World Academy of Science, Engineering and Technology
International Journal of Computer and Systems Engineering
Vol:18, No:04, 2024

A Comparative Study of Optimization Techniques and Models to Forecasting Dengue Fever

Authors : Sudha T., Naveen C.

Abstract : Dengue is a serious public health issue that causes significant annual economic and welfare burdens on nations. However, enhanced optimization techniques and quantitative modeling approaches can predict the incidence of dengue. By advocating for a data-driven approach, public health officials can make informed decisions, thereby improving the overall effectiveness of sudden disease outbreak control efforts. The National Oceanic and Atmospheric Administration and the Centers for Disease Control and Prevention are two of the U.S. Federal Government agencies from which this study uses environmental data. Based on environmental data that describe changes in temperature, precipitation, vegetation, and other factors known to affect dengue incidence, many predictive models are constructed that use different machine learning methods to estimate weekly dengue cases. The first step involves preparing the data, which includes handling outliers and missing values to make sure the data is prepared for subsequent processing and the creation of an accurate forecasting model. In the second phase, multiple feature selection procedures are applied using various machine learning models and optimization techniques. During the third phase of the research, machine learning models like the Huber Regressor, Support Vector Machine, Gradient Boosting Regressor (GBR), and Support Vector Regressor (SVR) are compared with several optimization techniques for feature selection, such as Harmony Search and Genetic Algorithm. In the fourth stage, the model's performance is evaluated using Mean Square Error (MSE), Mean Absolute Error (MAE), and Root Mean Square Error (RMSE) as assistance. Selecting an optimization strategy with the least number of errors, lowest price, biggest productivity, or maximum potential results is the goal. In a variety of industries, including engineering, science, management, mathematics, finance, and medicine, optimization is widely employed. An effective optimization method based on harmony search and an integrated genetic algorithm is introduced for input feature selection, and it shows an important improvement in the model's predictive accuracy. The predictive models with Huber Regressor as the foundation perform the best for optimization and also prediction.

Keywords : deep learning model, dengue fever, prediction, optimization
Conference Title : ICCSET 2024 : International Conference on Computer Science, Engineering and Technology
Conference Location : London, United Kingdom
Conference Dates : April 11-12, 2024