

TD3 Reinforcement Learning Algorithm Used for Health Condition Monitoring of a Cooling Water Pump

M.A. Sanz Bobi; I. Rodríguez-Muñoz-de-Baena; F.J. Bellido López; A. Muñoz San Roque; J. Anguera Gil; D. González Calvo; T. Álvarez Tejedor

Abstract-

In this paper, we describe the procedure of implementing a reinforcement learning algorithm, TD3, to learn the performance of a cooling water pump and how this type of learning can be used to detect degradations and evaluate its health condition. These types of machine learning algorithms have not been used extensively in the scientific literature to monitor the degradation of industrial components, so this study attempts to fill this gap, presenting the main characteristics of these algorithms; application in a real case. The method presented consists of several models for predicting the expected evolution of significant behavior variables when no anomalies exist, showing the performance of different aspects of the pump. Examples of these variables are bearing temperatures or vibrations in different pump locations. All of the data used in this paper come from the SCADA system of the power plant where the cooling water pump is located.

Index Terms- TD3; reinforcement learning; cooling water pump; performance monitoring; health condition; failure mode risk

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