

عنوان مقاله:

PREDICTION OF WAVE PARAMETERS USING SUPPORT VECTOR REGRESSION METHOD

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خلاصه مقاله:

Knowledge about wave characteristics is very crucial in activities related to the ocean environment such as the building and maintenance of coastal and offshore structures, maritimetransportation, environmental protection and etc. Different methods such as empirical, numerical and soft computing approaches have been proposed for significant wave height prediction. Numerical models are generally based on a form of the spectral energy or action balanceequation. However, due to their complexity of implementation, high amount of processor time is required, and the need for accurate local bathymetric surveys, their implementation is not an easy task [2]. When the huge amount of exogenous information is not available and the computationalresources and expertise are limited, data mining and machine learning approaches would be very good choices [4].Recently, artificial neural net- works (ANNs) have also been widely used to predict wave parameters [2, 3]. It is indicated that neural networks can provide a viable alternative tostatistical regression, time series analysis, numerical methods and approaches of this kind [3, 4]. The advantages are due to the improved accuracy, less complexity, smaller computational effortsand in some cases reduced data requirements. Mahjoobi et al [3] compared different softcomputing methods such as artificial neural networks, fuzzy inference system and adaptive network-based fuzzy inference system to hindcast wave parameters. Their results showed thatthe models skills are nearly the same. Furthermore, Mahjoobi et al [2] studied the performance ofSupport Vector Regression approach in predicting wave height. They tested their model with data from a buoy in Lake Michigan. Also Deo et al [1] performed a study on wave spectraprediction using SVR. Their results were almost satisfactory. The current study reports potential application of a SVR approach to predict the wave spectraand significant wave height in different sea environments and water depths. Support VectorRegression (SVR) solves regression problems based on the concept of Support Vector Machine (SVM) introduced by Vapnik (1995) [3]. It is a general algorithm based on guaranteed riskbounds of statistical learning theory [1]. Concurrent wind and wave records (standardmeteorological and spectral density data) from 4 measuring stations were used both for the training the SVR system and its verification. The choice of these four locations facilitated thecomparison of model ... performances in different geographical areas. The SVR model was then used to obtain predictions for the wave sp

کلمات کلیدی:

Support Vector Machine (SVM), Support Vector Regression (SVR), Wave Spectra, Significant Wave Height, Anzali Buoy, National Data Buoy Center

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