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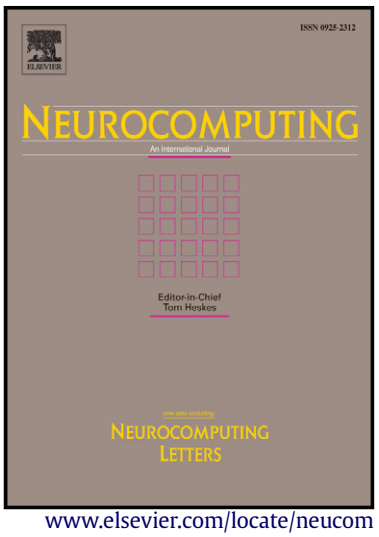

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PII: S0925-2312(14)00695-X
DOI: http://dx.doi.org/10.1016/j.neucom.2014.05.046
Reference: NEUCOM14252

To appear in: *Neurocomputing*

Received date: 19 August 2013
Revised date: 30 April 2014
Accepted date: 18 May 2014

Cite this article as: Jooyong Shim, Changha Hwang, Estimating small area mean with mixed and fixed effects support vector median regressions, *Neurocomputing*, http://dx.doi.org/10.1016/j.neucom.2014.05.046

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Estimating small area mean with mixed and fixed effects support vector median regressions

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Accepted manuscript

Abstract

Small area estimation has been extensively studied under linear mixed effects models. However, when the functional form of the relationship between the response and the covariates is not linear, it may lead to biased estimators of the small area parameters. In this paper, we relax the assumption of linear regression for the fixed part of the model and replace it by using the underlying concept of support vector quantile regression. This makes it possible to express the nonparametric small area estimation problem as mixed or fixed effects model regression. Through numerical studies we compare the efficiency of different models in estimating small area mean.

Keywords: Fixed effect, median regression, mixed effect, semiparametric model, small area estimation, support vector quantile regression

1. Introduction

Small area estimation (SAE) is a methodology for producing the estimates of parameters for small areas for which only small samples or no samples are available from the sample survey, and for assessing the estimation error. There are two typical types of models for SAE, which are unit-level and area-level small area models. The most popular method to tackle SAE

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