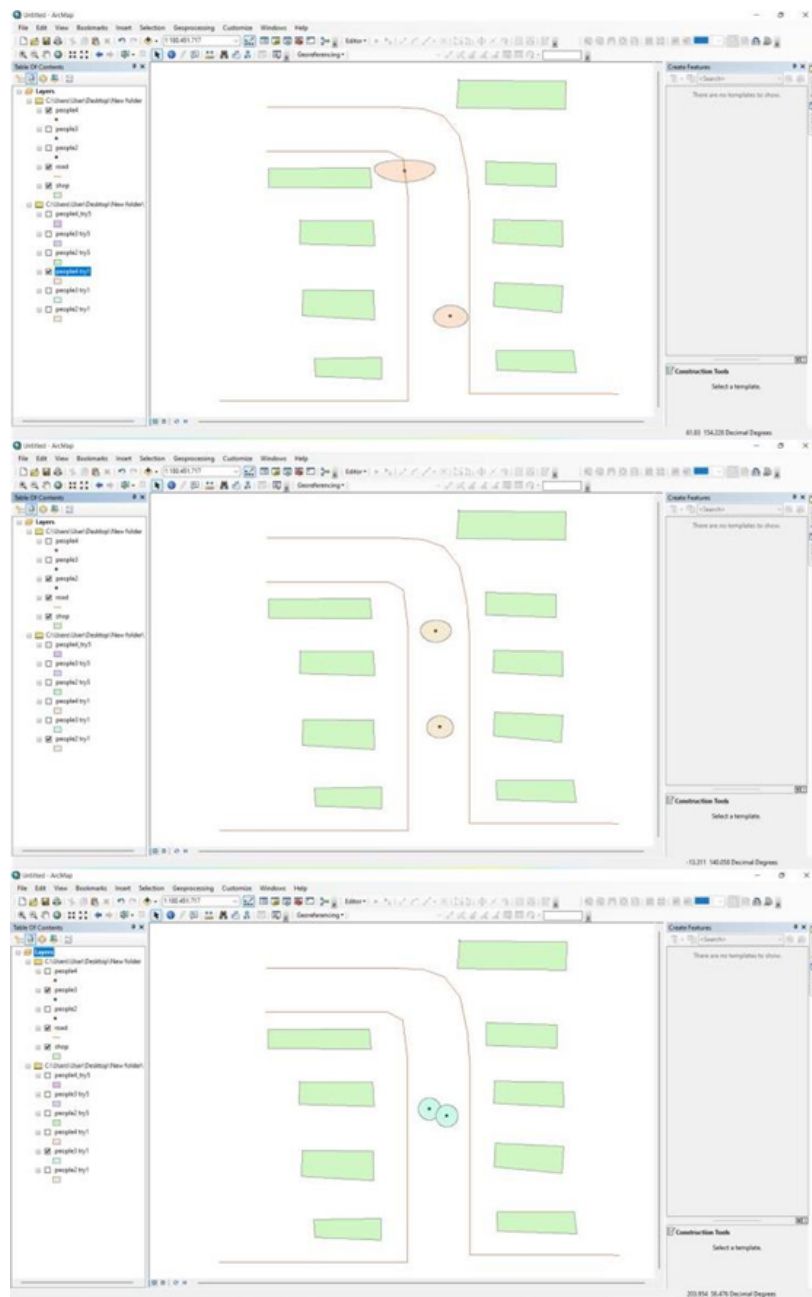


Fig. 2. The number of death rate due to the COVID-19

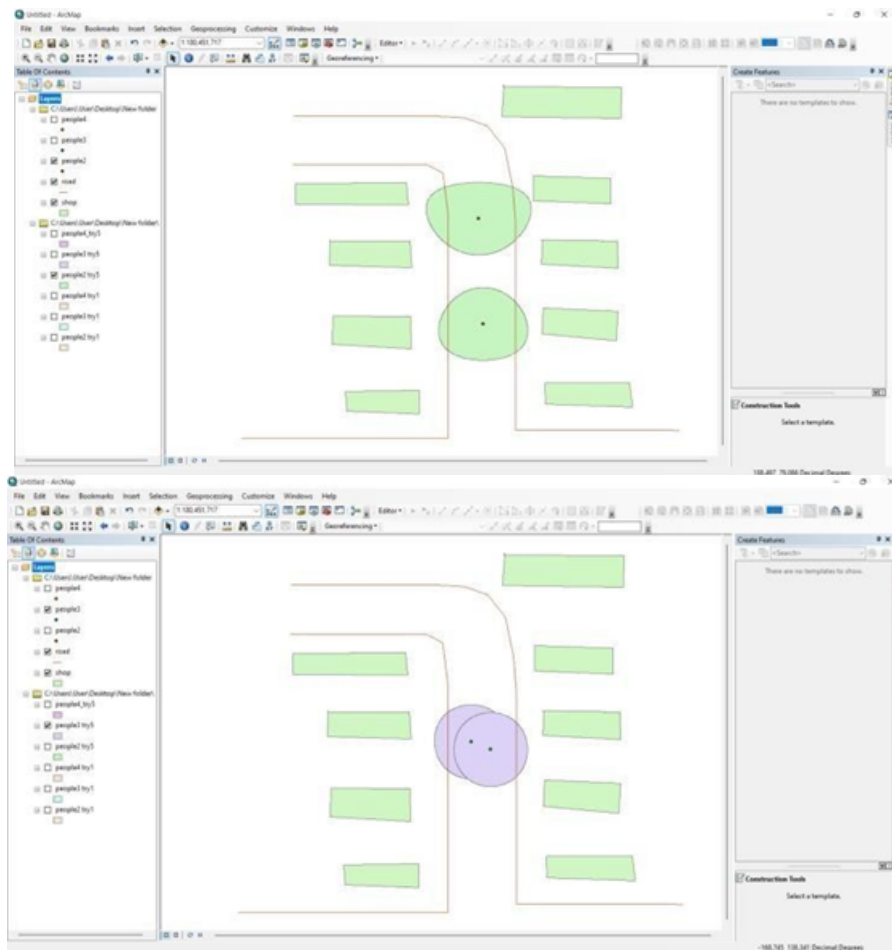
3.1 The Buffering Analysis in GIS and GPS Approach

In the process of technical analysis, the individual data will be key-in into ArcGIS before link to the GPS for 'Track-and-Trace' system. It is important if the GPS could process the 'Live Tracking System', whereby majority user having this application (or Apps) in their mobile smart phone could trace the condition of COVID19 (either infected or non-infected people) moving around them. In ArcGIS, the researcher will carry-out buffering analysis with distance of one (1) metre from center-point for people who consider not having any medical condition or not older people (Figure 3); as well as buffering analysis of five (5) metre for people who consider having medical condition or older people (Figure 4). It can be done when the algorithm of buffering model are modified to fit into GPS technology system before proceed to 'Live Tracking System' analysis. The technology will work when there are two (2) point (which referring to the two people) getting near between each other (example overlapping buffering within 1 metre range), then the system will alert and notify the user to stay away from the person. If the user are fall under medical condition or older people, the system will automatically set- up with 5 metre distancing. However, if the users are fall under not have any issues in medical condition, and then they could choose either to have 1 metre or 5 metre distancing approach. By implement this technology, the COVID19 could be prevent from continuously spreading within human being.



*Note: People who consider not having any medical condition or not older people.

Fig. 3. The buffering of 1 metre distancing approach using GIS and GPS techniques



*Notes: People who consider having medical condition or older people.

Fig. 4. The buffering of 5 metre distancing approach using GIS and GPS techniques

4. Conclusion

In conclusion, implement the GIS-mobility using 'Live Tracking System' Apps could enhance the quality of human life by alert and notify the surrounding condition whenever staying outside of the house. Although scientists and researchers are working so hard to develop the medicine, human are also have responsible to stop and prevent the COVID19 from being continuously spreading within human being.

Acknowledgement

The author would like to thanks to Faculty of Social Sciences and Humanities (FSSH), Universiti Malaysia Sabah (UMS), for 'Invitation of Webinar Speaker Sept-COVID 19' in 'Exploration and Behavior Seminar Sept-COVID 19' and provide financial support in publishing this paper as article journal.

References

- [1] Mojiol, Andy Russel Immit. Ecological landuse planning and sustainable management of urban and sub-urban green areas in Kota Kinabalu, Malaysia. Cuvillier Verlag, 2006.
- [2] Arnold, Jack, Kevin Winthrop, and Paul Emery. "COVID-19 vaccination and antirheumatic therapy." *Rheumatology* 60, no. 8 (2021): 3496-3502. <https://doi.org/10.1093/rheumatology/keab223>
- [3] Barberia, Lorena, Thomas Plümper, and Guy D. Whitten. "The political science of Covid-19: An introduction." *Social*

- Science Quarterly* 102, no. 5 (2021): 2045-2054. <https://doi.org/10.1111/ssqu.13069>
- [4] Ciotti, Marco, Massimo Ciccozzi, Alessandro Terrinoni, Wen-Can Jiang, Cheng-Bin Wang, and Sergio Bernardini. "The COVID-19 pandemic." *Critical reviews in clinical laboratory sciences* 57, no. 6 (2020): 365-388. <https://doi.org/10.1080/10408363.2020.1783198>
- [5] City Population Official Portal (2020). Sabah: State in Malaysia. City Population Official Portal. Retrieved from: https://www.citypopulation.de/en/malaysia/admin/12_sabah/
- [6] Estrada, Mario Arturo Ruiz, Evangelos Koutronas, and Minsoo Lee. "Stagpression: the economic and financial impact of the COVID-19 pandemic." *Contemporary Economics* 15, no. Special Issue (2021): 19. <https://doi.org/10.5709/ce.1897-9254.433>
- [7] Heitzman, Janusz. "Impact of COVID-19 pandemic on mental health." *Psychiatr Pol* 54, no. 2 (2020): 187-198. <https://doi.org/10.12740/PP/120373>
- [8] Mardones, Fernando O., Karl M. Rich, Lisa A. Boden, Andrea I. Moreno-Switt, Marisa L. Caipo, Natalia Zimin-Veselkoff, Abdulaziz M. Alateeqi, and Isabelle Baltenweck. "The COVID-19 pandemic and global food security." *Frontiers in Veterinary Science* 7 (2020): 578508. <https://doi.org/10.3389/fvets.2020.578508>
- [9] Singh, Jaspreet, and Jagandeep Singh. "COVID-19 and its impact on society." *Electronic Research Journal of Social Sciences and Humanities* 2 (2020).
- [10] World Health Organization (WHO) (2022). Coronavirus disease (COVID19). World Health Organization Official Portal. Retrieved from: https://www.who.int/health-topics/coronavirus#tab=tab_1
- [11] Hussain, Mirza Waseem, Tabasum Mirza, and Malik Mubasher Hassan. "Impact of COVID-19 pandemic on the human behavior." *International Journal of Education and Management Engineering* 10, no. 8 (2020): 35-61. <https://doi.org/10.5815/ijeme.2020.05.05>