IMPLEMENTATION OF TECHNOLOGY AT THE SERVICE OF OCCUPATIONAL ENGINEERING

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RESUMO

Faced with the high incidence of Work-Related Musculoskeletal Disorders (WMSDs) among their workers, organizations need to carry out interventions in their work systems to reduce occupational risks and contribute to the well-being of the individuals, seeking not to decrease productivity. The search for a balance between business objectives and workers' health and safety is part of the challenges that Occupational Engineering faces. These can be optimized by implementing technologies to manage occupational risks or even mitigate the development of WMSDs. The implementation of technological and digital solutions focused on the human being can improve Ergonomics, such as computer vision, which addresses the topics of image processing applied in the field of facial recognition, object detection and identification; and artificial intelligence, capable of imitating human reasoning in sectors where machines with the capacity to learn are applied. The construction of the solution aimed to develop a digital interface in a workstation with the integration of the station operator's facial recognition, the recording of upper limb movements during work activity and the provision of ergonomic feedback. Regarding the methodological processes used, it was possible to identify three distinct phases: The first phase consists of carrying out the facial recognition of the individual who will operate the workstation in a given shift, through the application of the computational vision. The second phase aims to comply with Regulatory Standard 17 Ergonomics and record the movements of the operator's upper limbs while he performs the work through the capture with high-resolution cameras. This way, the data is processed through the machine learning-based API to predict the number of incorrect movements. The third phase corresponds to the emission of ergonomic feedback, which uses data analytics as an analysis tool, based on an adaptation of the RULA methodology, allowing the realization of a prediction of the movements with greater risk assumed during the work activity. The collective functions promote a more efficient work architecture in which technological innovation collaborates with the human factor. The solution made it possible to monitor movements to generate ergonomic alerts about risky postures assumed during the workday. Furthermore, the application of technology, correlated to the ergonomic requirements, sought to direct the organization's occupational health and safety actions more assertively. The generation and collection of data can become valuable information for managers to support the decision-making process. There are opportunities to provide more quality of life to operators and to value their health and safety in the work environment, in addition to optimizing productivity. The built solution aimed to improve the work environment and reduce the risk of injuries resulting from unfavourable biomechanical conditions. Even so, the solution sought to meet a legal ergonomic demand and a need to increase industrial productivity and reduce health costs. Handling and monitoring workers' complaints can also be a tracking indicator for managing biomechanical and organizational risks. This research was supported by the Research and Innovation Support Foundation - FAPESC - and the SESI Innovation Technical Call (Industry Social Service) of the year 2019.

PALAVRAS-CHAVE: Ergonomic feedback, Artificial intelligence, Facial recognition, Computer vision

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