International Forum on Data Science Approaches to the COVID-19 Pandemic Successfully Held on 28-29 May 2020

The International Forum on Data Science Approaches to the COVID-19 Pandemic, jointly organized by the City University of Hong Kong's School of Data Science, College of Business and the Hong Kong Institute for Data Science, was successfully concluded. This two-day forum brought together top scholars from all over the world to exchange cutting-edge research on COVID-19 in various disciplines. More than 150 participants from the world joined in this online forum. Professor Way Kuo, President of the City University of Hong Kong and member of the U.S. National Academy of Engineering, delivered the opening remark for the International Forum.

The forum held two keynote speeches and ten presentations about the COVID-19 pandemic and its impact and responses. Keynote speakers and invited speakers shared their expert views from the perspectives of data science, medical sciences, management sciences, and engineering. They have analyzed the effects of this special epidemic in the whole world and presented their best approaches to containing the societal impact and economic consequences of the pandemic.

In the topic of assessing epidemic prevention measures and transmission control, Harvard Professor Xihong Lin, member of the U.S. National Academy of Medicine, used data from Wuhan, the United States and Europe to evaluate the effects of different public health interventions, such as quarantine and isolation, forced social distancing, on the control of the covid-19 epidemic. The results showed that social distancing, isolation and quarantine can play a significant role in limiting the spread of the disease, but it is not enough, and multi-faceted intervention measures are needed.

Based on the epidemic data in Hong Kong, Dr Sean Yuan, from the Department of Biological Sciences, City University of Hong Kong, shared his findings on how to determine the minimal intensity of movement restrictions required to prevent the resurgence of COVID-19 after the relaxation of the measures through modelling the quarantine measures and disease dynamics in Hong Kong.

Dr Michael Baldea from University of Texas at Austin introduced a novel optimization-based decision-making framework for managing the COVID-19 outbreak in the US. The analysis of their extensive computational efforts reveals that social distancing and quarantining are most effective when implemented early, with quarantining of confirmed infected subjects having a much higher impact.

Prof Paul Yip, Associate Dean of Faculty of Social Sciences of The University of Hong Kong, aims to estimate the infection curve of COVID-19 in Hong Kong and identify major events and preventive measures associated with the trajectory of the infection curve. The study shows that shorter or even no notice at all alongside the necessary supporting measures may be considered to effectively curb the spread of the COVID-19.

Predicting the epidemic size is another important topic in recent researches. Speakers from City University of Hong Kong have brought the latest models. Prof Jian Lu, Vice-President (Research and Technology) and Chair Professor of Department of Biomedical Sciences, proposed a simple projection model to assess the situation for the coming days to help policy makers in different countries address the epidemic outbreak of the COVID-19 more effectively. The model has achieved effective results in assessing local data according to the optimization of parameters.

Traditional epidemiological models assuming homogeneous relationships in the social network. Dr Qingpeng Zhang, Assistant Professor of School of Data Science, proposed a multiplex network framework for the modeling of the heterogeneous disease-behavior-information dynamics during epidemics. In this framework, people's vulnerability to the diseases is found to be influenced by the transmissions of information, behavior, and disease in the social network.

In addition, Professor Joe Qin, Dean of the School of Data Science, introduced a mechanistically inspired data-driven COVID-19 pandemic model with their structures to include the infected and intensely cared critical cases as inventories in the curing process. The results show that the overall models estimated from China's data, which went through a complete process early in the pandemic, predict well for other regions tested, including Mainland China, U.S., Canada, Germany, and Spain.

The global pandemic has exposed serious weakness in supply chains. Prof. David Simchi-Levi, Director of the MIT Data Science Lab, demonstrated in the other keynote speech the need for supply chain resiliency and stress-tests. Shortage of critical materials shows that governments should consider establishing a stress test for companies that provide critical goods and services. David stressed that this test should focus on the resilience of companies' supply chains. While food supply chains have not been exposed to major disruptions so far, those hiccups caused by temporary export bans and plant closures have revealed potentially colossal vulnerability in territories like Hong Kong, Prof Frank Chen, Head and Chair Professor of Department of Management Sciences, discussed the issues of managing both the supply and demand sides.

Besides, an introduction and sharing on the visualization project/ dashboard for New Your State conducted was presented by Prof Fengqi You from Cornell University. Prof Sean Young from University of California Irvine made a presentation about using social data for changing and predicting health behaviors. Prof Jie Liu, Dean of AI Research of Harbin Institute of Technology (Shenzhen), found that small data through the lens of COVID-19 pandemic revealed much richer information to help understanding the virus than big data. As the virus may co-exist with us for a long time, he anticipated small data to be deeply integrated into our lifestyles.