One AI Application on Lung Diseases

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Data mining is a brunch of artificial intelligence (AI). The aim of our study is to use data mining methods to investigate the control and prevention of lung diseases because some potential risks exceed our experiential estimates (Menachery V.D., et al. in 2015).

Life is precious. For now, millions of people are facing being killed by the novel coronavirus pneumonia in China. Many cities in China are locked down. Among them, the population in Wuhan city is more than 11 million. In comparison, the population in Toronto is just less than 3 million. Moreover, millions of dollars have been spent in the clinical research in Canada, but facing this novel coronavirus pneumonia, the clinics in Canada are very weak. It is a high possibility that there are asymptotic coronavirus carriers in Canada because we have not done a comprehensive clinical screening. For now, there is no report of AI treatment to this novel coronavirus pneumonia in the world. Our study clearly illustrates a machine learning method which works in lung diseases.

In our study, we used data mining methods to analyze and simulate lung disease data. It was divided into two parts. First, missing data were filled. We compared a traditional statistical method, a statistical learning method and a deep learning method. Second, we simulated the application of a machine learning method in variable selections in complete high-correlated high-dimensional data without missing values. At last, some virus pneumonias, such as the Wuhan novel coronavirus pneumonia, are diffuse in lung. Thus, Poisson distribution can be modeled to the count data. In all, an efficient AI method is proposed to address the issue in high-dimensional uncompleted lung disease data sets. It is especial suitable in this time of crisis.

Finally, this work should contribute to data mining methods to improve some existing lung disease medical work in the near future. Imaging, we just face a computer machine in a clinical center. However, further investigations are needed. Let us struggle to achieve this goal in Canada.