Forecasting COVID -19 Daily Infected Cases in Ukraine

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ABSTRACT

Ukraine has reported the 6th highest European Union country grabbed by COVID -19. Ukraine exceeds 2.6 million cases since 22nd January 2020 and still reporting an increasing trend with repeating the behavior. Due to the prevailing pandemic situation in the country, the future outbreak is doubtful. Identifying the future behavior of the outbreak is very important to be proactive and minimize the spread of the pandemic. It will be very useful to ensure the economic and social stability of Ukraine. Hence, the study has been designed to model the daily infected cases of COVID -19 within Ukraine to understand the future behavior of the outbreak. The daily confirmed cases of COVID-19 of the country for the period of 22nd January 2020 to 19th October 2021 were obtained from the World Health Organization (WHO) database. The pattern of the outbreak was identified by Time series plots and Auto Correlation Function (ACF). Holt's Winters three-parameter additive and multiplicative models were selected by considering the pattern of the data set. The Anderson Darling test, ACF, and Ljung-Box Q (LBQ)-test were applied to test the model assumptions. The forecasting ability of the models was assessed by both relative and absolute measurements and errors. They are; Mean Absolute Percentage Error (MAPE), Mean Square Error (MSE), and Mean Absolute Deviation (MAD). The results of the study revealed that Holt's Winters three-parameter additive and multiplicative models with α (level) 0.99, γ (trend) 0.25, and δ (seasonal) 0.18 were satisfied with all criteria and the performance of the model was extremely high. Measurements of errors were very low under the model fitting and verification process. Holt's Winter's three-parameter additive and multiplicative models are suitable models to forecast the infected cases within Ukraine. It is identified the repeating behavior of daily infected cases in every 7 days. It is recommended to impose and monitor non-pharmaceutical interventions to minimize and control the outbreak of the COVID -19 in Ukraine. Further, it is recommended to model the same outbreak to capture other hidden repeating behaviors to defeat the pandemic.

Keywords: Daily Cases, Repeating Behavior, Holts Winter's, COVID-19