

Dengue Outbreak Prediction: Hybrid Meta-heuristic Model

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Abstract—Parameter tuning of Least Squares Support Vector Machines (LSSVM) hyper-parameters, namely regularization parameter and kernel parameters plays a crucial role in obtaining a promising result in prediction task. Any improper values setting of the said hyper-parameters would demote the generalization of LSSVM. Concerning that matter, in this study, Flower Pollination Algorithm (PA), which is relatively new optimization algorithm is hybrid with LSSVM. Here, the FPA is served as an optimization algorithm for LSSVM. The hybrid FPA-LSSVM is later realized for prediction of dengue outbreak in Yogyakarta, Indonesia. Since it was first recognized, until now Dengue Fever (DF) remains as a major concern of public health in community, specifically during the massive outbreaks. A serious infection of dengue can progress into a more critical condition namely Dengue Hemorrhagic Fever (DHF). Therefore, a good prediction model is vital to predict the dengue outbreak cases. By using monthly disease surveillance and meteorological data, the performance of the prediction model is guided by Mean Square Error (MSE) and Root Mean Square Percentage Error (RMSPE). Findings of the study demonstrate that FPA-LSSVM is able to produce lower error rate compared to the other identified algorithms.

Keywords—Dengue outbreak prediction, Flower Pollination Algorithm, Least Squares Support Vector Machines, Machine Learning