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MODELING COVID-19 CASES IN SRI LANKA USING ARIMA MODELS

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COVID-19 (Novel Coronavirus) is a pandemic which spread around the world at an alarming rate. As of 10th June 2020, 1,880 infections and 11 deaths were reported in Sri Lanka due to COVID-19. The number of infections increase day by day requiring research on modelling the pandemic. Modelling of COVID 19 cases will be useful to understand the behavioural patterns of the disease and hence to identify control mechanisms. The aim of this study is to model and predict the daily cumulative COVID-19 cases in Sri Lanka. Autoregressive Integrated Moving Average (ARIMA) technique was applied to model the reported COVID-19 cases in Sri Lanka. Data from 11th March - 1st of June 2020 were used for the model development and data from 2nd - 10th June 2020 (10% of data) were used for model validation. In the analysis, second order differencing removed the non-stationarity of the original series. Different candidate ARIMA models were tested based on ACF and PACF plots and the best ARIMA model was selected based on minimum AIC and BIC measures. The most appropriate ARIMA model for the COVID-19 cases in Sri Lanka is ARIMA (2,2,2). After verifying the assumptions of the model, MAPE of the validation set revealed 1.86%. Therefore, the selected most appropriate model was used to forecast the future COVID-19 cases in Sri Lanka. According to the forecasted values of the model, it can be concluded that COVID-19 cases in Sri Lanka will increase slowly in the upcoming days. ARIMA technique is appropriate in only short-term forecasting. Availability of an effective prediction model will be helpful in anticipating the cases and to take timely action to control the COVID-19 incidence. Unexpected recordings cannot be modelled and predicted by the fitted models. Uncertainties limit the effectiveness of a model, specially, in an epidemic like novel coronavirus.

Keywords: Auto-regressive integrated moving average (ARIMA), COVID-19 (Novel Coronavirus), Modelling, Forecasting

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