



Contribution ID: 54

Type: not specified

Support Vector Regression for first Analysis of Time Series

In the last years, new and more sophisticated measurements have been at the basis of the major progress in various disciplines related to the environment, such as remote sensing and thermonuclear fusion. To maximize the effectiveness of the measurements, new data analysis techniques are required. First data processing tasks, such as filtering and fitting, are of primary importance, since they can have a strong influence on the rest of the analysis. Even if Support Vector Regression is a method devised and refined at the end of the 90s, a systematic comparison with more traditional non parametric regression methods has never been reported. In this paper, a series of systematic tests is described, which indicates how SVR is a very competitive method of non-parametric regression that can usefully complement and often outperform more consolidated approaches. The performance of Support Vector Regression as a method of filtering is investigated first, comparing it with the most popular alternative techniques. Then Support Vector Regression is applied to the problem of non-parametric regression to analyse Lidar surveys for the environments measurement of particulate matter due to wildfires. The proposed approach has given very positive results and provides new perspectives to the interpretation of the data.

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