Abstract

Electric motors perform the crucial task of converting electrical energy into essential mechanical energy on demand. Motors are plentifully used in the industrial sector all over the world to drive mechanical appliances. Despite being robust and sturdy, motors are not entirely fault-proof, and faults that are caused by the bearings trouble them the most. Early detection of these faults allows engineers to take preventive measures and avert hard breakdowns. Numerous studies have been conducted in this area of research. Many methods have been proposed and implemented to detect the existence and determine the type of fault present in an induction motor. However, this field of research is still open since there is room for improvements in the claimed results. In this paper, a novel fault diagnosis method has been proposed involving an emerging machine learning technique named extreme learning machine to identify the existence of flaws in motor bearings and specify their origins. The described method is tested on a benchmark bearing fault dataset provided by Case Western Reserve University Bearing Data Center. The acquired result yields a maximum classification accuracy of 99.86% and an average classification accuracy of 98.67% after being tested on multiple fault datasets.