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A Novel Method for Carbon Dioxide Emission Forecasting Based on Improved Gaussian Processes Regression

Abstract:

The fact that global warming will bring impact on immigration, agriculture and also generate human conflicts is becoming a focus in climate change topic and the forecasting of carbon dioxide emission has been attracting much attention. Here, we proposed an improved Gaussian processes regression method for carbon dioxide emission forecasting based on a modified PSO algorithm which can efficiently optimize the hyper parameters of covariance function in the Gaussian processes regression. Also we tested our improved PSO-GPR method with the total carbon dioxide emissions data of U.S., China and Japan in 1980-2012, and compared the prediction precision of our method with original GPR and BP Neural Networks by the data of U.S., China and Japan. The performance of our improved Gaussian processes regression method enhanced the prediction accuracy of original GPR method and is superior to other traditional forecasting method like BP Neural Networks.