1. Record Nr. UNINA9910254360503321

Autore	Jaber Alaa Abdulhady
Titolo	Design of an Intelligent Embedded System for Condition Monitoring of an Industrial Robot / / by Alaa Abdulhady Jaber
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017
ISBN	3-319-44932-X
Edizione	[1st ed. 2017.]
Descrizione fisica	1 online resource (302 p.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	670.4272
Soggetti	Robotics Automation Electronic circuits Microprogramming Robotics and Automation Circuits and Systems Control Structures and Microprogramming
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	Chapter 1 Introduction -- Chapter 2 Literature Review -- Chapter 3 Signal Processing Techniques for Condition Monitoring -- Chapter 4 Puma 560 Robot and its Dynamic Characteristics -- Chapter 5 Robot Hardware, Transmission Faults and Data Acquisition -- Chapter 6 Robot Vibration Analysis and Feature Extraction -- Chapter 7 Intelligent Condition Monitoring System Design -- Chapter 8 Embedded System Design -- Chapter 9 Embedded Software Design, System Testing and Validation -- Chapter 10 Conclusions and Future Work -- References -- Appendices.
Sommario/riassunto	This thesis introduces a successfully designed and commissioned intelligent health monitoring system, specifically for use on any industrial robot, which is able to predict the onset of faults in the joints of the geared transmissions. However the developed embedded wireless condition monitoring system leads itself very well for applications on any power transmission equipment in which the loads

and speeds are not constant, and access is restricted. As such this provides significant scope for future development. Three significant achievements are presented in this thesis. First, the development of a condition monitoring algorithm based on vibration analysis of an industrial robot for fault detection and diagnosis. The combined use of a statistical control chart with time-domain signal analysis for detecting a fault via an arm-mounted wireless processor system represents the first stage of fault detection. Second, the design and development of a sophisticated embedded microprocessor base station for online implementation of the intelligent condition monitoring algorithm, and third, the implementation of a discrete wavelet transform, using an artificial neural network, with statistical feature extraction for robot fault diagnosis in which the vibration signals are first decomposed into eight levels of wavelet coefficients.