عنوان مقاله:

Application of the Relevance Vector Machine for Modeling Surface Roughness in WEDM Process for Ti-۶Al-۴V Titanium Alloy

محل انتشار:

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خلاصه مقاله:

Cutting the Titanium alloys is a complicated task which cannot be performed by traditional methods and modern machining processes, such as Wire electro-discharge machining (WEDM) process which are mainly used for this purpose. As a result of the high price of the Ti-۶Al-۴V alloy, proper tuning of the input parameters so as to attain a desired value of the surface roughness is an important issue in this process. For this purpose, it is necessary to develop a predictive model of surface roughness based on the input process parameters. In this paper, The Taguchi method was used for the design of the experiment. According to their effectiveness, the input parameters are pulse-on time, pulse-off time, wire speed, current intensity, and voltage; and the output parameter is surface roughness. However, a predictive model cannot be defined by a simple mathematical expression as a result of the complicated and coupled multivariable effect of the process parameters on the surface roughness in this process. In this study, application of the relevance vector machine as a powerful machine learning algorithm for modeling and prediction of surface roughness in wire electro-discharge machining for Ti-۶Al-۴V titanium alloy has been investigated. The predicting result of model based on the root means square error (RMSE) and the coefficient of determination (R۲) .statistical indices, prove that this approach provides reasonable accuracy in this application

کلمات کلیدی:

Modeling, Relevance Vector Machine, Ti-۶Al-۴V Alloy, WEDM