IIM > Vol.4 No.3, May 2012

OPEN ACCESS

The Asymptotic Study of Smooth Entropy Support Vector Regression

PDF (Size:316KB) PP. 45-51 DOI: 10.4236/iim.2012.43007

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ABSTRACT

In this paper, a novel formulation, smooth entropy support vector regression (SESVR), is proposed, which is a smooth unconstrained optimization reformulation of the traditional linear programming associated with an ε-insensitive support vector regression. An entropy penalty function is substituted for the plus function to make the objective function con- tinuous ,and a new algorithm involving the Newton-Armijo algorithm proposed to solve the SESVR converge globally to the solution. Theoretically, we give a brief convergence proof to our algorithm. The advantages of our presented algorithm are that we only need to solve a system of linear equations iteratively instead of solving a convex quadratic program, as is the case with a conventional SVR, and lessen the influence of the penalty parameter C in our model. In order to show the efficiency of our algorithm, we employ it to forecast an actual electricity power short-term load. The experimental results show that the presented algorithm, SESVR, plays better precisely and effectively than SVMlight and LIBSVR in stochastic time series forecasting.

KEYWORDS

Support Vector Machine; SSVR; Entropy Function; Asymptotic Solution; Forecasting

Cite this paper

G. Hu and J. Zhang, "The Asymptotic Study of Smooth Entropy Support Vector Regression," *Intelligent Information Management*, Vol. 4 No. 3, 2012, pp. 45-51. doi: 10.4236/iim.2012.43007.

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