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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.** | |