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Non Intrusive Workflow Assessment (NIWA) for Manufacturing Optimization

Tech ID: 32187 / UC Case 2018-844-0

BRIEF DESCRIPTION

The invention is a smart non-intrusive workflow assessment platform for monitoring and optimizing manufacturing environments. The platform monitors environmental and energy metrics, and provides learning models to classify workers' activities and relate them to the equipment utilization and performance. Correlating both stream of data enables both workers and supervisors to improve the efficiency of the whole manufacturing process and at an affordable price.

FULL DESCRIPTION

Energy and production efficiencies are a major concern for manufacturing environments. Among the major challenges for achieving these efficiencies are the equipment and machine prognosis and operational health monitoring. Moreover, worker's activity impacts the system performance in a considerable way that is still unmeasurable with the current technologies. To overcome some of these issue, automation and monitoring systems are being installed as part of the manufacturing process, where sensors and meters collect data regarding the machine performance and energy consumption. Optimization is then applied accordingly to improve the workflow efficiency. Unfortunately, installing these systems is not affordable for most factories due to their high cost of installation and maintenance. Furthermore, even with these systems installed, the data is not adequately linked to the workers' activity and behavior at the work place environment.

Inventors at UCI developed an affordable smart non-intrusive workflow assessment platform for monitoring and optimizing the manufacturing environment. The platform utilizes the infra-structure already installed at the facility to collect data related to the machine performance, utilization behavior and energy usage. Moreover, the platform gathers data regarding the workers' activity and traffic trajectory at the work environment, to correlate it with the machinery information. Blending all of these parameters, the platform develops models to learn the environment workflow and provides the optimization options for achieving the best efficiency for the whole manufacturing environment.

SUGGESTED USES

» Workflow assessment for manufacturing facilities

» Energy consumption monitoring and optimization in manufacturing facilities

» Monitoring machines performance and operational health

» Workers' performance and activity monitoring and assessment

FEATURES/BENEFITS

» Utilizes the infrastructure already installed in the facility (meters, sensors, cameras, ...etc.)

» Dynamic system; learns the utilization pattern and self-adjust for optimization

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OTHER INFORMATION

KEYWORDS

Smart, Non-Intrusive, Workflow, Assessment, Monitoring, Optimizing, Manufacturing, Environment, Machine, Performance, Self-Adjust, Automation,, Activity, Traffic, Trajectory

CATEGORIZED AS

» **Energy**
  » Other
» **Environment**
  » Other
» **Sensors & Instrumentation**
  » Analytical
  » Environmental Sensors

» Does image classification for worker's activity and traffic trajectory to correlate it to the machine performance

» Performs detailed high accuracy energy disaggregation analysis

» Optimization of workflow and energy/materials usage associated with equipment and human factors

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,526,827	12/13/2022	2018-844

OTHER INFORMATION

Country	Type	Number	Dated	Case
United State of America	Published Application	20200104779A1	04-02-2020	2018-844

STATE OF DEVELOPMENT

In the experimental stage, and developing extensions to allow flexible scalability of the system for deployments in manufacturing environments and improving accuracy of load disaggregation from single or banks of machines, using both pattern and contextual environmental data.

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