

COMOKIT BUILDING: simulating the impact of NPI against Covid-19 at building scale

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Abstract

Since the appearance of Covid-19, many models have been developed to answer the question of what policies to implement to minimize its spread. Among these models, some are interested in the propagation inside buildings. Many works have indeed highlighted the impact of propagation in closed environments. It is in this context that we have developed the COMOKIT BUILDING model. This model is part of the COMOKIT framework (COVID-19 Modeling Kit) [1]. COMOKIT BUILDING is based on the model proposed by [2]. As in this model, the agents represent individuals who will come to do activities in the building. For that, each agent has an agenda that defines the activity it has to perform according to the time. They will then move in the building to go to their activity place and realize it. However, contrary to the model [2], which is primarily interested in the risk taken by individuals over a day, we are interested impact of the preventive measure over a longer period. Thus, we use the epidemiological model of COMOKIT (SEIR) to describe the evolution of the disease for individuals. In addition, taking inspiration from [2], we defined three types of transmission vectors (direct, airborne and via surfaces). Several types of interventions are taking into account: masks, physical distancing, room ventilation, physical barrier, etc. The model was implemented using GAMA 1.8.2 and takes advantage of some new features of this version, in particular the use the newly integrated pedestrian plugin for the agent movement.

An application of the model to study the impact of prevention measures on the spread of the virus in a Hospital in the city of Danang in Vietnam will be presented. This hospital was at the origin of the formation of a cluster. Since then, several clusters have appeared in hospitals in Vietnam, making the issue of preventive measures in hospitals a major challenge for the Vietnamese government.

References

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Additional material

Github (plug-ins code): <https://github.com/gama-platform/gama.experimental>