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Event Program

Programa do Evento

Thursday, May 23rd

14h00   **Opening Cerimony**

Vítor Carvalho (EST Director)

João Vilaça (Pro-President for Research and Innovation)

14h15 – 15h00   **Keynote**

Como colocamos um modelo de IA em produção

Javier Martínez Torres CEO & Partner - Possible Incorporated SL

15h05 – 15h40   **Session I – Best Abstract**

Moderator: *Teresa Abreu*

Braga City Center in 1750 - The Role of VR in Cultural Heritage Communication

Diogo Barbosa @MEDJD

Prevalence of Symptoms of Work-connected Musculoskeletal Disorders: Identification of the Main Symptoms in a Textile Industry

Emanuel Darlan Lima de Mendonça @MSIGQAS

Differences In Performance, Scalability, And Costs When Using Monolithic And Microservices Architectures.

Ricardo Azevedo @MEI

Rfid Systems Optimization For Passive Tags Reading in Multi-product Applications

Cláudia Pereira@MEEC

Optimization Of Logistics Processes In The Telecommunications Sector - The Proef Case Study

Márcia Araújo @MEGI

Event Program
Programa do Evento
Thursday, May 23rd

15h50 – 16h20   **Session II – Best Poster**

Moderador: *Duarte Duque*

Collaborative Multiplayer Videogame For Hospitalized Children
Joana Alves @MEDJD

Improving Project Management At An It Consulting Company
Diana Costa @MEGI

Characterization of the Variables Influencing Exposure to Ionizing Radiation by Professionals Involved in Radiopharmaceutical Production
Aires Arnaldo Rodrigues Correia @MSIGQAS

Fine-tuning automático de aplicações de Large Language Models para domínios de aplicação específicos
Daniel Gonçalves @MEI

Soccer Pitch Parsing
Miguel Santos Marques @MEEC

16h25 – 17h00   **Session III – Best Thesis**

Voxel Terrain Generation Aplicação de Técnicas Procedimentais a Terrenos Voxels
Gabriel Mira de Assumpção Peixoto@ MEDJD

Veterinary nurses' knowledge, practices, and risk perception on antibiotic resistance exposure and dissemination
Cláudia Sofia Cerqueira Capela @ MSIGQAS

Development of a handheld needle guide for ultrasound-guided breast biopsy
António Ferreira Real @ MEEC

Webhooks: Asynchronous Communication through the HTTP Protocol
Ivo Belchior Badim Lopes Gomes@ MEI

Índex
Índice

Índex
Índice

Índex
Índice

MASTER IN DIGITAL GAMES DEVELOPMENT ENGINEERING

MASTER IN APPLIED ARTIFICIAL INTELLIGENCE

MASTER IN INTEGRATED SYSTEMS OF MANAGEMENT QES

Índex

Índice

MASTER IN ELECTRONICS AND COMPUTERS ENGINEERING

SOCCER PITCH PARSING

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Keywords

Soccer video, Field segmentation, Field lines segmentation, Field areas segmentation, Camera calibration

Abstract

Soccer video analysis is a complex field within computer vision research, involving various tasks such as player detection and tracking, player performance analysis, and team behavior analysis. A critical component of such systems is the image semantic segmentation module, which accurately delineates elements within each frame, specifically the soccer field. This segmentation module serves as a foundational processing step, enabling spatial understanding of player positioning and facilitating tasks like camera calibration for 3D tracking.

Our method directly infers the lines, line extremities' heatmaps and areas of the soccer field in the image, using a Deep Learning Convolutional Neural Network based on U-Net (Ronneberger et al., 2015) with a hierarchical output and unbalanced loss weights. The hierarchical output contains four outputs composed of different segmentation masks.

For camera calibration we will implement as baseline the method (Spiideo, 2023) using as input our method described above and test different optimizations with the goal of improving the method.

The output of line extremities' heatmaps achieved third place in the Pitch Localization task of the SoccerNet Calibration Challenge (Giancola et al., 2022) with 71.01%, 76.18%, and 77.60% accuracies for the 5 pixel, 10 pixel, and 20 pixel thresholds respectively, and a global average accuracy score of 73.81% on the challenge set. The output of areas produces visually convincing results and can achieve an Average Precision of 80.4%, Average Recall of 73.1%, Average F-score of 76.1%, Average Accuracy of 95.1%, and Average IoU of 62.4%.

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MEASUREMENT, STORAGE, RETRIEVAL, AND PREDICTION OF MAGNETIZATION CURVES FROM MATERIAL SAMPLES FOR ACCELERATOR MAGNETS

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Keywords

Magnetization curves, Databases, Web services, Artificial Intelligence.

Abstract

Effective simulation of magnets hinges on a good understanding of the magnetization behavior of the materials used, particularly in iron dominated designs. For this reason, we rely on characterization of materials and measurement of their magnetization curves (BH curves). Our project aims to streamline the storage, processing, and retrieval of measured BH curve data for simulation, while also leveraging artificial intelligence methods to generate predictive BH curves.

Our objective is twofold: Firstly, to enhance the accessibility and usability of magnetization curve data, by building databases tailored for BH curve storage, integrating them seamlessly into measurement scripts, and creating a web interface for easy access. Secondly, to generate predicted BH curves using artificial intelligence. This approach aims to reduce the dependency on measured data, for scenarios where data is scarce or unavailable.

We've developed an Oracle database for BH curve storage and integrated it into our measurement scripts, as well as web services to streamline several key tasks. Alongside this we developed an API to ensure smooth communication with the database. Simultaneously, we have developed a web interface using Streamlit, enabling easy access to BH curve data. Concurrently, we're experimenting with LSTM and Transformer models for predictive BH curve generation. Our next steps involve refining these models, optimizing database functionalities, and rigorously testing the system's performance.

In summary, our project presents a comprehensive framework for magnetization curve management and prediction. By combining databases, web services, measurement script integration, a web interface, and AI-based predictions, we aim to facilitate efficient data utilization.

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SYSTEM FOR DETECTING RUBBER IMPERFECTIONS IN EXTRUSION LINES

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Keywords

Defect Detection, Computer Vision, Artificial Intelligence, Rubber

Abstract

During the production phase of rubber components, the implementation of an advanced machine vision system becomes crucial for carrying out the high-quality checks required for the rigorous manufacturing process. The main objective of this system is to identify damage on the rubber surface, focusing on detecting, classification and segmentation of various non-conformities. Thorough surface inspection is essential in the extrusion process to guarantee the quality of the end product and minimize waste generation, a critical aspect for optimizing operating costs. Non-conformities are a challenge to detect, often only identifiable at the end of the production line or in subsequent phases, and can compromise entire batches.

The project aims to develop an advanced artificial vision system adapted to rubber surfaces during production, with the aim of increasing production efficiency and raising product quality. This project includes the design and assembly of mechanical structure for the installation of cameras and lights, as well the selection of suitable electrical components, such as linear cameras and an industrial computer.

The developing rubber inspection algorithms involves the use of traditional (Nguyen et al., 2023) and deep learning methods (Wang et al., 2019) (Zheng et al., 2021) (Zhang et al., 2021). The validation and testing process will comply with company's standards. This research integrates traditional image processing with deep learning techniques to effectively detect and classify non-conformities. The resulting system is to set to increase the accuracy of defect detection in real time, thus improving overall process efficiency and product quality.

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AUTOMATED SYRINGE WITH AI SUPERVISING FOR PRECISE FLUID DELIVERY

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Keywords

Automated Liquid-Level, Computer Vision, Syringue pump, OpenCV, Python.

Abstract

The administration of medication to bedridden patients, who require daily doses, requires a precise and efficient approach to drug preparation. Currently, this responsibility falls to nurses, who are susceptible to factors such as fatigue, variations in dosages and potential reading errors, influencing the safety and efficacy of the treatment. In this context, this project develops an automatic syringe that guarantees the correct dosage of medication, reducing dependence on manual intervention.

The project idea is to create an integrated feedback system for the automatic syringe. For this, vision, pressure and artificial intelligence components will be incorporated. The vision system, using a Raspberry Pi camera and the YOLO (You Only Look Once) network, allows precise identification of the drug, the prescribed dosage and the quality of the drug, while the pressure system, with an HX711 sensor, guarantees the mechanical condition of the syringe. Artificial intelligence, integrated through the Raspberry Pi 4, plays a crucial role in adjusting and calibrating dosages, using advanced algorithms to guarantee the accuracy of the process.

To validate this project, problem cases will be recreated for data acquisition, including vision and pressure data, which are necessary for designing the feedback system. In addition, rigorous tests will be carried out to assess the efficacy and safety of the automatic syringe in simulated clinical situations and then in real hospital environments.

This type of syringe stands out from others today due to the integration of a feedback system and its adaptation for future integration into robotic drug preparation systems. This project represents an important advance in healthcare automation, promoting a safer and more efficient approach to medication management in hospital environments. Eliminating the need to manually prepare dosages prevents eyestrain for nurses. Reducing the nurses' workload, allows them to concentrate on more value-added tasks and provides a better quality of care for patients.

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DIGITALIZATION AND INSPECTION OF WIRING HARNESS FOR AUTOMOTIVE SYSTEMS USING ARTIFICIAL VISION

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Keywords

Wiring harness, collaborative robot, computer vision, AI, 3D modeling, inspection

Abstract

Automotive wiring harnesses are crucial for transferring information and energy throughout vehicles. The importance of these wiring harnesses has heightened due to the growing embrace of trends such as autonomous driving and electrification. Guaranteeing functionality, accuracy, and traceability is essential for ensuring the highest quality of these harnesses.

The manufacturing and inspection of wiring harnesses heavily depend on manual labor because of their customized and highly variable nature. During the inspection process, technicians identify problems such as defective connectors, stressed cables, and other abnormalities that may impact the integrity of the harness. This process is being automated through deep learning, which is enhancing efficiency and accuracy in detecting defects (Huong Giang Nguyen R. H., 2022).

This project suggests converting wiring harnesses into digital format. By utilizing advanced technologies such as 3D scanning and deep learning, the goal is to revolutionize and improve the effectiveness of the inspection procedure (Huong Giang Nguyen J. F., 2021). This approach allows for a thorough examination of the harnesses, combining a robotic arm with an automated system (Thong Phi Nguyen, 2021). This arm carefully moves along the cable, taking 2D pictures at set intervals. After that, 3D scanning provides a comprehensive three-dimensional view of the harness, allowing for a detailed inspection of its characteristics and aiding in the accurate detection of imperfections. Deep learning boosts the system even more, improving its capacity to detect abnormalities with great accuracy, even in challenging situations. There are various advantages to this method. Automating repetitive tasks leads to a notable decrease in both inspection time and labor costs and also results in higher quality standards and improved accuracy in identifying defects.

A user-friendly graphical interface will be created in an upcoming application. This interface will show a graphical representation of the harness, emphasizing its features, pinpointing defective connectors, and offering important details about strained cables. This project acts as a catalyst for modernizing and increasing efficiency in the automotive wiring harness assembly industry.

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VISION SYSTEM FOR DETECTING AND CLASSIFYING THE RIPENESS OF BERRIES FOR MOBILE PLATFORMS

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Keywords

Computer Vision, Agrotech, Artificial Intelligence, Ripening, Blueberry;

Abstract

Precision agriculture is constantly evolving, and its use is becoming increasingly common, with artificial vision systems being a crucial part of this, allowing information to be generated automatically for crop control (Mavridou, 2019).

This work proposes to explore this field, focusing on the development of a vision system for detecting and classifying the ripeness of berries, with a special focus on the blueberry crop. However, blueberries grow in bunches and a bunch usually contains fruit with different degrees of ripeness, which leads to low efficiency in the manual harvesting of ripe fruit and at the same time wastes a lot of manpower and material resources (MacEachern, 2022).

There will be major challenges due to the varying environment, for example fruit occlusion and the small size of the fruit. An accurate deep learning model for maturity detection could provide a prerequisite for automated harvesting technology. In addition to identifying the state of ripeness, the system could integrate innovative features such as early detection of pests and monitoring the development of the plantation. The methodology combines principles of computer vision and machine learning to develop a model for detecting and classifying the ripeness of blueberries, with the aim of optimizing efficiency and promoting more sustainable agricultural practices. By merging location and ripeness data, it generates a ripeness map and makes it available to the user so that they can make the best decision to start harvesting.

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INTELLIGENT DRUG CONTROL IN ANESTHETIC MAINTENANCE BASED ON NEURAL NETWORKS

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Keywords

Artificial Intelligence, Neural Networking, Deep Learning Methods, Vital Signs, Bispectral Index, Total Intravenous Anesthesia.

Abstract

Effective anesthesia management is crucial for ensuring patient safety during surgical procedures. Intravenous general anesthetics like Propofol and Remifentanil are commonly used, accompanied by standard American Society of Anesthesiology (ASA) monitoring and Bispectral Index Score (BIS) monitoring of anesthetic depth. Total Intravenous Anesthesia (TIVA) emerges as a technique exclusively administered intravenously, omitting inhalation agents.

The "Artificial Intelligence Anesthesiologist" model, based on neural networks, accurately doses anesthetics, comparable to clinical anesthetists (Chen et al, 2022). Deep learning offers potential for optimizing anesthesia depth control and homeostasis. A BIS prediction model, using interpretable deep learning algorithms, forecasts BIS values ahead using electroencephalogram (EEG) data (Hwang et al, 2023), and a deep learning in controlling propofol infusion during anesthesia (Yun et al, 2023) demonstrates the effectiveness in maintaining stable anesthesia state and showing promise in adverse event prediction during anesthesia.

These studies highlight deep learning's potential and that role in anesthesia control. We intend collect data (vital signs, EEG, current drug infusion rate, with a frequency of five reads per second, type of surgery and patient) from 100 patients under TIVA with vital signs and BIS monitored to create a data set that allows us to train a neural network (Convolutional Neural Network or Recurrent Neural Network) for a prediction model of the ideal drug infusion rate for patient homeostasis.

As result and conclusion this research should be able to predict ideal and optimal drug infusion rate, to individual patients and procedures, using a neural networking model, through the real-time data analysis of their vital signs, BIS, and current infusion rate of the anesthetic drugs.

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RFID SYSTEMS OPTIMIZATION FOR PASSIVE TAGS READING IN MULTI-PRODUCT APPLICATIONS

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Keywords

RFID, Passive UHF tags, Deep Learning methods, Inventory

Abstract

Radio Frequency Identification (RFID) technology is crucial for modern inventory management, enabling rapid and accurate tracking of goods. Passive TAGs are widely used due to their simplicity, low cost and readability. However, challenges arise when reading multiple passive tags simultaneously due to interference (Knapp & Uckelmann, 2022). The read range of RFID tags varies based on factors including the type of tag, type of reader, position of the tags relative to the antenna, frequency and interference in the surrounding environment or from other tags/readers (Fernandes, et al., 2009).

This study aims to optimize RFID systems by improving tag readability across various interferences, in multi-product environments. We will carry out tests on RFID tags in terms of their distance, orientation in relation to the reader and material interference. Moreover, we intend to increase the efficiency of the system and the correct positioning of the tags on the product. For this, we will be exploring AI methods (Lach, Rutz, & Biebl, 2022) to analyze RFID (RSSI, Phase) data and generate to most prominent place to ensure the best readings.

We created an environment with 55 tags arranged in a 5x11 matrix, along with a RFID reader and a fixed antenna. Experiments involve testing different material blocks (metal, organic, others) at varying distances and distances from the tags and other blocks. With the collection of data, we preprocess the tag readings. Then we place the object between the antenna and tags, and store RFID data (RSSI, Phase). This dataset captures combinations of interferences, such as material and distance, with which we can then train a neural network to recommend the best place on the product to place the tag, for better reading.

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SNAP VENT PICK&PLACE IN LEAKAGE TEST MACHINE

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Keywords

Cycle Time, Quality Production, Pick&Place, Leakage, Testing Machine

Abstract

The concept of a Leakage test machine, that the company already has, perform the test has a manual process. This test concept is conceived, on a way to perform two smaller tests on each automotive display, to ensure that they are watertight and dust proof, according to the specification. Halfway through these two tests, the operator accouping one snap vent on the display back, which requires a lot of testing time and greater availability and contact, between the operator and the device.

To increase performance and quality tests, performed by these kinds of machines, related to the production, and testing of a high-level instrumentation device, the manual insertion of components is being put aside, and the automation is thus undergoing a paradigm shift [1], increasing company revenues, lowering costs, improving productivity and efficiency, reducing risks, and improving safety on the factory floor [2]. Beyond that, quality standards are a critical aspect of any product's life cycle, and to achieve this, technical systems must avoid costly failures [3].

The solution consists in one feeder, that goes on the back of the machine. The system is based on one reservoir full of snap vents, that through shaking, allows the snaps to go to the bottom of one vibrating vat, that will be shaking too. The shaking is made by 3 feeder vibrating controllers, one for each part of the system. The snaps will climb up through the edges, until a point, that they must be on the correct position, to be guided to a tiny 3-piece aluminum conveyor, with some inclination, that through gravity and shaking, will bring the snaps to the pick&place axis. This pick&place axis uses a vacuum system to catch the snaps, with vertical movements in Y, and horizontal movements in X, will move to the parameterized position, and clamp them on the device.

This new concept, using qualitative methodology, through capability studies, to assure the correct impact of this new implementation, will allow that the cycle time that this machine requires, can be reduced between 5 to 10 seconds, per each device tested. Increase production capacity of the line and even improve the test quality and final product quality.

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PREDICTIVE MAINTENANCE OF HIDRAULIC PRESS THROUGH SOUND AND VIBRATION ANALYSIS WITH EDGE AI SYSTEM

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Keywords

Predictive Maintenance, Hidraulic Press, Data Analysis, Anomaly Detection, Edge AI.

Abstract

The concept and practice of predictive maintenance has become significantly more important in industry, allowing cost savings and increased equipment efficiency. Predictive maintenance is about predicting future failures, by applying techniques to analyze data based on equipment characteristics(Mulders & Haarman, 2017). According to this concept, predictive maintenance techniques have emerged to identify anomalies, using computational techniques in other to develop predictive models (J. Lee et al., 2013). Edge AI systems enhance predictive maintenance solutions, as they can combine edge computing technologies with AI models, ensuring efficiency and a smaller amount of data. Edge AI systems are characterized by including a portable device capable of performing processing, usually located next to the machines, which is the particularity of using AI models. (Y.-L. Lee et al., 2018), (Singh & Gill, 2023).

In this project, the aim is to design an AI-embedded system for incorporation into hydraulic presses, which, by analyzing real data, can make predictions and classify press behavior and failures. This makes it possible to anticipate and prevent malfunctions that the press may have, or even perform its tasks incorrectly.

The system will use data/information from the readings taken by the vibration, temperature and sound sensors present in the system, processing the data, analyzing, and interpreting it, using an AI solution, making decisions, and detecting existing anomalies, the system will generate an alert when an anomaly is detected. The embedded AI system to be used will be based on the STEVAL-STWINKT1B (STM32L4R9), from STMicroelectronics this product is characterized by being able to multisensory measurements. The system will remain in operation and will be subject to constant observation and evaluation, by a responsible maintenance team, to validate its proper functioning and effectiveness.

This embedded system solution, will be able to be replicated/added to different machines to promote an independent anomaly detection system, being able to help the maintenance teams to plan and perform the future interventions with more efficiency.

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AUTOMATED HEAVY METAL MONITORING IN INDUSTRIAL WASTEWATER

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Keywords

Automated monitoring system, heavy metals, wastewater

Abstract

Industrial running emissions are a source of heavy metal contamination, industrial wastewater poses a serious environmental problem if not treated correctly before discharge to municipal streams or water surfaces. However, the conventional monitoring techniques used in wastewater treatment plants (WWTP) are time-consuming and require specialized infrastructures, often providing data lag and short timespan characterization of the efficiency of the WWTP processes, turning the operation and the control of the WWTP even more challenging and increasing the risk for environmental pollution (Mokarram et al., 2020).

Studies using electrochemical sensors have shown promising results for faster and simpler detection and quantification of heavy metal ions (HMI) in water and wastewater as compared to conventional analytical methods. The small footprint and the robustness of these sensors open the possibility for integration in an automatic sensing system allowing the *in-situ* analysis of such contaminates in water (Barton et al., 2016). Over the last years, monitoring devices based on the electrochemical detection of metals have reported recovery rates around 84% and LOQ bellow 1mM (Chapman et al., 2012; Zhang et al., 2021).

In this work, we propose an automated monitoring system based on electrochemical sensing of HMI to be implemented on the infrastructure of an industrial WWTP network using Ethernet/IP, to assist in the control of the wastewater treatment processes. The device can collect a sample of wastewater, estimate the level of Ni(II) and Zn(II) and communicate the data to the WWTP control system, facilitating timely adjustments on the operating parameters and ensuring better efficiency.

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IIOT TINYML FOR GAUGE DIGITALIZATION

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Keywords

Artificial Intelligence , Computer Vision, Embedded Systems, TinyML, Edge Devices

Abstract

In many industrial environments physical process values are still measured using analog gauges (Dumberger et al. 2020), either for their low cost or for their high reliability. These devices allow the acquisition of various quality control characteristics such as pressures, liquid levels, temperatures, etcetera.

Despite all the advantages analog gauges are monitored manually, thus posing problems, especially in large facilities where gauges are often placed in hard-to-access or dangerous locations. (Peixoto et al., 2022).

With all these premises, emerges the main objective of this project that is develop an embedded system that allows, through artificial intelligence and computer vision methods, detect, segment and extract data from analog pressure gauges, replacing the extraction made by a human.

With the development of this project, there are focus on a new area on the rise, which is TinyML. Tiny machine learning is a specific focus within Edge Intelligence (EI) that targets machine learning algorithms deployed to constrained edge devices such as microcontrollers (Gibbs, et al., 2023). This type of applications has the advantage of low latency, low consumption, low bandwidth and privacy because they do not need to be sent to an external server. They also allow a small device to be used with a battery for various periods of time, making it portable.

Throughout the development of the project, one of the convolutional neural networks (CNN's) present in the Keras API that belongs to the Tensorflow library will be tested and later chosen, which will be converted to TensorflowLite posteriorly. With the model trained and converted, an STM microcontroller will be used as well as its XCubeAI development framework that accelerates and makes easier the process of model inference on this device.

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MASTER IN COMPUTERS ENGINEERING

PREDICTION MECHANIMS FOR HABITATIONAL TOUSRISM IN PORTUGAL

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Keywords

 Tourism, Tourism Forecasting, Data Mining, Dynamic Reconfiguration

Abstract

Tourism is one of the largest industries in the world, yet this prominent position can easily be affected by a variety of factors and events. Evaluating the impact of certain events on tourism has become a necessity in this increasingly dynamic and demanding world.

To respond to this need, solutions have been developed that can analyse data on a given reality and thus identify trends and patterns. This data is constantly recorded and updated by the various tourism establishments and is fundamental to the success of models that fall within the scope of Tourism Forecasting.

The association of intelligent models with this analysis process has facilitated the process of identifying complex patterns and extracting valuable insights that were previously unknown, enabling more accurate and effective forecasts.

The purpose of this study is not only to document the techniques, models and some of the most used platforms in Tourism Forecasting, but also to serve as a scientific basis for the development of a solution that aims to apply some of these mechanisms.

This solution will involve the analysis of public databases and data from tourist establishments, where Data Science strategies will be defined for their processing and the creation of scenarios intended to simulate the occurrence of a particular event. To make a prediction, the intelligent model must be able to analyse and manipulate the existing data, making a set of predictions following the patterns associated with the characteristics of the different scenarios developed. The presentation of the forecast data will involve the construction of a small dashboard where it will be possible to see some of the main metrics and measures calculated by the model.

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IOT LOW FREQUENCY TRACKING PLATFORM

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Keywords

Internet of Things, NB-IoT, IoT Tracking Device, IoT Platform, API Gateway Service, IoT Security

Abstract

This master's thesis describes the development of an Internet of Things Low Frequency tracking platform, a solution intended to resolve prevalent challenges in the field of the IoT, specifically energy autonomy, device dependence, and information security.

This solution integrates IoT devices, cloud-based technology, and application development techniques to provide users with real-time information without the need for constant reliance on their mobile devices. The IoT component of the platform consists of devices endowed with georeferencing capabilities, a minimum of one year of autonomy, local storage, LF data transmission capacity, and low cost. Utilising cloud computing facilitates the establishment of services that seamlessly synchronise information across several devices. This facilitates the monitoring of their specific information, such as their whereabouts. The application development aspect concentrates on the creation of all-inclusive services for the integrated management of the device network, such as device registration, control settings, and monitoring. The platform promotes an open ecosystem that promotes the incorporation of other devices and operates independently of mobile phones. The platform also includes the provision of an Application Programming Interface for developers, allowing them to build customised solutions for tracking, monitoring, and data analysis on devices that integrate with this platform.

The objective of this project is straightforward: to enhance the accessibility and comprehensibility of technology for all individuals. Our objective is to enhance the synergy and improve the rapport between individuals and their electronic devices. The proposed platform will be validated with a prototype solution, having its supporting architecture functionality and communication capacity as main criteria to access. This platform represents a significant advancement in the realm of IoT. This programme is comprehensive, user-friendly, and robust for real-time data monitoring and management.

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A PROOF OF CONCEPT FOR A PORTUGUESE DECENTRALIZED VOTING SYSTEM

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Keywords

 Blockchain, Ethereum, Smart contracts

Abstract

Elections stand as pillars of democracy, and trust in the electoral process is essential for the stability and legitimacy of political systems. However, conventional voting systems often face significant challenges such as fraud, manipulation, and lack of transparency. Additionally, the logistics involved in conducting in-person elections can be costly, time-consuming, and prone to errors.

The primary goal of this project is to investigate the viability and impact of harnessing blockchain technology to bolster the security, transparency, and efficiency of electronic voting systems (Nakamoto, 2018). Our precise objectives encompass employing smart contracts to automate processes while ensuring security and transparency, conducting security testing and audits, mitigating fraud risks, optimizing the tallying of votes (Buterin, 2013).

The proposed solution entails the development of an online voting system using blockchain technology and smart contracts, built on the Ethereum network. This comprehensive system will incorporate a robust electronic identification system to ensure secure voter authentication. Additionally, it will feature remote and online voting mechanisms, enabling convenient participation from any location.

The project methodology starts with a comprehensive literature review, delving into existing research and previous related work. The process then progresses to requirement analysis and prioritization, mock-up design creation ensuring an intuitive and user-friendly interface. Secure prototype development follows suit, integrating robust features to safeguard sensitive data. A secure prototype is developed and tested rigorously. Evaluation using predefined metrics enhances system integrity and efficiency.

By embracing these innovations, this project endeavors to enhance voter engagement, foster inclusivity, and promote confidence in secure and reliable electronic voting systems, thereby strengthening democratic processes in Portugal.

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Study of the comparison between AI algorithms in simulator of Electrical Distribution Network

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Keywords

L2RPN, Power Network, graph, learning, Control, Power flow, competition

Abstract

Electricity is a commodity in the modern age, behind the scenes there is a logistic team that works to make sure that there is always electricity, maintaining a balance of the energy flow.

Due to this balance between the production and the consumer there is a need to get the best from it, since we are moving to a decarbonization society. The challenge L2RPN (Learning to Run a Power Network) (Zhou et al., 2019) comes to create solutions using AI and reinforcement learning that tries maintaining the balance of the flow.

This challenge started in 2019, having competition learning to run (Kidzi´nski et al., 2018) as inspiration. Resuming the learning to run competition is to find a solution where virtual robot learns to run by itself with less attempts, with this inspiration L2RPN main objective is to find a solution that looks for the best from the power network and it as the ability to adapt to the geographic network layout and other factors.

It is intended to present a study of the results on the solutions used in L2RPN (Learning to Run a Power Network) challenge, since it started 2019 and finished in 2022 it as evolve, the rules, the conditions and evaluation have change along the years, it will tried to answer the question on how have best 3 solution of each year work with condition of different years.

It is planned to use Design science research methodology over 9 months, where the first 4 months is the state of the art, the last 4 months to write the report, it is required to work between this date it is pretended to develop a prototype where is possible to analyze the best 3 winning solutions of each year.

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INTERACTIVE TOURISM: THE SYNERGY BETWEEN GAMIFICATION AND AUGMENTED REALITY

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Keywords

Augmented Reality, Gamification, Tourism, Technology.

Abstract

As tourism constantly seeks innovative approaches to captivate visitors, this dissertation explores how Augmented Reality and Gamification could revolutionize tourist interactions in culturally vibrant cities like Barcelos (Joaquim et al., 2017). Augmented Reality is revolutionizing tourism by enhancing visitor experiences and deepening engagement with cultural heritage (Cibilić et al., 2021). This dissertation focuses on developing an application tailored for Barcelos with the primary aim to assess effectiveness of Augmented Reality and Gamification in enriching tourist experiences at key locations. Through user interaction analysis and engagement assessment, the study evaluates the impact of both on knowledge acquisition, satisfaction, and overall enjoyment of cultural heritage (Mohamed Noor et al., 2015).

Methodologically, this research involves a comprehensive literature review on Augmented Reality and Gamification in tourism, analyzing successful projects. It focuses on developing and implementing solutions in Barcelos, with data collected through surveys and user testing. Additionally, the study assesses user interactions and engagement to evaluate the efficacy of these technologies in enhancing tourist experiences.

Furthermore, this research anticipates potential challenges in the integration of Gamification elements and Augmented Reality technology. Factors such as technical limitations, user adoption barriers, and cultural sensitivities may pose hurdles to the successful implementation of these technologies.

Driven by a passion for technology and innovation in the tourism industry, this study aims to not only contribute to the advancement of tourist interactions in Barcelos but also to inspire other cities and professionals to embrace Augmented Reality and Gamification as tools for creating immersive and meaningful travel experiences.

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ACTIVE AGEING: THE SYNERGY BETWEEN MICROSERVICE ARCHITECTURE AND APPLICATION INTEGRATION

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Keywords

Active ageing, Microservices architecture, Application integrations

Abstract

The world population has been experiencing a significant ageing process since the middle of the 20th century, characterised by an increase in the number of elderly people in the world population. This phenomenon began earlier in the more developed regions. It became more noticeable globally on the occasion of the International Conference on Population and Development, held in 1994 in Cairo, Egypt. However, these issues are not recognised in the European Union, where only 3% of health budgets are focused on promoting health, independence and autonomy (Commission Economic et al., 2021).

Population ageing was further highlighted during the Second World Assembly on Ageing, held in Madrid, Spain, in 2002. Demographic projections at the time indicated a clear trend towards continued ageing (United Nations, 2013).

From a salutogenic perspective, ageing is an achievement to be embraced (Bernardo et al., 2022). It is often claimed that older people's quality of life (QoL) improves when they adopt information and communication technologies (ICT), such as the Internet, mobile phones and computers (Damant et al., 2017). In this context, the synergy between microservices architecture and application integration emerges as a promising approach to boost and support active ageing, which raises the need to know how these two concepts can work together to support initiatives in the field of active ageing. Therefore, this study aims to:

To study how microservices architecture and application integration can coexist, evaluating interoperability with different applications, considering communication protocols, data format and integration requirements.

Evaluate scalability and flexibility to ensure that integration with different applications through microservices architecture can cope with increasing data volumes and changing integration requirements.

Evaluate security practices that can be adopted in these two concepts to protect sensitive data, considering response time and latency.

Understand how the synergy between microservices architecture and application integrations works to facilitate accessibility and inclusion for older people with different levels of ability and physical capabilities, including support for voice and video commands, text magnification and other accessibility features.

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DIGITAL ACCESS TO MENTAL HEALTH: PSYCHOLOGICAL SUPPORT ACCESS PLATFORM

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Keywords

Mental health, Psychology, Public Health, Digital Technology

Abstract

Mental health is a state of psychological equilibrium that empowers individuals to face daily challenges, yet it can be influenced by a variety of factors. In 2019, it was estimated that 970 million people worldwide were affected by some form of mental disorder, with the most severe cases potentially reducing life expectancy by up to 20 years, significantly heightening the risk of suicide and human rights violations (World Health Organization, n.d.). This phenomenon has been exacerbated by the emergence of the COVID-19 pandemic, where studies indicate that symptoms of depression and anxiety have increased by between 20% to 35% (Penninx, Benros, Klein, & Vinkers, 2022).

Seeking help for mental disorders remains a challenging task, primarily due to the stigma associated with mental illnesses, which continues to be recognized as the major barrier in accessing mental health services, despite improvements recorded in recent decades (Schomerus & Angermeyer, 2008).

This project aims to address the challenges that people face when seeking support in the field of mental health, proposing innovative solutions to ensure more equitable and effective access to mental health services. To achieve this, the development of a web platform is proposed to strengthen the connection between mental health professionals and patients, offering support, accessible resources, and access to a detailed list of specialized medical professionals, accompanied by academic and professional information. Additionally, the solution includes an artificial intelligence functionality to conduct internal diagnoses, without disclosing conclusions to the patient, recommending suitable professionals and support materials like articles and self-help manuals. Users also have access to the professional and academic history of mental health professionals to make informed decisions when seeking help.

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MASTER IN INDUSTRIAL ENGINEERING AND MANAGEMENT

IMPROVE PROJECT MANAGEMENT IN AN IT CONSULTING COMPANY

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Keywords

DMAIC, Management, Improvement, Project.

Abstract

In today's competitive market, organizations need to continuously improve their processes, products or services. In this context, Lean Six Sigma DMAIC (Define, Measure, Analyse, Improve, and Control) methodology can be highlighted, which provides a structured approach to guide organizations in identifying areas for improvement, analyzing data carefully, implementing effective solutions and ensuring the sustainability of these improvements over time (Guimarães, 2021; Subagyo et al., 2020).

In line with the need identified in the previous paragraph, this project was created with the aim of improving project management of the IT consultancy company C2B Consulting through the implementation of the Lean Six Sigma DMAIC methodology.

Thus, the objectives outlined for the work to be carried out at C2B Consulting are 1) to identify the two most critical process groups (PMI, 2017), 2) to determine the four most critical knowledge areas (PMI, 2017), 3) to define the project models marketed, 4) to identify, map and analyze one project model, 5) to measure the performance of ten previously completed projects, 6) to carry out one study to determine the main difficulties in the project management processes, 7) to identify and apply at least six improvement proposal.

To accomplish the project objectives, the Action Research methodology combined with the Lean Six Sigma DMAIC methodology will be used, so that upon completion of the project C2B Consulting will have: 1) a standardized approach to project management of one of the project models marketed, 2) reduced time and cost deviations in projects, 3) improved the way the activities are planned, 4) improved project budgeting procedures, 5) a procedure that supports the deadlines accomplishment, 6) improved customer satisfaction, 7) increased the company's profitability, 8) higher employee motivation and involvement.

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IMPLEMENTATION OF ATTRIBUTE MSA IN AN AUTOMOTIVE MULTINATIONAL

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Keywords

MSA, Measurement System Analysis, Quality, Control, DMAIC.

Abstract

This project arises from the need to fill a gap identified in a multinational automotive company, where studies of Attribute Measurement System Analysis (MSA) are not conducted in a structured manner, raising concerns about the quality of inspections and evaluations, as well as meeting customer requirements.

The main objective is to implement the analysis of the Attribute Measurement System (MSA), aiming to improve the quality of inspections and evaluations. With the increasing competitiveness in the automotive sector, where customer satisfaction is crucial, the implementation of programs to improve the quality of industrial processes becomes essential to avoid being surpassed by competitors.

MSA is a statistical method required by the IATF 16949:2016 standard, aiming at the statistical control of equipment and measurement systems, identifying and quantifying sources of variation to ensure the quality and reliability of measurements.

The DMAIC methodology will be adopted to ensure a systematic approach from problem identification to the implementation of solutions and control measures to sustain the improvements achieved, in compliance with the mentioned standard. This approach will provide a robust framework for conducting the project, ensuring the quality and efficiency of operations.

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IMPLEMENTATION OF A DASHBOARD TO MONITOR A COMPANY'S PERFORMANCE INDICATORS

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Keywords

Management control, Dashboard, KPI's, PDCA, Efficiency

Abstract

The constant evolution of market demands leads to an increased demand for information and knowledge by companies. This demand aims at implementing successful strategies, satisfying customers, continuously improving processes, innovating products, and measuring organizational performance.

This project arises from the need to fill a gap in a furniture sector company, as it lacks a database and where the data are not all grouped in the same place, making decision-making and strategy definition difficult.

The main objective of this project is to develop a dashboard to aggregate Key Performance Indicators (KPIs) related to the management of different product categories. The metrics to be monitored include the number of items sold, average selling price, production cost, profit margin, return rate, customer complaints, stock quantity, production defects, average production time, and production line efficiency per product category. Its principle is to group all these indicators in the same place and provide management with a comprehensive view of the performance of each category, allowing them to identify areas that need improvement in terms of quality and efficiency.

To develop this project, the creation of a dashboard, the Power BI software will be used, and the PDCA cycle (Plan, Do, Check, Act) will be utilized as a supporting tool to identify problems, implement effective solutions and ensure the efficiency and effectiveness of processes over time.

The main objective is the reduction of production costs, which will be achieved through the identification of critical points and optimization opportunities in each phase of the production process. The expected benefits of this project are that besides helping the company better manage its internal resources and processes, it will also help it adapt more effectively to changes and challenges in the furniture market, resulting in significant improvements in efficiency, competitiveness, and profitability.

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IMPLEMENTATION OF ISO 9001 IN A COMPANY THAT MANUFACTURES MODULAR COMPONENTS FOR CIVIL CONSTRUTION

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Keywords

 ISO 9001, Management and Quality System, Competition, Certification

Abstract

Certification is no longer "just" a competitive advantage but has become a criterion for selecting companies, differentiating them from their competitors. The concept of continuous improvement underlying the ISO 9001 standard conveys to the market the image of companies capable of satisfying and exceeding customer demands, directing all employees towards this common objective.

The industrialization sector strongly embraced this innovation, showing interest in acquiring a greater organizational culture, improving product and process quality.

The internship project has the purpose of implementing the Management and Quality System, based on the ISO 9001:2015 standard, in an off-site construction company, located in Braga, Blufab, where certification is a strategic decision taken for the improving the management of all its processes, enabling entry into new markets.

The methodology used to develop the internship project was to carry out a bibliographical review, using books, scientific articles, online research tools and databases. Action-Research was used, which is based on the active participation of the researcher and the entire population involved, where there is an intervention in the process through the definition and implementation of improvements, proposing one or more actions.

The analysis of data obtained during the internship report will be carried out using the Power BI or Planner program, or other similar programs.

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PRODUCTIVITY GAINS BY ADDING A NEW PRODUCTION EQUIPMENT - RESPONSE TO INCREASED CAPACITY IN AN AUTOMOTIVE INDUSTRY COMPANY

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Keywords

DMAIC, Lean Six Sigma, Continuous Improvement, Quality

Abstract

This project focuses on productivity enhancements due to the adoption of a new automated equipment for screwing in the production line of product XYZ at Safelife - Indústria de Componentes de Segurança Automóvel, Lda, driven by increase in demand from an automotive customer and, subsequently, it aims to define and implement actions to improve its efficiency.

The project objectives consist of 1) carrying out studies of Methods and Times 2) conducting capacity studies for both equipment comparing similar production periods (May, June, July 2023 versus 2024), 3) performing statistical tests, including T-tests and correlations to compare both production equipment, 4) analyzing the causes of variations in both production processes using quality tools 5) formulating improvement proposals to enhance the capacity of the production process.

The research methodology to be used will be Action-Research using Six Sigma DMAIC methodology, as the project requires data collection through observation, data analysis, consultation with workers.

This project aims to answer two research questions: QI1: How can the adoption of automated equipment affect the productive capacity of a production line?; QI2: What is the impact on customer response when having a more optimized process? Subsequently, based on the data analysis, it will be possible to test the research hypotheses: HI1: Does the new machine demonstrate better performance than the original machine?; HI2: Does automated equipment provide greater stability in the screwing process?

This project not only highlights the immediate benefits of technology upgrades, but also outlines a continuous improvement framework for operational excellence.

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DEVELOPMENT OF A PLATFORM FOR REQUESTS AND HUMAN RESOURCES

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Keywords

 Python-based tool, Internal logistics, Request management, Human resource optimization

Abstract

This project undertakes the development of a Python-based tool designed to revolutionize the management of requests and human resources within the internal logistics of businesses. At its core, the primary objective is to streamline operations by crafting and customizing templates for logistical requests, thereby simplifying navigation and bolstering the efficiency of internal processes.

The tool's fundamental aim is to furnish a platform for dynamic and up-to-date information management, circumventing data inconsistencies and fostering smoother, more precise communication channels between various departments. Through the creation and adaptation of templates tailored to diverse request types, the system ensures the consistent collection of vital information. This, in turn, mitigates the occurrence of errors and omissions, elevating both decision-making capabilities and the operational efficacy of internal logistics.

Beyond mere optimization of request management, the system serves as a linchpin for fortifying human resource management endeavors. By aligning tasks with the proficiencies of individual employees, it contributes to the cultivation of more tailored and efficient management practices, finely attuned to the specific needs of the company at hand. This dual-pronged approach not only enhances the efficiency of logistical processes but also augments the overall operational agility and effectiveness of the organization as a whole.

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ANALYSIS AND IMPROVEMENT OF STOCK MANAGEMENT IN A COLD DISTRIBUTION COMPANY

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Keywords
Stock Management, Lean, Action-Research, Statistic Models

Abstract

This project focuses on improving the stock management at PlusFroid, a company that specializes in cold distribution (HVAC). PlusFroid has historically faced challenges with its stock management, which has impacted its ability to respond agilely to market demands and control operational costs. This project is driven by the desire to improve operational efficiency, reduce waste, and enhance profitability, setting a sustainable foundation for future business operations.

At the moment, PlusFroid does not have any type of Lean methodology applied to it, and so the primary goal is to review its current stock management methods by introducing Lean tools like 5S and Kanban, along with statistical approaches such as EOQ (Economical Order Quantity), Forecast Prediction Models, and Periodic Review Models. The project will follow an Action-Research methodology, which allows for iterative problem-solving through the stages of identifying the issue, planning, implementing measures, and evaluating results, promoting ongoing improvements.

The methodology includes a thorough examination of the current stock management systems to identify inefficiencies, followed by the introduction of optimized practices.

Expected challenges involve dealing with resistance to change within the company and incorporating new technologies smoothly with existing systems.

The projected outcomes are a notable cost decrease and improved operational efficiency through better stock management practices. Adopting Lean methodologies is expected to simplify processes, minimize waste, and enhance workflow, leading to higher customer satisfaction and increased profitability.

Ultimately, this project seeks not only to address immediate stock management concerns but also to lay the groundwork for sustainable operational practices in the future.

OPTIMIZING THE PRODUCTION OF AIR HANDLING UNITS: A LEAN SIX SIGMA APPROACH

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Keywords

Lean Six Sigma, DMAIC, Continuous improvement, Waste, AHU

Abstract

The Heating, Ventilation, Air Conditioning (HVAC) industry faces significant challenges as its market evolves. Growing customer demand for more efficient, sustainable, and customized systems puts a strain on Air Handling Units (AHU) manufacturers. In addition, the need to meet shorter delivery times is a priority to meet customer expectations. Thus, the need to maximize efficiency, shorten delivery times and minimize costs becomes crucial for the survival and success of HVAC companies. In this context, the Lean Six Sigma methodology has emerged as a promising approach to improve processes and reduce waste.

The subject of this project resulted from the need to optimize the production process of an air conditioning company. To achieve the established objective, the DMAIC methodology will be used, consisting of five phases, namely, define, measure, analyze, improve, and control. The first phase involves identifying the main problems in the process and their root causes, through an analysis of the production processes. To identify the main problems, data will be collected on cycle times and waiting times at each stage of the process, followed by a detailed analysis of this data. Based on the results of the analysis, targeted improvements will be proposed and implemented to optimize production and reduce cycle times.

The methodological approach will follow a systematic process, with an emphasis on accurately identifying bottlenecks and implementing effective solutions. In the end, it's expected not only a significant reduction in delivery times, but also an overall improvement in the company's operational efficiency, resulting in greater customer satisfaction and greater competitiveness in the market.

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CREATION OF A NEW STORAGE SPACE FOR RAW MATERIALS AND PRODUCTION SUPPLY IN AN ELECTRICAL CABLE COMPANY

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Keywords

Raw materials reception; Storage; Warehouse; Layout; Tracking, Warehouse Management System

Abstract

The project was carried out in a factory context at the company SolidAl, in order to fight problems like the space and information lack about the stock location throught the creation of a well organized logistic centre with location for every spot.

The phases of the methodology are based in documental and case study research through which we intend to understand what is already being done in other companies (competitors, partners…), what solutions exist, which ones suit the companies reality, study the possible results and act (Action-Research).

This project aims to create a logistic centre that serves as a central raw material warehouse with 750 pallets space and equiped with a location system for all the goods in the company (CR-Codes for each cell in the warehouse). This space is designed to recieve all types of materials that enter in the company and respond to all stages of the materials life cycle. Regarding future plans, this project will aims the improvement of the capacity for at least 1050 pallets, the automation of the location process and the centralization of the reception process in company making the logistic centre not only a space for raw materials, but also for all other orders made by the company departaments.

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ANALYSIS AND IMPROVEMENT OF STOCK MANAGEMENT IN A TEMPERED GLASS INDUSTRY

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Keywords

Stock Management; Problematic; Tracebility; Statistical Analysis; Improvements

Abstract

The theme of the aforementioned internship proposal was selected based on the main limitations in the stock management activities currently carried out by the company Nortempera – Indústria de Vidros Temperados do Norte, S.A., as established within the partnership between IPCA and the company. In this sense, the work to be developed during the internship period aims to analyze and interconnect data relating to stock movements, based on the different stock management software used by the company, with the aim of improving the minimum quantity of glass required to be available in the raw material warehouse.

To achieve this main goal, a set of specific objectives was defined that are based on the main concepts, policies, key performance indicators and stock management tools (Carvalho et al., 2023). As for the study methodology adopted to achieve the objectives outlined within the scope of the problem under study, it is based on an action-research methodology that is divided into five phases related to each other, namely, the identification of the problem, the collection and preparation data, data analysis, creation/implementation of solutions and evaluation of results (Santos et al., 2013).

Finally, statistical analysis of stock movements is essential for identifying possible opportunities for improvement in activities related to stock supply. The development of a database capable of linking all information relating to stock movements is the most effective solution to the traceability problems found in the stock management systems currently used by the company.

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PRODUCTION MANGEMENT SYSTEM IN A CUTLERY COMPANY

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Keywords

Industry 4.0, Production Management Software, Performance Indicators

Abstract

Businesses must harness advanced production technologies to improve industrial management. The implementation of a Manufacturing Execution System (MES), can be a relevant investment to effectively control production operations (Rodrigues, 2018). With the implementation of a Manufacturing Execution System businesses can collect and send data in real-time to various production processes and machines, laying the ground for enhanced operational efficiency (Xinyu Chen, 2020).

The primary objective of this project is to implement a manufacturing execution system to enhance and connect the planning process on a cutlery production company, to be driven by real-time data sourced directly from the factory floor. To complement this system, tablets will be strategically placed on three machines within the polishing sector. The manufacturing execution system will offer the capability to define and monitor performance indicators, enabling a comprehensive analysis of the manufacturing performance on real-time (Silva, 2023).

As the project progresses, data from the factory floor will be collected and analyzed to refine the manufacturing execution system effectiveness. The tablets will interface with the new manufacturing execution system, enabling operators to efficiently record production information. This integration will enhance data acquisition capabilities, providing insights previously inaccessible in real-time. The high quality data supplied to the manufacturing execution system will improve the daily management, the lead-time and productivity of factory floor. Besides that, this system can help to define the exact time needed to produce a certain product.

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INDUSTRY 5.0 – HUMAN-CENTRIC MANUFACTURING

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Keywords

Industry 5.0, Human-machine, Sustainability, Resilience, Smart Society

Abstract

The fourth industrial revolution, or Industry 4.0, has brought digitalization and artificial intelligence technologies to be the centre of production efficiency, however sustainability and human relations within the work environment have been pushed to a second plan. With the COVID-19 pandemic crisis, enterprises learned the need to be more resilient. The main purpose of this research, is to define a roadmap to put in place Industry 5.0 guidelines in the production field, based on the Human-centric values (Nahavandi, 2019), in a resilient and sustainable work environment (Morteza Ghobakhloo, Mohammad Iranmanesh, Manuel E. Morales, Mehrbakhsh Nilashi, Azlan Amran, 2022). Each industrial revolution has made a high impact on the economy and in the society. Linked to technical and technological transformations, the social impact was also significant and has been overlooked until now. For this fifth industrial revolution, which is still very "silent", we expect the improvement of the value chain, more innovation driven by artificial intelligence and big data (Aditya Akundi, Daniel Euresti, Sergio Luna, Wilma Ankobiah, Amit Lopes and Immanuel Edinbarough afi. , 2022), an integration of procedures focused on sustainability in all production processes, a human-machine connection development in the workplace, and an increase of resilience procedures to prepare organizations for unpredicted disruptive events. The growing of the machine learning methods in the industry efficiency, is also in line with the social evolution of today's generations, namely, Society 5.0. A systematic literature review will be presented for the topics addressed in this research, the methodology, and the research survey. This study also aims to measure the level of knowledge of the Industry 5.0 located in the northern region of Portugal, given the prevalence in terms of manufacturing industry, with a special focus on the Textile, Clothing and Footwear industries – TCF, (Lila J. Truett, Dale B. Truett, 2019), but also extended to other areas such as, manufacture of plastic, metal and wood products, which also occupies a prominent position. The development of the roadmap will be useful for industrial enterprises that, given the lack of information and know-how, want to update their strategic businesses development with positive repercussions in terms of competitiveness, and matching with the advanced Industry 5.0 level of integration in Europe (Directorate-General for Research and Innovation, 2022). The main paradigm will certainly be to adjust the level of research as rigorously as possible, in organizations with different levels of state-of-the-art in terms of technology (Industry 4.0 or less). About defining the roadmap, more than 300 companies will be consulted through an online survey with a Likert scale, a statistical analysis will be carried out, and the standards ISO 27501, ISO 22136, ISO 14001 will be followed. A universe of at least 50 companies will be needed to draw meaningful conclusions.

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ANALYSIS OF HUMAN FACTORS, SAFETY AND HEALTH AT WORK IN A TECHNOLOGY COMPANY

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Keywords

Human Factors, Safety and Health, Quality of life at work, Job satisfaction, Technology companies.

Abstract

The influence of Human Factors, Safety and Health at work increases many aspects on quality life and it is a way for companies to stand out on the market. Known as a science of work, Human Factors is useful in designing the components that are used at workplaces, such as environmental working conditions and prevention of occupational diseases (Silva, 2005). Furthermore, a safe and healthy workplace is one in which workers and employers collaborate to continuously improve the protection and promotion of health, safety, and well-being (World Health Organization, 2010).

Improvements on productivity and quality at work are achieved through the good relationship between humans and the work environment. Kuhn & Barbosa (2016) emphasizes comfort and safety as the main points for workers' well-being. Quality of life at work, has as its basic idea the fact that people are more productive when they are satisfied and involved with their work and for this to happen the company must be aware about theses aspects (Conte, 2003).

Therefore, these themes will be analyzed in a technology company, to answer the following research problem: How to analyze the influence of Human Factors, Safety and Health practices on productivity and quality of life at work in a technology company? Two research techniques will be used: (1) research development phase, where employees of company will be subjected to a questionnaire on human factors, safety, and health, and (2) observation, where it will be carried out at the workplace for analysis.

In the end, the objective is to evaluate these themes at the company, collecting what is already applied through the questionnaire and observation, and moreover, suggest possible changes and improvements.

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DIGITAL TRANSFORMATION IN THE TELECOMMUNICATIONS SECTOR: A PLATFORM TO IMPROVE PLANNING AND CONTROL

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Keywords

Control, Management, Planning, Software Development

Abstract

Many companies suffer from deficiencies in their planning and control due to lack of performance measurement, indicator analysis, and metrics to track activity progress (Magalhães et al., 2017). Planning and control are fundamental in effective project management (Mattos, 2019).Planning encompasses goal and procedure definition, while control involves supervising activity execution. They should be interdependent parts of a unified management system (Ballard, 2000). Mattos (2019) emphasizes the importance of having a data collection system for planning effectiveness and adjustments.

The Mobile Networks department at Proef has a dynamic operational environment demanding swift responses, flexibility, and effective management. It faces challenges in planning and control due to reliance on an Excel-based system which creates difficulty in updates, lack of global visibility, ineffective communication, and dependence on individual knowledge.

This project's main goal is to implement a platform to simplify the process of planning and control, allowing for real-time communication, geographical team viewing, and data collection on task performance to create and analyze performance indicators. To accomplish this, firstly, gaps in the current planning and control methods will be identified and analyzed. Secondly, requisites will be gathered to guide the development. Afterward, an initial prototype will be created. The implementation of specific features will be made progressively, continuously seeking validation of the prototypes through tests and operational feedback. Lastly, the final version of the platform will be tested, and its impact will be evaluated on the department's operational efficiency.

It's expected that the platform will contribute to continuous improvements, pushing for operational efficiency.

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PROCESS OPTIMIZATION IN THE RETAIL SUPPLY CHAIN WITH A FOCUS ON AUTOMATIC ORDERS

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Keywords

Supply chain management, process automation, optimization, efficient stock management, automatic ordering, operational efficiency.

Abstract

In the era of process automation and optimization, efficient supply chain management has become a crucial element for the success and competitiveness of companies, especially in the food retail sector. Given that meats are perishable items of great sensitivity, correct management of existing stocks, both in warehouses and stores, becomes extremely important.

In this dynamic context, this project presents itself as a follow-up to the implementation of automatic ordering in the meat sector in the 94 LIDL stores in the Northern region, an initiative aimed at revolutionizing the company's supply processes. The main objective is to optimize the order management process in the company's supply chain, improving operational efficiency and the quality of service provided to customers.

To achieve this objective, an action research will be conducted, which will include monitoring the implementation of RELEX, analyzing the process, and proposing improvements. It is expected, therefore, to obtain crucial results for the business, such as increased efficiency, decreased volume of losses, cost reduction, and, above all, satisfaction of employees and customers.

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DIGITAL TRANSFORMATION IMPACTS IN MANUFACTURING DECISION-MAKING PROCESS

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Keywords

Digital Transformation, Document Management, Decision-making in Manufacturing, Digital Transformation in Manufacturing

Abstract

The current project takes place in a manufacturing company where an important part of the production process includes documentation management, which is currently fully manual. The subject was proposed by the company where the project is developed because of an internal necessity. Browning Viana operates on weaponry production market for civil use. So, the export licensing process is mandatory from both company's and export countries. For each weapon delivered, both shall be available.

To undertake such an endeavor, the current process is analyzed, and intervention points shall be identified. The ideation process for each intervention point shall bring to light the solutions to be implemented. The planning stage must follow ideation and proceed with the implementation.

Digital era is changing how markets behave, either because consumers are changing, or because new business models are emerging, and, with them, new competitors. The manufacturing industry is no exception. Pressure on companies to be fast to adapt to changes is increasing. Among other reasons, production is becoming more and more automated, and technology enabled, making it faster and data-driven, which, in its turn, makes it prone to optimization and non-added-value components reduction. As this scenario becomes normal for large companies, the pressure will increase on others to take steps towards digitalization. However, the digital transformation (DT) process brings many challenges. DT is not just about applying technology to processes; a deeper change is needed to fully embrace the concept and make it a long-run sustainable option. Identifying those challenges to uncover a solution for a real case is the goal of the current project, more specifically in the context of the first steps into the implementation of a Digital Supply Chain (DSC).

IMPLEMENT A POKA-YOKE MANAGEMENT PROCESS IN AN AUTOMOTIVE COMPANY

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Keywords

Automotive Industry; Quality; Poka-yoke;

Abstract

This project will mitigate the gap of assessing whether the current test algorithms of the anti-error systems have the necessary capacity to detect and approve parts that are within specifications and reject parts that are outside the specifications.

This project's overall objective is to enhance the Quality Management System of an automotive company by developing an online tool that allows the clear and easy definition of anti-error systems and characteristics to be monitored by line and product, with the aim of reducing the number of customer complaints and, consequently, improving the organization's quality and customer satisfaction.

"Poka-yoke" is a Japanese term that means "mistake-proofing" or "error prevention." It refers to any mechanism or process that helps an equipment/operator prevent failures. The concept was developed in the manufacturing industry by Shigeo Shingo, an engineer working for Toyota as part of the Toyota Production System.

The methodology that will be used for the problem-solving will be the DMAIC. It will allow a structured definition of the problem to be solved enabling the correct definition of the root causes to be addressed and the implementation of the corrective/preventive actions required.

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OPTIMISING PROCESSES AND REDUCING WASTE IN THE JEWELLERY MANUFACTURING PROCESS

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Keywords

 Planning, Kaizen, Monitoring, Improvement, Lean Manufacturing

Abstract

In today's business environment, the search for efficiency and operational excellence is a constant, and various methodologies and tools are used to achieve this. Some of these include Value Stream Mapping Planning, Early Identification of Waste, Development of Work Standards, Kaizen Event Planning, Employee Training and Preparation and Monitoring and Control of Improvement Measures.

The main objective of this work is to carry out a detailed analysis of the production processes of a company dedicated to the manufacture of jewellery pieces and to propose improvements using the principles and techniques of Lean Manufacturing. The aim is to increase operational efficiency, reduce waste and guarantee the quality of final products.

To this end, the process will be restructured, where information will begin to be digitised, an information flow will be created (order, manufacturing order and invoice), where it will be possible to trace the entire process. For stock management, article structures will be created, where consumption will be recorded, and stock will be better controlled.

With this implementation, production will flow better, it will be possible to access printed manufacturing orders, instead of the current manual orders, and quickly understand the item to be produced by attaching a photo. When starting stock management, it will be possible to check if there is stock and what the manufacturing needs are.

For greater efficiency, labels will be created to identify stock boxes.

In the Lean methodology, 8 types of waste have been identified, which represent areas of inefficiency in production processes or operations (Marinho, 2023).

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Keywords

Logistics, Picking, Optimization of logistics processes, Warehouse management, Operational efficiency

Abstract

Operational efficiency is essential for company sustainability and competitiveness. This project explores the strategic importance of logistics in order to optimize its performance. Logistics is a strategic function that encompasses a complex network of activities involving the planning, execution and control of resources to meet the needs and expectations of customers. The correct management of resources and supply networks is fundamental to the efficiency and competitiveness of organizations.

The aim of this project is to promote efficiency gains, reduce costs and increase the productivity of Proef's logistics processes. To this end, a study will be carried out, based on the simulation of a restructuring of the company's current layout, which is expected to reduce the distances covered in the picking process by more than 80%, making the process faster and more accurate, thus contributing to greater logistical efficiency and, consequently, a reduction in operating costs. In addition, it will also have an impact on the company's overall productivity, as it reduces picker fatigue, allowing them greater productivity and more time to carry out other logistical tasks.

Restructuring the layout will lead to greater logistical efficiency, and will have a direct impact on customer satisfaction, staff productivity and a reduction in operating costs. The project work will provide evidence to prove that layout restructuring is a strategic investment with significant benefits for the long-term sustained success of the company.

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DEVELOPMENT AND IMPLEMENTATION OF A MAINTENANCE PLAN IN A DISPOSABLE MEDICAL DEVICES COMPANY

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Keywords

Maintenance, equipment, plan, improvement

Abstract

With the increasing competitiveness in the global market, companies need to develop and improve, and increase the quality of their processes in order to aim for success. Thus, this project intends the continuous improvement of a producer of disposable medical devices company, with the development of a maintenance plan to increase the equipment availability index, thereby reducing unplanned (Moubray, 1997). In this way, it will be possible to increase the quality of the company's production line processes, thus increasing its productivity.

The methodology used in this project consists of action-research since it will be possible to verify theoretically grounded research on maintenance, its forms, its origin, some tools, and possible performance indicators to use in the project. This literature base will underpin all the work done on the factory floor of the mentioned company. Thus, we will have two aspects in this project, one of research and another of implementation, which will allow obtaining more complete and better-developed results (Coghlan & Shani, 2014).

The project phases vary between data analysis and collection, such as equipment failure histories, to plan implementation, with the choice of preventive actions to use, their periodicity, and importance. After the plan implementation, all maintenance technicians will be trained to standardize procedures, and finally, there will be an analysis of indicators to ensure the improvement of equipment availability.

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LAYOUT OPTIMIZATION OF A ELETRICAL HARNESS AND ELECTRO-MECHANICAL STRUCUTRES ASSEMBLING INDUSTRY

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Keywords

Layout planning; Optimization; Industrial layout; Lean production.

Abstract

This work has been carried out as part of the thesis for a master's degree in industrial management and engineering at Instituto Politécnico do Cávado e Ave. The main goal of this work is to plan the new layout of a electrical harness and electro-mechanical structures assembling industry, once this company will change his production facilities to another building.

The specific goals include a diagnosis to the actual situation of the company, describing and analyzing the current layout, plan and implementing the new layout.

To carry out this work, an action-research methodology was adopted. A critical review of the literature was performed for better understanding themes around layout planning such as types of production, types of production layout, layout planning methods, lean production, lean tools, and simulation tools. Articles, thesis, and case studies were analyzed aiming to choose the layout planning method most adapted to the situation of the company in study and to understand which are the indicators that should be used to evaluate the layout performance and the success of the new layout implementation.

The work carried out so far allowed to define the use of the DMAIC methodology to answer the layout optimization problem. The use of this methodology will make possible to evaluate the current performance of the factory, identify the most critical problems in the current configuration, analyze the causes of these problems, develop a new configuration, and choose the best solution to improve the current layout configuration.

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MASTER IN DIGITAL GAMES DEVELOPMENT ENGINEERING

COLLABORATIVE MULTIPLAYER VIDEOGAME FOR HOSPITALIZED CHILDREN

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Keywords

Hospitalization, Children, Pediatric, Stress, Videogame

Abstract

Hospitalization has been identified as stress-inducing event that potentially contributes to depression and anxiety among children. Several researchers have identified stressful experiences for children in the hospital such as being sick, fear of the unknown (Carney et al., 2003), having activity restrictions and decreased independence, missing school, isolation, being in an unfamiliar environment, and loss of self-determination (Coyne, 2006; Lindeke, Nakai & Johnson, 2006).

Play activities may comfort children from stress, allowing them to mentally distract from the hospital environment. Engaging children in play activities while in hospital can enhance their coping skills and relieve stress, leading to improved psychosocial adjustment both to their illness and to the fact of hospitalization (Li et al., 2016). Interventions aimed at alleviating stress in children during hospitalization not only have the potential to reduce immediate stress but also to shape how they perceive and manage future experiences.

To address the issue of isolation in hospitalized children, promoting socialization between them, and help distract them from the negative aspects of hospitalization, a 3D collaborative multiplayer videogame (prototype) will be developed. The target demographic for this game will be in-patient children between the ages of 6 to 13 years.

The primary objective of the project is to understand if a multiplayer collaborative videogame can have a positive impact, on hospitalized children, in terms of psychological and emotional effects accessed by a questionnaire (developed in collaboration with a psychologist). Giving the children the opportunity to social interact with others in the same condition, through game activities and voice, normalizing the hospitalization journey. Along with this, some aspects of the game itself, as gameplay and usability, will also be tested by a questionnaire given to the children. Statistical analysis will be conducted to compare results across different data values. The optimal approach for this analysis is under consideration.

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WEARABLE TECHNOLOGY APPLIED TO VIDEOGAMES AS A MEAN OF INCREASING IMMERSION AND GAME QUALITY

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Keywords

Wearable Technology, Gaming, Players, Developers, Immersion

Abstract

Wearable technology refers to devices worn on the body that incorporate advanced sensors and connectivity features to enhance daily activities. In the realm of gaming, wearable tech has evolved to elevate player experiences and immersion. Initially used for basic fitness tracking, wearables now contribute to creating more engaging and interactive gaming environments. In gaming, wearables offer unique opportunities to enhance user engagement by providing real-time biometric feedback, such as heart rate and body movement, which can influence gameplay dynamics. For instance, fitness trackers can be integrated into sports or adventure games to measure physical exertion, affecting in-game character performance. Additionally, virtual reality (VR) headsets serve as a prominent example of wearables, transporting players to immersive digital worlds.

Analyzing the implementation of wearable tech in the gaming industry involves a multifaceted approach. In this dissertation, the goal is to firstly analyze and assess user preferences and comfort to ensure seamless integration. Secondly, understand which biometric data responsibly enhances gameplay without compromising player well-being. Thirdly, propose a concept of product that would allow players to have a high degree of immersion and allow developers to produce a higher quality product with increased ease of development.

The implications of this work are substantial, focusing on the health of gamers by monitoring real-time physical effects of gaming, thereby enhancing immersion while prioritizing player well-being. This research will contribute valuable insights into the responsible integration of wearable technology in gaming, advancing the knowledge base in this field. Furthermore, it will provide a framework for developers to create more immersive and health-conscious gaming experiences.

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SERIOUS GAME FOR LINEAR ALGEBRA TO AID HIGHER EDUCATION STUDENTS

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Keywords
Education, Linear algebra, Serious games.

Abstract

Learning technologies have now become an essential component of learning and teaching methods. Recent studies indicate that, to use these technologies effectively, both teachers and students must be able to master a certain set of skills, generally referred to as digital literacy competences (Silber-Varod, Eshet-Alkala, & Geri, 2019). Students need to feel that the content is compatible with their learning preferences, coherent with their personal learning objectives and related to previous curriculum modules (Bolliger, Supanakorn, & Boggs, 2010) .

The aim of this project is to create a game that will aid students in linear algebra, particularly in matrices operations. The use of row operations on matrices is the basis for most of the concepts covered in linear algebra, so mastering them as well as using them effectively is fundamental to preventing unnecessary errors that sometimes cost time when solving problems. There will be a series of matrices for players to work through while guiding them through the steps necessary to improve, which means that the player can go through a range of stages and obtain feedback for each choice they make making them more proficient in problem-solving. This game will be play-tested on students attending linear algebra for the first time, with different levels of baseline knowledge. Subsequently, two groups of students will undertake a theoretical exam to gauge the impact the game will have on the overall performance.

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UPDATING TEACHING: EXPLORING THE IMPACT OF GAMIFICATION AND LEVEL DESIGN TECHNIQUES IN VIDEO GAMES IN PHYSICS EDUCATION

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Keywords

Education, Physics, Video Game, Game-Based Learning

Abstract

Physics Education is essential for a student's early curriculum as it engages them in the science mindset and help stimulate critical thinking and problem-solving skills. Despite this, physics education often brings problems in terms of student engagement due to the presence of abstract and conterintuitive contents [1].

Game-Based-Learning (GBL) research, which is already proving to be a successful approach [2], is currently with challenges on how to create a video game that maximizes learning performance while maintaining students' engagement [3]. This study aims to create a video game that enhances educational outcomes by combining established design principles with new techniques, tested in a school setting to assess student performance and engagement, potentially addressing the decline in academic performance noted in the recent PISA report [4].

This study will follow a pre-post test Quasi Experimental design, organizing different classes into two different experimental groups: one traditionally taught; and the other taught with the aid of the game. Knowledge and affective outcomes will be analyzed through the comparison of the pre and post tests, and through a survey about the game, respectively. The experiment will be divided into three sessions to test the game and to administer the tests.

With this study we hope to contribute to game-based learning research, and based on the systematic review made for this study the results are expected to be positive in both metrics that are to be observed.

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BRAGA CITY CENTER IN 1750

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Keywords

Abstract

Heritage foundations worldwide have been constantly on the lookout for emerging technologies to aid in the communication of Cultural and Historical Heritage. Students have shown poor results in the subjects of history and geography [IAVE] being one of the worst scoring subjects in Portugal, and consequently have shown some disinterest in the matter [Cascão, I., 2017]. In recent years Virtual Reality has presented itself as a leading proponent in this field.

'Braga city center in 1750' is a virtual reality exploratory experience which sources a book named Mapa das Ruas de Braga from 1750, that depicts the city of Braga as it was in the 18th century. This book contains drawings in an orthogonal perspective of the 70 streets and more than 4000 houses existing at the time. The goal of the project is to recreate these streets, buildings in VR and allow users to explore and immerse themselves in the city as it was in the 18th century, tasting a possibility of what it was like to live back then, observing cultural depictions of not just buildings but also people.

This dissertation looks to further understand what role VR could play in this field, making a prototype of the project available in a public setting, and submitting the users to a questionnaire that evaluates their prospects or detractions, outlook and excitement towards the use of this technology.

Looking at previous similar projects[Boffi et al., 2023], we expect to find a reported increased interest and motivation in exploring Cultural Heritage and History through this medium of Virtual Reality.

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FEMALE GAME DEVELOPERS IMPACT ON VIDEO GAME REPRESENTATION AND DEVELOPMENT

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Keywords

Women, Representation, Videogame, Industry, Development

Abstract

The inclusion of women in the workspace, explicitly, the game development teams is necessary to create accurate female depictions in videogames and deconstruct sexist stereotypes within the industry. Despite this fact, the industry currently struggles in implementing a system of equity within the development team, that would allow female developers to progress character tropes and traits.

The state-of-the-art provides an insight on the development of inclusion of female roles within the industry, however scarce proves to be a competitive advantage not many companies take, it also considers external factors like the relationship between gamers of different sexes.

The research conducted is meant to bring up a conversation regarding characterization of female characters with the assistance of female developers, in addition to studying the conditions of female gamers amongst gaming and within the industry.

Investigating how gaming publishers and companies can include gender-inclusive design patterns and classify these patterns, diversify character representation, be an outlet to empower women and the creative contributions of women. Additionally, seek to understand the complex ways in which multiple identities intersect and influence representation in video games.

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GAMIFIED INTERCULTURAL NARRATIVITY: EXPLORING "MOBEYBOU IN ANGOLA" IMPACT ON THE DEVELOPMENT OF CHILDREN

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Keywords

Video Games, Children, Multicultural Knowledge, Digital Literacy, Narratives

Abstract

Digital literacy is crucial for children navigating today's information landscape (Maqsood, 2018). While traditional teaching methods remain valuable, they need to adapt to engage students in a digital world (Robles-Bykbaev et al., 2019). However, research suggests that traditional classroom technology use often fails to prioritize child-centered learning through play (Sylla et al., 2016). This highlights the need for innovative approaches that leverage technology to create engaging learning experiences.

This study focuses on the development and evaluation of an educational application called "Mobeybou in Angola," designed to teach Angolan culture to children aged up to 12. The app features simple touch-based gameplay tailored to require minimal digital literacy, ensuring accessibility for young users, combining gameplay with educational content and storytelling elements to foster a more engaging and interactive learning experience. To measure learning outcomes, initial interviews will assess children's pre-existing knowledge of Angolan culture. Following interventions using the app, semi-structured interviews will be conducted to evaluate learning gains. This approach enables the assessment of the app's efficacy in facilitating cultural learning and knowledge retention.

Additionally, the Leuven scale will be utilized to measure user engagement and involvement while using the app. Observations will focus on indicators such as user focus, joyfulness, and overall well-being during app interaction. This holistic evaluation approach provides insights into the app's ability to captivate users and create positive learning experiences.

This data will be analyzed to evaluate the app's effectiveness in completing the expective objectives, e.g. to foster child-centered learning about different cultures, by creating a fun and engaging experience, fostering not only cultural knowledge but also cognitive development and improved classroom engagement.

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MASTER IN APPLIED ARTIFICIAL INTELLIGENCE

MACHINE LEARNING ALGORITHMS APPLIED TO INTRUSION DETECTION SYSTEMS

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Keywords

AI-based IDS, Cybersecurity, Intrusion Detection System, Machine Learning, Nvidia Jetson Nano

Abstract

Artificial Intelligence has proven its value in multiple fields. Cybersecurity is one of the critical fields that due to its importance and evolution needs AI to protect the systems against hackers (Abdallah, Eleisah, & Otoom, 2022). Intrusion Detection Systems (IDS) play an essential role in the Cybersecurity environment due to their behaviour of detecting intruders in network traffic. Even though it's not possible to prevent these attacks, it is possible to know that they happened and if so, apply procedures related to each type of incident. The problem to be addressed in this research, the use of AI in IDS, is based on a classification problem that consists of distinguishing between benign traffic and various attack types. AI-based IDS are already in the Cybersecurity market, but researchers affirm that there is more need for research on improvements and challenges related to the IDS (Xin, Kong, Liu, & Chen, 2018).

This research contributes with an updated exploratory data analysis of the most recent datasets, a study of feature importance showing that using less than half of the total number of features we can achieve similar performance, with machine learning algorithms, a parallel training of ML algorithms that can speed up execution to more near than half of the sequential time needed, an explainable AI study that shows the impact of each feature to the classification process (Timilsina, Sahal, & Serrano, 2021), and finishes with a proof of concept of an embedded AI-based IDS ready to use with a updated version of the cicflowmeter software and a web interface developed in Python.

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MASTER IN INTEGRATED SYSTEMS OF MANAGEMENT QES

PSYCHOSOCIAL RISKS IN A CARPENTRY INDUSTRY

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Keywords

Psychosocial risks, COPSOQ III, Carpentry industry

Abstract

The new forms of management, changes in the organization, such as shift work, mental and physical work overload, job insecurity, among others, are factors that drive the emergence of emerging risks, such as those of a psychosocial nature (Areosa, 2023).

The impact of psychosocial risk factors has serious consequences for the health of workers, as well as for the productivity of organizations. Thus, it is crucial to adopt models for the diagnosis and control of new sources of risk, which ensure the prior detection and contiguous definition of preventive measures (Neto et al., 2014).

The main objective of this study is to identify, based on the perception of workers, the main risk factors to which they are exposed in their workplace. In addition, it was intended to evaluate the relationship between psychosocial factors and socioprofessional variables. It is also intended to identify the psychosocial risk factors of the organization in order to make the organization aware and sensitize to this reality, which is often camouflaged by work accidents and occupational diseases.

The empirical study will be carried out in a carpentry industry. To assess psychosocial risks, the Copenhagen Psychosocial Questionnaire - COPSOQ III method by Cotrim et al. (2022) was used, in its middle version adapted and validated for the Portuguese population.

At the end of the study, it is expected to have been able to identify the psychosocial risk factors to which workers are exposed, as well as the most vulnerable groups.

In addition, it is also expected to have workers more sensitized to the issue and alert to the indicators of exposure.

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SERVQUAL MODEL AND CUSTOMER SATISFACTION APPLIED IN THE CONTEXT OF

TELECOMMUNICATIONS SERVICES

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Keywords

Quality; Telecommunications; Satisfaction; Service; SERVQUAL

Abstract

In Portugal, according to Anacom (2022), in July 2022, the number of subscribers for residential commercial offers of the main providers of electronic communications services amounted to 13.8 million. With an increasingly limited expected growth potential, telecommunication operators are moving from a strategy focused essentially on attracting new customers to a more defensive strategy focused on retention/loyalty of existing customers (Keramati, 2011).

The present study aims to evaluate the quality of the service provided to their customers by Portuguese telecommunications companies in the context of northern Portugal, over May 2024, to clients who have at least one telecommunications service.

The research method for this study is based on data collection through questionnaire and subsequent statistical analysis, using the SPSS. The data will be collected by means of a survey questionnaire, applying the adapted SERVQUAL model (Parasuraman et al., 1991), the first part comprising 22 items, seeks information about customers expectations regarding an ideal telecommunications service, based on their past experiences. The second part, also comprising 22 items of the questionnaire aims to gather information about customers perceptions of your telecommunications service, which will be distributed to customers through digital social media platforms or email.

In this sense, and similar study carried out in other countries, Al-Shamsi et al. (2023), carried out in Ghana the Comparative Analysis of the Quality of Services in Telecommunications Services of Public and Private Companies, published in the book "Advances in Information and Communication" is a useful approach to evaluate the quality of services.

This study will allow you to identify discrepancies between customer expectations and perceptions, facilitating the analysis of priority requirements to meet their needs, to assess possible points for improvement.

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PREVALENCE OF SYMPTOMS OF WORK-CONNECTED MUSCULOSKELETAL DISORDERS: IDENTIFICATION OF THE MAIN SYMPTOMS IN A TEXTILE INDUSTRY

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Keywords

Occupational Health, Occupational Safety, Work-Related Musculoskeletal Disorders (WRMD), Nordic Musculoskeletal Questionnaire (NMQ), Symptomatology.

Abstract

Work-related musculoskeletal injuries represent a public health challenge, causing financial, physical and social problems. The motivation for carrying out this study stems from the significant temporary or permanent incapacity of workers, resulting in a reduction in quality of life and, in addition to the effects on workers, increased costs for companies. Society is also affected by the high costs of health and rehabilitation services for workers. Work-related musculoskeletal injuries can be avoided if preventive measures are implemented in labor organizations, reducing the problems for workers, companies and society.

The study will identify the prevalence of symptoms of work-related musculoskeletal injuries and aims to understand the main positions with incidence of symptoms in a textile company. It is hoped that the study can serve as a starting point for the early recognition and identification of workers at risk, as well as for possible preventive intervention in the workplace, assuming a high prevalence in the lumbar regions, neck and shoulders. The self-administered and confidential questionnaire called Nordic Musculoskeletal Questionnaire, adapted from the Portuguese version, will be used for data collection. The sample will include workers from the company Confecções Lemos & Moreira Lda, where it is expected to recognize the incidences in the 9 anatomical regions where the most complaints are found, the overall prevalence of symptoms in the last 12 months, in the last 7 days and identify the positions with the highest prevalence of symptoms. The data obtained will be analyzed and organized in an electronic MS Excel file.

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DEVELOPMENT OF THE MUNICIPAL SUSTAINABILITY REPORT OF THE MUNICIPALITY OF ESPOSENDE

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Keywords
Sustainability, MSI, SDGs, Sustainability Report, Municipality of Esposende

Abstract

Sustainability is mainly divided into three dimensions: social, economic, and environmental (Caradonna, 2022). With concern and implementation of it, was created the Agenda 2030, with the Sustainable Development Goals (SDGs), to meet goals established, based on the analysis of certain indicators (BCSD Portugal, 2022), applying worldwide.

In Portugal, there are several Municipalities that adhere to the objectives, but only a few have carried out the analysis using the Municipal Sustainability Index (MSI) (Abreu *et al*., 2023), and the Municipality of Esposende is not one of them.

The main objective of this work is to create a Sustainability Report, analyzing the knowledge and, mainly, the measures taken by the Municipality of Esposende about the SDGs.

As such, the Municipality of Esposende, decided to carry out the Report, based on the previously developed Sustainability Plan and the MSI model developed by CESOP (Center for Opinion Studies and Polls) (Abreu *et al*., 2023), carrying out as a study case using data analysis, more specifically statistical analysis of values obtained by the Municipality and statistical data bases.

The 17 SDGs are analyzed, comparing with values at national level, North region, Cavado area, and with values for socioeconomically comparable Municipalities, considering that the indicators will be standardized, and limits will be defined. A global analysis is made, using the 5 Ps (People, Prosperity, Planet, Peace, and Partnerships) and by GESE (Governance, Economy, Social, Environment) (Abreu *et al*., 2023).

Considering that the Municipality is developing projects and goals for the sustainable development, there are great hopes and probability that the Municipality is doing its part, although there is still no way to confirm that they are complying (Silva, 2021). Some of the indicators are already analyzed, but still without a conclusion about any SGDs. The Municipality's progress is like the country's progress itself, with most of the indicators analyzed showing progression towards the 2030 objectives or having achieved the goal. As such, the final objective will be to carry out an analysis in which realistic goals can be established.

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RAISING QUALITY STANDARDS: THE PATH OF ISO 9001:2015 IN A TELECOMMUNICATIONS COMPANY

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Keywords

ISO 9001:2015, Quality Management System (QMS), Continuous improvement, Telecommunications

Abstract

This project outlines the implementation of a Quality Management System (QMS) compliant with ISO 9001:2015 within a telecommunications company. It aims to enhance process efficiency, customer satisfaction, and organizational competitiveness. The methodology integrates qualitative and quantitative research methods, starting with a comprehensive analysis of existing processes, systems, and organizational culture. Stakeholder consultations and employee engagement initiatives will follow to ensure alignment with organizational objectives.

Expected outcomes include improved process efficiency, product quality, and regulatory compliance. However, potential barriers such as resistance to change and resource constraints may impede progress. Strategies to overcome these barriers will include robust change management protocols and targeted training programs.

In conclusion, this project seeks to transform the QMS into a strategic asset, driving organizational growth and operational excellence in the telecommunications sector. By addressing methods, expected outcomes, and potential challenges, it offers a roadmap for ISO 9001:2015 implementation, contributing to the advancement of quality standards within the industry.

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ANALYSIS, IMPLEMENTATION AND OPERACIONALISATION OF NP ISO 45001:2019 IN A PORTUGUESE ORGANIZATIONS: CASE STUDY

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Keywords

Ocupational Health and Safety, Ocupational Health and Safety Management Systems, NP ISO 45001:2019, Safety Culture, Gap Analisys

Abstract

Ensuring Health and Safety at the workplace is not only a legal obligation, but also an area that is increasingly valued by several stakeholders as costumers and workers.

Occupational Health and Safety Management System is a tool that aims to help companies define, implement, maintain, and improve strategies, mostly inductive, to mitigate risks and enhance opportunities regarding Occupational Safety and Health. This standard also promotes a better safety culture in organizations. Implementing NP ISO 45001:2019 is increasingly becoming a social responsibility marketing strategy and demanded by brands in the textile sector with strong sustainability strategies.

Through a deductive methodology, this case study aims to implement NP ISO 45001:2019 in a Portuguese textile company as well as evaluate the safety culture evolution. This company is an SME operating in the textile sector and dedicated to the dyeing and finishing of circular knitwear. The implementation of this standard will be carried out in three phases:

Diagnosis – Evaluation of the legal and regulatory requirements applicable, followed by an initial audit to determine the current state of the company. A Gap analysis will then be carried out.

Implementation – Implementation of the action plans defined in the Gap analysis and development of questionnaires to be applied in the next phase.

Validation and Evaluation – Performing of a follow-up audit to understand the company's evolution and apply the questionnaires to assess the evolution of the safety culture in the organization.

At the end of the three steps methodology implementation, it is expected that the company is able to certify through the standard NP ISO 45001:2019 and conclusions about the progress on the Safety culture perspective in the company can be taken.

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A FOOD SAFETY SYSTEM IN A PRE-COOKED MEALS AND DISHES INDUSTRY

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Keywords

Food Safety, HACCP, Veterinarian Control Number, Prerequisites

Abstract

Commission Regulation (CE) n. º 852/2004 of April 29, 2004, imposes on operators in the food sector the obligation to apply the principles portrayed in the HACCP methodology as presented in the Codex Alimentarius.

Therefore, operators in the food sector show a growing interest in implementing quality and food safety management systems that satisfy the requirements of the products purchased by their consumers, making them safer and more nutritionally and visually appealing.

This work aims to implement a food safety system in a company manufacturing pre-cooked meals and dishes and cold storage in accordance with Commission Regulation (CE) n. º 852/2004, based on the Codex Alimentarius and, with reference to NP EN ISO 22000:2023.

It is intended through a case study, using observation methodology, to implement a Food Safety System, because it is through observation that I verify the good and bad practices used in the food industry, carrying out an assessment of the degree of implementation of the prerequisites and, internal audits in order to ascertain the behavior of workers in two moments before and after training actions.

The greatest benefits of implementing a food safety system based on iso 22000:2023, focus, among many others, on better risk management, improved traceability system, global recognition, greater business opportunities.

The implementation of the food safety system is expected to produce safe products, improve production practices, increase control over the verification of good hygiene practices, as well as comply with all requirements in the context of food inspections official controls.

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ESTUDY ON BURNOUT AMONG EMPLOYEES OF A COMPANY IN NORTHERN PORTUGAL

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Keywords

Burnout, Psychosocial Risks, Maslach Burnout Inventory.

Abstract

Burnout stands as one of the most detrimental factors affecting the health and well-being of workers, inflicting substantial damage to mental health. This condition falls under the category of organizational-induced pathologies, resulting from the way work is organized. Among these factors are high levels of stress and anxiety, low autonomy and excessive control over workers, lack of adequate rewards and recognition, work overload and intense emotional demands, imbalance and injustices in labor relations as well as toxic dynamics among colleagues (Areosa & Queirós, 2020).

Work-related stress is the second most common health problem in Europe, just after musculoskeletal disorders. This can result in absenteeism and/or early exit from the labor market, leading to significant human and economic losses (Aleksynska M et al., 2019).

The most commonly used instrument for assessing Burnout has been the Maslach Burnout Inventory with confirmed validity and reliability indices, which is why it is intended to be used in this study, adding a set os questions aimed at evaluating sociodemographic and socioprofessional factors. For administrative workers, the questionnaire will be sent via email, ando for operacional workers, the questionnaire will be answered in person during Health and Safety audits conducted by Occupational Health and Safety Technicians.

The obtained results will allow assessing Burnout trends within the organization, as well as uncovering, pursuing, and delving into other variabes that may emerge in this field of study.

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FIRE SAFETY IN ORGANIZATIONS - PREVENTION AND PROTECTION STRATERGIES

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Keywords

Fire safety, Emergency organization, Self-protection measures, Textile industrie, Questionnaire

Abstract

Accident prevention is the best way to reduce the chances of fires occurring in the workplace. Prevention methods consist of adapting a set of protective and anticipatory measures to ensure that the physical safety of persons cannot be put at risk. [1] Thus, looking for methods that are more effective in prevention and guidance in the event of an emergency linked to fires as I intend to show a panoramic and safe path for everyone with tools and training to reinforce in prevention against the beginning of fire.[2]

The main objective of this work is to study and analyze two companies in the textile sector where there are 137 employees in the 2 companies where the dissertation intends to highlight the importance of fire safety organization. Visits to the company are carried out to learn about the structuring, soon after, a questionnaire will be carried out to the employee based on conclusion, in this way the questions will be carried out via email and printed, being made available in May 2024, soon after the results will be analyzed. It shows how good functionality is essential to act until the arrival of external help, it is essential to have an internal structure, with organized, trained and qualified people, in order to ensure speed and effectiveness in the actions to be carried out to control the various risk situations that may occur.[3]

In this way, show the importance of preventing and controlling the occurrence of fires and other emergencies, as well as minimizing their negative effects. To achieve this goal, it is necessary to establish prevention measures, such as the proper installation and maintenance of firefighting systems, training of personnel, adoption of fire and emergency safety measures in buildings, among others. It is also important to be prepared to act in emergencies, with regular evacuation training, emergency plans, and quick and effective actions to minimize the damage caused.[4]

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[1] Amended by Ordinance No. 135/2020 of 02-06-2020, Article 2 - Amendment to the annex to Ordinance No. 1532/2008, of 29 December.

[2] Edition: National Civil Protection Authority / National Directorate of Emergency Planning Authorship: Planning Unit / Emergency Planning Unit, Availability on: http://planos.prociv.pt, 2022.

[3] Decree-Law No. 220/2008, of 12 November LEGAL REGIME OF FIRE SAFETY IN BUILDINGS –SCIE 5th most recent update (Decree-Law No. 9/2021, of 29/01).

[4] Approves the Technical Regulation for Fire Safety in Buildings (SCIE) Ordinance No. 1532/2008, Decree-Law No. 220/2008, of 12 November.

CHARACTERIZATION OF THE VARIABLES INFLUENCING EXPOSURE TO IONIZING RADIATION BY PROFESSIONALS INVOLVED IN RADIOPHARMACEUTICAL PRODUCTION

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Keywords

Abstract

Nuclear Medicine is a medical specialty that uses radiopharmaceuticals to study the metabolism and function of the human body (Khalil, 2011). Radiopharmaceutical production is a highly specific area of the pharmaceutical industry, with only two authorized production sites in Portugal. All processes are highly controlled, specific, and dependent on ionizing radiation (Ordem dos Médicos, 2006).

Despite the constant evolution of this field, there is still a lack of public knowledge on the subject due to the shortage of studies in the literature. It is therefore crucial to assess the level of occupational exposure to ionizing radiation faced by professionals, due to the risks and duration of exposure they experience daily. This dissertation aims to identify the variables that influence this exposure, the tasks with the highest risk and the associated dosimetry.

This study will be an observational cross-sectional study of an exploratory nature. It´s non-experimental, and the data collected will be analyzed using inductive and descriptive statistical methods. Data collection is intended to be conducted through a questionnaire for professionals involved in radiopharmaceutical production industry, using a non-probabilistic convenience sampling method. The data collected will be stored in a *Excel* database and statistically analyzed (*IBM-SPSS-Statistics*).

Variables such as professional experience, academic qualifications, workload, and the degree of process/task automation are anticipated to influence exposure to ionizing radiation.

The expected results from this study may point that subjects which are more exposed to ionizing radiation are the engineering department and dose limits collected should not exceed the values stipulated by legislation.

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STUDY OF THE RELATIONSHIP BETWEEN WORKING CONDITIONS AND QUALITY OF LIFE AMONG YOUNG WORKERS

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Keywords

Quality of life, working conditions, young workers, health and safety at work, decent work.

Abstract

As the conditions in which people work are influenced by society's social structures, individuals withless power and fewer political, economic, social, and cultural resources are exposed to poorer working environments and unemployment (Dahlgren & Whitehead, 2006). Young people are prevalent among these vulnerable groups, facing precarious working conditions such as unstable contracts, low wages, underqualified jobs, and long and irregular hours (Organização Internacional do Trabalho, 2017), as well as a higher susceptibility to workplace accidents (European Agency for Safety and Health at Work, 2007).

This paper aims to investigate the relationship between working conditions and the quality of life of young workers in Portugal, analyzing the key factors and implications for their well-being and personal satisfaction.

This study will utilize a non-probabilistic sample and the snowball sampling method to collect data from young workers aged 18 to 30. The research aims to evaluate their perceptions of working conditions and quality of life, employing a quantitative approach for analysis. Data will be gathered through a questionnaire, developed based on existing surveys and social responsibility norms, and analyzed using Microsoft Excel and SPSS.

The expected outcome of this work is to identify precarious working conditions affecting young workers and assess their repercussions on quality of life This research aspires to raise awareness among employers, politicians, and stakeholders regarding the crucial necessity of addressing the specific needs of young workers in Portugal.

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NORMALIZATION OF THE TEACHING-LEARNING SUB-PROCESS ACCORDING TO ISO 9001 AND A3ES REFERENCE IN A HIGHER EDUCATION INSTITUTION

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Keywords

ISO 9001, Internal Quality Assurance System, Higher Education, A3ES

Abstract

The growth in the supply of higher education, not only in Portugal, but also worldwide, has led higher education institutions (HEIs) to look at quality as a necessity and an added value in the positioning they want to assume, in a sector where supply is high and demand tends to decrease in the face of demographic constraints (Sá, 2019).

The Bologna process has reformed higher education. Law No. 38/2007 of 16 January approves the legal framework for the evaluation of higher education and establishes the main rules and procedures for the establishment of the Internal Quality Assurance System (IQAS), in line with European guidelines and standards (Cardoso et al., 2017; Sin et al., 2017).

The main objective of this project report is the normalization of the Quality Management System in accordance with the requirements established by the NP EN ISO 9001:2015 and A3ES standards, to the Teaching-Learning process at the Polytechnic Institute of Cávado and Ave (IPCA).

The methodology for this case study is based on collective interviews and semi-structured individuals.

It´s expected that at the end of this project it will be able to achieve the proposed objectives and provide the necessary support for an effective and dynamic IQAS.

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SUSTAINABLE EVENT MANAGEMENT AT THE VODAFONE PAREDES DE COURA FESTIVAL

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Keywords

Sustainability, Events, Event Management, Sustainable Event, ISO 20121:2012

Abstract

According to Ranzan (2016), major events, both nationally and internationally, generate a panoply of benefits for the locations where they take place. Although holding an event has multiple advantages for all parties involved, the resulting environmental impacts must also be taken into account. In order for events to be held in a more sustainable way, it is imperative to comply with the Principles of Sustainable Development.

The main objective of this work is to identify the aspects necessary for the application and implementation of the ISO 20121:2012 standard - developed with the aim of outlining methodologies for applying a Management System in event planning and dealing with the challenges related to sustainable development - at the Vodafone Paredes de Coura Festival. Rock in Rio was a world pioneer in certifying this standard.

Since the first edition, the VPC has shown its environmental commitment, and in 2023 it was recognized by the Sê-lo Verde Program as having the best environmental sustainability practices at national level, making the event a strong candidate for certification to the standard.

The stages outlined for the development of the project include analyzing the event´s documents, collecting data during the Festival and critically analyzing the results. Questionnaire surveys and focus meetings with the organization will be used to gather information. A specific questionnaire will be drawn up with questions to assess the target groups' knowledge of sustainability.

It is hoped that the application of the Sustainable Event Management System will lead to a reduction in environmental impact, an increase in financial sustainability and community involvement, an improvement in the festival's image and an increase in operational efficiency, as well as a more conscious and educational experience for the public.

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IMPLEMENTATION OF THE NP ISO 45001:2019 STANDARD IN A COMPANY IN THE RENEWABLE ENERGY SECTOR

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Keywords
Health, Safety, Work, System, Management

Abstract

In the current context, the demand for compliance with regulatory requirements is increasing in different market sectors. Companies that want to position themselves strategically must therefore invest in their management systems and, consequently, in the improvement of processes that will help improve their performance and build solid foundations for their development. In this sense, the ISO 45001 standard has become an instrument that allows any organization that wishes to establish and implement the international health and safety management system, regardless of its size, type or nature, to maintain and constantly improve its performance in this area (Kleinová & Szaryszová, 2014).

The company under study is a relatively recent organization, but already with some reputation at a national level and with the ambition to reach the international market. As such, the implementation of a Management System within the scope of Occupational Health and Safety is mandatory.

The project will be carried out based on the methodology of Research-Action. This method combines research with practical action to solve specific problems in real context. Berg (2004) adds that Action Research is a collaborative approach to research that provides individuals with the tools for action that allows them to solve problems. This project will be divided into 3 phases: Phase I – Diagnosis, II – Implementation, III– Evaluation and Validation. Upon completion of the project, the Occupational Health and Safety Management System of the company under study is expected to be well positioned to obtain NP ISO 45001:2019 certification.

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CHALLENGES AND SPECULATIONS OF THE NEW REALITY OF REMOTE WORK IN THE CONTEXT OF HEALTH AND SAFETY AT WORK

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Keywords

Challenges of health and safety at work, Health and safety at work, Risk assessment, Telecommuting, Work accident.

Abstract

Companies that were once seen as static realities no longer exist and are now dynamic, fragmented, decentralized and dematerialized (Gomes, 2020). Like companies, work can no longer be framed in the same way as in the past, and this change has become more evident with the Covid-19 pandemic. Teleworking already existed in Portugal, but it has now become a widespread practice in most professional activities.

With OSH at its core, the aim is to understand the new problems and current challenges that have arisen in the context of the increase in remote working, capturing the new dimensions of the impact on workers assigned to remote activities. As OSH challenges in companies require the presence of medical and OSH technicians, the aim of this research is to understand the new variables in the context of remote working relationships, to understand the measures implemented by these professionals in the context of teleworking.

To achieve these objectives, a questionnaire survey was administered to teleworkers and interviews were conducted with health professionals, whose data was analyzed.

This study aims to assess how teleworkers perceive teleworking in terms of its advantages and disadvantages. It also seeks to understand whether health professionals have implemented specific measures for professionals who work in this way.

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NAIL DESIGN PROFESSIONALS' PERCEPTION OF CHEMICAL HAZARDS AND RISKS IN THE WORKPLACE - A CASE STUDY IN THE MUNICIPALITY OF BARCELOS

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Keywords

Nail Designer; Risks; Hazards; Occupational Diseases

Abstract

The beauty and aesthetics services have been growing worldwide [1]. In this sense, the growth of the beauty and aesthetics market has enabled the emergence of new technologies for nail beautification, such as the use of gel and polish for artificial nail construction [2].

All workers face significant risks in their professional routine, and risk analysis is the first step to achieve some degree of control over these risks [3]. Professionals working in beauty salons complain of respiratory problems, allergies, and pains in the back, wrists, and neck [4].

However, few studies are found regarding both working conditions and their impact on health outcomes [5]. The overall objective of the dissertation is to characterize the perception of Nails Design professionals in the Municipality of Barcelos regarding the dangers and chemical risks in the workplace, as well as to develop and disseminate educational flyers to be used in raising awareness and consciousness among the professionals.

The exploratory quantitative approach will be used, the case study as a research method and the application of a questionnaire with extensive data analysis as a tool. Thus, the expected results of this work are: Raise awareness among Nail Design professionals about the dangers and chemical risks in the workplace and the use of personal protective equipment, as well as contributing to the literature on the impact of working conditions on the health and illness of these professionals.

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FOOD SAFETY AND INDUSTRY 4.0

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Keywords

Food Safety, Industry 4.0, Technology, Agriculture, Food

Abstract

This dissertation focuses on analyzing the application of Industry 4.0 tools in the food industry, particularly in enhancing food safety. The study will examine how companies at different stages of the industrial chain have utilized advanced technological solutions and how this has contributed to food safety.

Food safety has been a critical issue in the agri-food sector since the early days of industrialization. Modern technological advancements offer solutions that meet companies' needs, enabling them to improve their processes and gain a significant competitive advantage. Thus, this work seeks to investigate the current state of technology adoption in the food industry, identify key tools used, and assess the benefits of their implementation for food safety.

The methodology adopted is grounded in inductive reasoning, focusing on the analysis of companies integrating advanced technologies into their operations related to food safety. Three approaches will be employed: initial observation of facts during visits to industrial units, interviews with professionals responsible for implementing advanced technologies and food safety measures and conducting focus groups with local agricultural farm owners to discuss the feasibility and challenges of adopting these technologies.

Although modern technological advancements are a relatively recent topic, their implications for the food sector are of paramount importance. This study aims to contribute to a deeper understanding of how companies can leverage these tools to ensure the safety and quality of food, addressing the challenges faced by the sector.

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Barcelos, May 23rd, 2024