An improved optimization algorithm-based prediction approach for the weekly trend of COVID-19 considering the total vaccination in Malaysia: A novel hybrid machine learning approach

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ABSTRACT
SARS-CoV-2 is a multi-organ disease characterized by a wide range of symptoms, which also causes severe acute respiratory syndrome. When it initially began, it rapidly spread from its origin to adjacent nations, infecting millions of people around the globe. In order to take appropriate preventative and precautionary actions, it is necessary to anticipate positive Covid19 instances in order to better comprehend future risk. Therefore, it is vital to build mathematical models that are resilient and have as few prediction mistakes as feasible. This research recommends an optimization based Least Square Support Vector Machines (LSSVM) for forecasting Covid19 confirmed cases along with the daily total vaccination frequency. In this work, a novel hybrid Barnacle Mating Optimizer (BMO) via Gauss Distribution is combined with Least Squares Support Vector Machines algorithm for time series forecasting. The data source consists of the daily occurrences of cases and frequency of total vaccination since 24 February,2021 to 27 July,2022 in Malaysia. LSSVM will thereafter conduct the prediction job with the optimized hyper-parameter values using BMO via gauss distribution. This study concludes, based on its experimental findings, that hybrid IBMOLSSVM outperforms cross validations, original BMO, ANN and few other hybrid approaches with optimally optimized parameters.

KEYWORDS
Time series prediction; Barnacle mating optimizer; Gaussian distribution; Least square support vector machines; Covid-19 confirmed case and total vaccination

ACKNOWLEDGMENT

This research study was supported by Ministry of Education Malaysia (MOE) and Universiti Malaysia Pahang under Fundamental Research Grant Scheme (FRGS/1/2019/ICT02/UMP/03/1) & (#RDU1901133).