

Accepted Manuscript

Title: A robust fuzzy least squares twin support vector machine for class imbalance learning

Authors: B. Richhariya, M. Tanveer

PII: S1568-4946(18)30387-9
DOI: <https://doi.org/10.1016/j.asoc.2018.07.003>
Reference: ASOC 4969

To appear in: *Applied Soft Computing*

Received date: 21-11-2017
Revised date: 1-3-2018
Accepted date: 1-7-2018



Please cite this article as: Richhariya B, Tanveer M, A robust fuzzy least squares twin support vector machine for class imbalance learning, *Applied Soft Computing Journal* (2018), <https://doi.org/10.1016/j.asoc.2018.07.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A robust fuzzy least squares twin support vector machine for class imbalance learning

B. Richhariya¹, M. Tanveer²

Discipline of Mathematics, Indian Institute of Technology Indore, Simrol, Indore, 453552,
India

¹phd1701241001@iiti.ac.in

²Corresponding author

E-mail address: tanveergouri@gmail.com, mtanveer@iiti.ac.in

Highlights

- A robust and efficient algorithm is proposed for class imbalance learning.
- A novel fuzzy membership function is proposed specifically for class imbalance problems.
- 2-norm of slack variable is used to make the optimization problem strongly convex.
- The proposed algorithm is efficient in terms of computation complexity.

Abstract

Twin support vector machine is one of the most prominent techniques for classification problems. It has been applied in various real world applications due to its less computational complexity. In most of the applications on classification, there is imbalance in the number of samples of the classes which leads to incorrect classification of the data points of the minority class. Further, while dealing with imbalanced data, noise poses a major challenge in various applications. To resolve these problems, in this paper we propose a robust fuzzy least squares twin support vector machine for class imbalance learning termed as RFLSTSVM-CIL using 2-norm of the slack variables which makes the optimization problem strongly convex. In order to reduce the effect of outliers, we propose a novel fuzzy membership function specifically for class imbalance problems. Our proposed function gives the appropriate weights to the datasets and also incorporates the knowledge about the imbalance ratio of the data. In our proposed model, a pair of system of linear equations is solved instead of solving a quadratic programming problem (QPP) which makes our model efficient in terms of computation complexity. To check the performance of our proposed approach, several numerical

Download English Version:

<https://daneshyari.com/en/article/6903281>

Download Persian Version:

<https://daneshyari.com/article/6903281>

[Daneshyari.com](https://daneshyari.com)