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| Title | 4P Model for Dynamic Prediction of COVID-19: a Statistical and Machine Learning Approach | | |
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| Abstract |  |
| Around the world, scientists are racing hard to understand how the COVID-19 epidemic is spreading and growing, thus trying to find ways to prevent it before medications are available. Many different models have been proposed so far correlating different factors. Some of them are too localized to indicate a general trend of the pandemic while some others have established transient correlations only. Hence, in this study, taking Bangladesh as a case, a 4P model has been proposed based on four probabilities (4P) which have been found to be true for all affected countries. Efficiency scores have been estimated from survey analysis not only for governing authorities on managing the situation (P(G)) but also for the compliance of the citizens ((P(P)). Since immune responses to a specific pathogen can vary from person to person, the probability of a person getting infected ((P(I)) after being exposed has also been estimated. And the vital one is the probability of test positivity ((P(T)) which is a strong indicator of how effectively the infected people are diagnosed and isolated from the rest of the group that affects the rate of growth. All the four parameters have been fitted in a non-linear exponential model that partly updates itself periodically with everyday facts. Along with the model, all the four probabilistic parameters are engaged to train a recurrent neural network using long short-term memory neural network and the followed trial confirmed a ruling functionality of the 4Ps. | |