Hybrid grey exponential smoothing approach for predicting transmission dynamics of the COVID-19 outbreak in Sri Lanka

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Abstract

Purpose – The Coronavirus (COVID-19) is one of the major pandemic diseases caused by a newly discovered virus that has been directly affecting the human respiratory system. Because of the gradually increasing magnitude of the COVID-19 pandemic across the world, it has been sparking emergencies and critical issues in the healthcare systems around the world. However, predicting the exact amount of daily reported new COVID cases is the most serious issue faced by governments around the world today. So, the purpose of this current study is to propose a novel hybrid grey exponential smoothing model (HGESM) to predicting transmission dynamics of the COVID-19 outbreak properly.

Design/methodology/approach – As a result of the complications relates to the traditional time series approaches, the proposed HGESM model is well defined to handle exponential data patterns in multidisciplinary systems. The proposed methodology consists of two parts as double exponential smoothing and grey exponential smoothing modeling approach respectively. The empirical analysis of this study was carried out on the basis of the 3rd outbreak of Covid-19 cases in Sri Lanka, from 1st March 2021 to 15th June 2021. Out of the total 90 daily observations, the first 85% of daily confirmed cases were used during the training, and the remaining 15% of the sample.

Findings – The new proposed HGESM is highly accurate (less than 10%) with the lowest root mean square error values in one head forecasting. Moreover, mean absolute deviation accuracy testing results confirmed that the new proposed model has given more significant results than other time-series predictions with the limited samples.

Originality/value – The findings suggested that the new proposed HGESM is more suitable and effective for forecasting time series with the exponential trend in a short-term manner.

Keywords Coronavirus, COVID-19, Exponential smoothing, GM (1, 1) model, Grey system theory

Paper type Research paper

the current situation.

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Further reading

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