Machine learning based modeling of cumulative COVID-19 confirmed cases across African regions.

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Zurki Ibrahim[1]

[1]Faculty of Natural and Applied Sciences, Department of Biological Sciences, Sule Lamido University Kafin Hausa, Nigeria
zurkiibrahim@yahoo.com

Abstract

A worldwide pandemic caused by the COVID-19 has created disastrous effects on social interactions, the economy, and public health. Due to a lack of technology and an inadequate or underdeveloped healthcare system, Africa continues to rank among the most vulnerable continents in the world, even though COVID-19 has contracted and spread less there than in some other continents. Consequently, the ability to accurately predict new situations is essential for making well-informed decisions and assessing appropriate course of action. Even though COVID-19 poses risks and concerns, there are not many studies on prediction in Africa. Therefore, taking into account nations with low and large numbers of daily COVID- 19 instances, this study was conducted to estimate the cumulative COVID-19 cases in 10 African countries distributed across the north, south, east, west, and central regions. For this aim, machine learning (ML) models—such as artificial neural networks (ANN), adaptive neuro-fuzzy inference systems (ANFIS), support vector machines (SVM), and traditional multiple linear regression (MLR) models—were used because of their nonlinearity and precise prediction skills. The COVID-19 pandemic may have both linear and nonlinear aspects, just like any other natural phenomenon. Combining both nonlinear (ML) and linear (MLR) models may result in improved accuracy in certain situations where neither model could be sufficient. The outcome of the findings showed that ANN displayed better prediction performance with MAD= 0.0005, MSE= 0.0006, RMSE= 0.0006 and R2= 0.9998. This study outcome offers a very good foundation in the application of machine

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