

Efficient Large-Scale Classification with Linex Least Square Twin Bounded Support Vector Machine

RATTANAPORN WANGKEEREE^{1,2}, DAWRAWEE MAKMUANG¹, AND RABIAN WANGKEEREE^{1,2}

ABSTRACT. This paper addresses the challenges of large-scale classification problems in machine learning, where traditional algorithms often struggle with computational and memory constraints, resulting in prolonged training times. To overcome these limitations, we propose LSTBSVM-linex, a model that combines an asymmetric Linex loss function with Least Square Twin Bounded Support Vector Machine (LSTBSVM), optimized for large-scale datasets using the Adam algorithm. Our proposed model demonstrates superior performance in terms of both classification robustness and computational efficiency, as supported by convergence analysis and numerical results. Additionally, statistical tests are employed to validate the competitive performance of LSTBSVM-linex. The effectiveness of the model is further illustrated through its successful application to Knee Osteoarthritis X-ray images, where features are extracted using the pre-trained ResNet18 model.

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Corresponding author: Rabian Wangkeeree; rabianw@nu.ac.th

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¹ DEPARTMENT OF MATHEMATICS, FACULTY OF SCIENCE, NARESUAN UNIVERSITY, PHITSANULOK 65000, THAILAND

Email address: rattanapornw@nu.ac.th

Email address: dawrawee@gmail.com

² RESEARCH CENTER FOR ACADEMIC EXCELLENCE IN MATHEMATICS, NARESUAN UNIVERSITY, PHITSANULOK, 65000, THAILAND

Email address: rabianw@nu.ac.th