

Prediction of specific binding affinity of aptamers to the influenza virus using Neural Network

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Abstract— The influenza virus kills many people and animals worldwide each year and causes significant economic and social damages. Developing reliable, easy-to-use, high-sensitive diagnostic methods will help us to control epidemics and their side effects. In this vein, the proposing of new molecular methods based on aptamers has been considered due to their high potential in the diagnosis, control, and even treatment of influenza infection. Thanks to artificial intelligence, now, it is easy to evaluate the effectiveness of aptamers in the detection of influenza viruses. This study applied neural networks to predict aptamers' binding score to the influenza viruses using nine descriptors. In this study, GRNN model predictions matched the experimental binding scores with $r^2=0.66$ and MLP with $r^2=0.77$. These results indicate that MLP neural network outperforms the multilinear regression method applied in the previous study on the same dataset.

Keywords—Aptamer, Influenza Virus, Binding Affinity, Prediction, Artificial Intelligence, Neural Networks