Study And Development Of Innovative Machine Learnig Techniques ForReliability Test Systems

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INTRODUCTION: An Implementation of an analytical approach on reliability test systems for electronic components is introduced. The work presents an integrated solution, merging a deeper understanding of the process through AI algorithms, knowledge extraction from raw data by Data Mining and real-time control due to data collection by sensors –directly from the stress process.

AIM: Given the increasingly massive use of electronics in applications that also pervade our daily life, it becomes critical to ensure the safety and reliability of electronic components. Consequently, testing machines for electronic components also need to be as reliable and fault-free as possible.

To the aim, new algorithms have been designed and implemented to model the components of test machines, capable of receiving without conflicts the information coming from heterogeneous hardware and field sensors**.**

MATERIALS AND METHODS:

A Digital Twin has been created to model the behavior of the test machine in an integrated way.

It can realize the following functions:

•monitoring and optimization of the use
•of the test machine, through a model that allows the classification of ordinary and abnormal operating conditions.

•modulation of KPIs for scheduled maintenance, according to the actual use of the machine, based on real time information on the status of each of its components

RESULTS: Better monitoring of operations, with higher availability and OEE, was achieved when compared to traditional process control. The model developed helps to determine the useful life of the mostsignificant and critical component of the machine and simplifies the knowledge of the process phases and the identification of the most critical sub-processes. It also helps to test the most appropriate actions on the DT, significantly reducing the risks of service interruption on the machines in production.

CONCLUSIONS:
The proposed work constitutes a flexible, scalable and interoperable solution that helps to understand in advance when components or processes are drifting, proceeding with the most appropriate maintenance or replacement actions

KEYWORDS:

Predictive Maintenance, Reliability Test, Digital Twin, Machine Learning, Data Mining, OEE.

BIOGRAPHY:

Davide Cascella was born on April 1980. He received the MSc degree and the PhD degree in Electrical Engineering from the Polytechnic University of Bari. He is author of 20+ peer reviewed scientific papers on industry 4.0 and AI applications. He currently works as Innovation Manager and Industrial & Process Automation specialist. He is also responsible for technologicalinnovation and energy efficiency projects, enabling the digital transformation and the adoption ofIndustry 4.0 Key Enabling Technologies in manufacturing companies.