

Universidade de Pernambuco

Programa de Pós-Graduação em Engenharia da Computação (PPGEC)

Proposta de Projeto de Mestrado

Área: Computação Inteligente

Título: Industrial data mining for waste reduction in manufacturing production line.

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Descrição:

Waste reduction is critical for increasing the competitiveness of companies (Bhattacharya & Ramachandran, 2021). This task is challenging especially when it's not possible to measure all kinds of waste in the production line due to its extension, complexity and type of material (Younes et al. 2016). In general, automation systems include model-driven human implemented algorithms for waste estimation, explains your assumptions (Frye et al. 2020). However, these models are built under specific scenarios and assumptions. Therefore, it may lose accuracy due to variations on the production rhythm, changes in equipment such as setup parameters, improvements or degradation, it uses argumentation (Yan, 2020).

In this context, this project aims to deal with this problem in a multinational factory. Access for the data will be provided by the company.

Given this context, the problem to be investigated in this research, the main goal, and the supportive investigation points are stated as follows:

- Research Problem: How can Machine Learning (ML) contribute to reducing waste in an automated and extensive production line?
- Research Goal: Develop a ML machine learning solution to indicate when specific actions should be performed to avoid waste generation.

The key idea of this project is to consider specialized knowledge about the behavior of discrete manufacturing plants.

Basic requirements are skills on python programming since this project will evolve the implementation of scripts to perform the data pre-processing tasks, as well as background in manufacturing systems and industrial automation since it will be necessary to intervene on Programmable Logic Controllers and Human Machine Interfaces in order to collect data and perform experiments.

The student should also be available to perform part of the research at the shop-floor in a factory in the Suape Industrial Complex

Referências Bibliográficas:

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[2] Younes, M.K., Nopiah, Z.M., Basri, N.E.A., Basri, H., Abushammala, M.F.M., & Younes, M.Y. et al. (Sep., 2016). Landfill area estimation based on integrated waste disposal options and solid waste forecasting using modified ANFIS model. Waste Management, 55, p. 3-11.

[3] Frye, M., Gyulai, D., Bergmann, J., & Schmitt, R.H. (Oct., 2020). Production rescheduling through product quality prediction. Procedia Manufacturing, 54, p. 142-147.

[4] Yan, M.M.W. (Dec., 2020). Accurate detecting concept drift in evolving data streams. ICT Express, 6 (4), p. 332-338.