

Design and implementation of wireless system for vibration fault detection using fuzzy logic

Moneer Ali Lilo, Maath Jasem Mahammad

Abstract:

This paper presents the wireless system for fault detection and monitoring based on fuzzy logic technique. Wireless applications are utilized to identify, classify, and monitor faults in the real time to protect machines from damage. Two schemes were tested; first scheme fault collected X-Y-Z-axes mode while the second scheme collected Y-axis mode, which is utilized to protect the induction motor (IM) from vibrations fault. The vibration signals were processed in the central computer to reduce noise by signal processing stage, and then the fault was classified and monitored based on Fuzzy Logic (FL). The wireless vibration sensor was designed depending on the wireless techniques and C++ code. A fault collection, noise reduction, vibration fault classification and monitoring were implemented by MATLAB code. In the second scheme the processed real time was reduced to 60%, which is included collection, filtering, and monitoring fault level. Results showed that the system has the ability to early detect the fault occurrence on the machine with processing time of 1.721s. This work will reduce the maintenance cost and provide the ability to utilize the system with harsh industrial applications to diagnose the fault in real time processing..