2021 IEEE International Conference on Prognostics and Health Management (ICPHM 2021)

Detroit, Michigan, USA
7 – 9 June 2021

IEEE Catalog Number: CFP21PHM-POD
ISBN: 978-1-6654-2996-2

Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number: CFP21PHM-POD
ISBN (Print-On-Demand): 978-1-6654-2996-2
ISBN (Online): 978-1-6654-1970-3

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

K1: Keynote 1

Automotive PHM & the Role for Health-Ready Components

Conf. Opening: Conference Opening

T 1: Tutorial 1

Introduction to Battery Prognostics and Early Life Prediction

T2: Tutorial 2

PHM in the Future of Communications Networks

T3: Tutorial 3

In-Time Safety Assessment & Risk Prediction for Unmanned Aerial Systems

T4: Tutorial 4

Applied Wavelet Transform in Prognostics and Health Management

K2: Keynote 2

Digital Transformation using Artificial Intelligence/Machine Learning in Electronics Manufacturing

D211: Prediction Models 1

Temporal Convolutional Network Based Regression Approach for Estimation of Remaining Useful Life...1

Rongze Li, Zhengtian Chu, Wangkai Jin, Yaohua Wang and Xiao Hu

A Hybrid Bayesian Deep Learning Model for Remaining Useful Life Prognostics and Uncertainty Quantification...11

Huang Dengshan, Rui Bai, Shuai Zhao and Pengfei Wen

A novel deep soft clustering for unsupervised univariate time series...19

Alexandre Eid, Guy Clerc and Badr Mansouri

Combining Approaches of Brownian Motion and Similarity Principle to Improve the Remaining Useful Life Prediction...27

Dima El jamal, Mohammed Al-kharaz, Bouchra Ananou, Guillaume Graton, Mustapha Ouladsine and Jacques Pinaton

D212: Batteries and Power

Digital Twin for Degradation Parameters Identification of DC-DC Converters Based on Bayesian Optimization...34

Shaowei Chen, Shengyue Wang, Pengfei Wen and Shuai Zhao

Real Time Ultrasonic Monitoring of Solid-State Lithium-Ion Cells in the Frequency Domain...43
Steven Li and Matthew Musiak

A Multiscale Entropy-Based Long Short Term Memory Model for Lithium-Ion Battery Prognostics...48
Alireza Namdari and Steven Li

Particle Filtering framework for Health Monitoring of Lithium-Ion Batteries using Ampere-hour Throughput based Semi-Empirical Model...54
Bikky Routh, Arijit Guha, Amit Patra and Siddhartha Mukhopadhyay

Gaussian Process Regression based State of Health Estimation of Lithium-Ion Batteries using Indirect Battery Health Indicators...61
Duggireddy Yashwanth Reddy, Bikky Routh, Amit Patra and Siddhartha Mukhopadhyay

D213: Planning and Maintenance

A Maintenance Cost Optimization Strategy Based on Prognostics and Health Monitoring Information...68
Leonardo Rodrigues

Operating room planning with multiple downstream units...75
Arian Andam and Hossein Hashemi Doulabi

A Dynamic Programming Approach for Multistage Reliability Growth Planning Considering Time and New Contents Allocation...83
Charles Z Li and Jian Guo

Comparison of Two Maintenance Policies for the Coordination of Decisions of Quality Control and Maintenance Planning...89
Hasan Rasay and Farnoosh Naderkhani

D221: General Hardware

Research on Residual Life Prediction of Joint Rotating Structure with Multiple Failure Coupling...95
Chao Song and Zhi Bian

Tool Wear Prediction Under Varying Milling Conditions via Temporal Convolutional Network and Auxiliary Learning...100
Pengcheng Xia, Yixiang Huang, Dengyu Xiao, Chengliang Liu and Lun Shi

Tool Fault Diagnosis Based on Improved Multiscale Network and Feature Fusion...106
Dongyang Li, Dongfeng Yuan, Dao jun Liang, Zijun Di, Mingqiang Zhang, Feng Cao, Miaomiao Xin, Tengfei Lei and Mingyan Jiang

Identification and Analysis of Tool Wear Signal in CNC Machine Tool Based on Chaos Method...112
Haiyan Fu, Tengfei Lei, Miaomiao Xin, Feng Cao, Minglei Jin and Tingyang Yan

Application of Deep CNN-LSTM Network to Gear Fault Diagnostics...117
T. Haj Mohamad, Amirhassan Abbasi, Edward Kim and C. Nataraj

A Hybrid F-G-D Approach for Reliability Risk Assessment of Surgical Robots...123
Gang Yan, KeSheng Wang and Jing Liu

D222: Networks

Sensing Technologies and Artificial Intelligence for Subsea Power Cable Asset Management...128
Wenshuo Tang

A Smart Agricultural Monitoring System Based on Cloud Platform of Internet of Things...134
Shaowei Chen, Fangda Xu, Shengyue Wang, Yanping Huang, Pengfei Wen, Huang Dengshan and Shuai Zhao

Fault Prognosis of Satellite Reaction Wheels Using A Two-Step LSTM Network...142
Md Sirajul Islam and Afshin Rahimi

D223: Prediction Models 2

Leveraging Big Data to Discover High Yield Prognostics Applications...149
Cody Coleman, Yi Zhang and Maria Seale

OPELRUL: Optimally Weighted Ensemble Learner for Remaining Useful Life Prediction...156
Onat Gungor, Tajana Rosing and Baris Aksanli

K3: Keynote 3

Trusting A Digital Twin?

D311: Inspection & Sensors

Object Detection using Deep Learning in a Manufacturing Plant to Improve Manual Inspection...164
Afshin Rahimi, Mohammad Anvaripour and Khizer Hayat

3D objects descriptors method for fault detection in a multi sensors context...171
François Meunier and Selma Khebbache

Simultaneous Actuator and Sensor Faults Estimation for Aircraft Using a Jump-Markov Regularized Particle Filter...178
Enzo Iglésis, Nadjim Horri, James Brusey, Karim Dahia and Hélène Piet-Lahanier

Source localization using beamforming and double L-shape sensors arrays...188
Qiang Gao, Junyoung Jeon, Gyuhae Park and Yunde Shen

Guided visual inspection enabled by AI-based detection models...192
Maria Teresa Gonzalez Diaz

D312: Aircraft

An Aero-engine Gas Path Fault Diagnosis Method Based on OPABC-BP...200
Jing Zhao, Yuhuai Peng and Ning Xin

Remaining Useful Life Prediction Based on Multi-scale Residual Convolutional Network for Aero-engine...206
Jinhui Yu, Yuhuai Peng and Qingxu Deng

An Aero-engine Gas Path Fault Feature Extraction Method Based on IGA-KPCA...212
Can Zhao, Yuhuai Peng and Shoubin Wang

GE Aviation Use-case - Apache Spark for Analytics...217
Lucas Partridge, Honor Powrie and Peter R Knight

Automated Machine Learning for Remaining Useful Life Estimation of Aircraft Engines...222
Marios Kefalas, Mitra Baratchi, Asteris Apostolidis, Dirk van den Herik and Thomas Bäck

Remaining Useful Life Prediction of Aircraft Engines Using Hybrid Model Based on Artificial Intelligence Techniques...231
Unit Amin and Krishna Kumar

D313: General

A Local Mahalanobis Distance Analysis Based Methodology for Incipient Fault Diagnosis...241
Junjie Yang and Claude Delpha

Comparison of Agent Deployment Strategies for Collaborative Prognosis...249
Maharshi Dhada, Ajith Kumar Parlikad, Marco Perez-Hernandez and Adrià Palau

D321: Bearings

Exploration and Effect Analysis of Improvement in Convolution Neural Network for Bearing Fault Diagnosis...257
Diwang Ruan and Clemens Guehmann

An improved CNN based on attention mechanism with multi-domain feature fusion for bearing fault diagnosis...265
Mingzhu Yu, Heli Liu, Rengen Wang, Xiangwei Kong, Zhiyong Hu and Xueyi Li

Unsupervised Domain Adaptation for Bearing Fault Diagnosis Considering the Decision Boundaries...272
Tianyu Han, Xi Shi, Gang Zhang and Chao Liu

A Novel Intelligent Diagnosis Method for Bearing Based on Fused-feature Images...279
Jianguo Miao and Qiang Miao

GAN-based LSTM Predictor for Failure Prognostics of Rolling Element Bearings...284
Hao Lu, Vahid Barzegar, Venkat Nemani, Chao Hu, Simon Laflamme and Andrew Zimmerman

D322: Systems

An Optimized Support Vector Regression for Identification of In-phase Faults in Control Moment Gyroscope Assembly...292
Hossein Varvani Farahani and Afshin Rahimi

Automated Dynamic Safety Evaluation of Generic Fail-Operational Mechatronic Systems...299
Christian Ebner, Kirill Gorelik and Armin Zimmermann

Prognostics and Health Management of Wafer Chemical-Mechanical Polishing System using Autoencoder...307
Kart L Lim

Comparison of an Automatic Classification of Partial Dischage Patterns for Large Hydrogenerator...315
Olivier Kokoko, Claude Hudon, Mélanie Levesque, Normand Amyot and Ryad Zemouri

C1: Closing Ceremony