OPERARIO SENSORIZADO Y ROBÓTICA COLABORATIVA

BOLETÍN DE VIGILANCIA TECNOLÓGICA.

Julio-Septiembre 2021. **CTAG**

ÍNDICE

SECCIÓN I. Operario Sensorizado

SECCIÓN II. Robótica Colaborativa

SECCIÓN III. Eventos Industria 4.0

SECCIÓN I. OPERARIO SENSORIZADO

NOTICIAS

06/07/2021

AI Leveraged To Simplify and Optimise Machine Vision Configurations

Traditionally, to identify defects and scratches in production has required the sensitivity and knowledge of technicians with extensive experience. But owing to rising labour costs and shortage of skilled labour, manufacturers need to automate processes that once relied on the senses of experienced human workers. To solve this challenge in the 'factory of the future', Omron has integrated artificial intelligence (AI) and machine vision to develop two new solutions: 'AI Fine Matching' and 'AI Scratch Detect Filter'. In some cases, AI can now recognise object features as efficiently as humans and automatically learn the critical parameters on the fly.

https://metrology.news/ai-leveraged-to-simplify-and-optimise-machine-vision-configurations/

14/07/2021

Comau y Siemens simplifican la programación de robots industriales

El fabricante de robots industriales Comau ha presentado Next Generation Programming Platform, un protocolo que implementa el estándar de comunicaciones Uniform Robotics Data Interface (URDI) para simplificar la programación de robots. Esta implementación facilita la integración completa de la familia de robots de Comau con Siemens Simatic Robot Library, reduciendo significativamente la complejidad dentro de la automatización de máquinas. Ahora, los operadores de cualquier sector industrial pueden programar fácilmente uno o más robots Comau a través del ecosistema de Siemens que utilizan actualmente para otras aplicaciones y procesos. La interfaz también ofrece ahorros tangibles de

costos y tiempo, ya que todos los productos y células de automatización se pueden administrar sin necesidad de una competencia específica en programación robótica.

https://www.infoplc.net/noticias/item/109905-comau-siemens-simplifican-programacion-robots-industriales

21/07/2021

Airbus lanza un servicio de formación de pilotos basado en la nube

El fabricante aeronáutico Airbus presenta Mobile Airbus Training experience (MATe) Suite, una plataforma para la formación de pilotos con un entorno de cabina virtual interactiva en 3D.

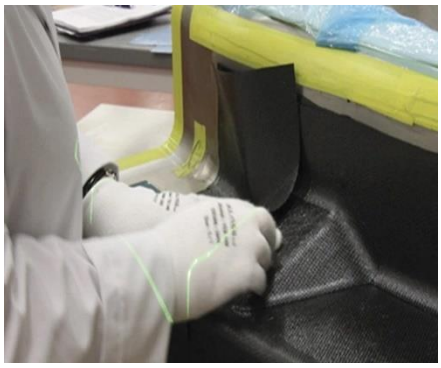
Se basa en el Airbus Cockpit Experience (ACE) Trainer, un simulador de cabina virtual e interactivo utilizado en los centros de formación de Airbus para los cursos de licencias de tripulación de vuelo.

https://www.infoplc.net/noticias/item/109607-realidad-aumentada-mantenimiento-entornos-industriales-complejos-remotos

12/08/2021

3D Laser Software Enables Accurate Part Positioning

Virtek recently released its Iris ActiveTrack laser positioning software that continuously projects stable, accurate laser lines onto moving parts to guide workers in a variety of manufacturing processes. Even complex, 3D shapes are projected with precision, dramatically accelerating time to market and ensuring product quality. Along with the launch of Iris ActiveTrack, Virtek also released the newest edition of its Iris 3D software with enhanced Application Programming Interface (API). This enhancement includes a production reporting database. Accessed through the API, the production reporting tools provides instant remote access to current production status for any system on the floor.



https://metrology.news/3d-laser-software-enables-accurate-part-positioning/

PUBLICACIONES CIENTÍFICAS

Agosto/2021

Cybersecurity Metrics for Human-Robot Collaborative Automotive Manufacturing

S. M. Mizanoor Rahman

A human-robot collaborative system was developed where a human co-worker and a collaborative robot collaborated to perform assembly tasks. We assumed such assembly tasks as the representative assembly tasks in the automotive manufacturing industry. We assumed that the collaborative assembly system would be a part of an industrial control system (ICS) in actual industrial environment. We recruited 20 human subjects to perform the assembly tasks in collaboration with the robot. We trained the subjects to enable them to perform the collaborative assembly tasks and evaluate cybersecurity conditions (status) of the collaborative system. Each subject performed the collaborative assembly separately with the robot. At the end of the assembly task, each subject was asked to brainstorm, write down the cybersecurity assessment criteria as best as he/she could perceive or realize through his/her experiences with the collaborative system, and rate the cybersecurity status of the collaborative system for each of the criteria (i.e., how capable the collaborative system was in fulfilling the cybersecurity requirements for each criterion) using a five-point subjective rating scale (a Likert scale), where 1 indicated the least and 5 indicated the most secured system. We then analyzed the responses and determined a list of the tentative cybersecurity assessment criteria with their relative importance (the total frequency of each criterion proposed by the subjects was to indicate the importance level for that criterion).

https://ieeexplore.ieee.org/abstract/document/9502873

Agosto/2021

An Integrated Mobile Augmented Reality Digital Twin Monitoring System

F.He, S.K.Ong, A.Y.C.Nee

The increasing digitalization and advancement in information communication technologies has greatly changed how humans interact with digital information. Nowadays, it is not sufficient to only display relevant data in production activities, as the enormous amount of data generated from smart devices can overwhelm operators without being fully utilized. Operators often require extensive knowledge of the machines in use to make informed decisions during processes such as maintenance and production. To enable novice operators to access such knowledge, it is important to reinvent the way of interacting with digitally enhanced smart devices. In this research, a mobile augmented reality remote monitoring system is proposed to help operators with low knowledge and experience level comprehend digital twin data of a device and interact with the device. It analyses both historic logs as well as real-time data through a cloud server and enriches 2D data with 3D models and animations in the 3D physical space. A cloud-based machine learning algorithm is applied to transform

learned knowledge into live presentations on a mobile device for users to interact with. A scaled-down case study is conducted using a tower crane model to demonstrate the potential benefits as well as implications when the system is deployed in industrial environments. This user study verifies that the proposed solution yields consistent measurable improvements for novice users in human-device interaction that is statistically significant.

https://www.mdpi.com/2073-431X/10/8/99

Septiembre/2021

Effect of Virtual Reality-Based Training on Complex Industrial Assembly Task Performance

Ömür Kaya Kalkan, Şener Karabulut, Gürhan Höke

This study investigates the effect and permanency of a virtual reality (VR) based training method on complex assembly task performance and product quality. The correct assembly of a complex industrial product is crucial to reduce the production flaw in manufacturing. For this reason, a VR training set was developed for a hydraulically-controlled clutch complete set (HCCCS), consisting of 90 parts, to investigate the effectiveness and permanency of assembly training. A highly reliable measurement tool (KR-20 = 0.81) was developed to measure the participants' assembly task performance for this study. Two different experimental designs were used to firmly control threats to internal validity, such as testing, subject characteristics, maturation, and regression. One hundred and twelve factory workers who had no VR and assembly experience were assigned to the randomized post-test-only control group design (n = 56) and the randomized pre-test/post-test control group design using matched subjects (n = 56). In addition, training permanency was investigated, and the HCCCS quality reports were monitored every month for 6 months. The study results revealed that the VR-based training method reduced the training time per individual by 25% and achieved a 27.9% improvement in complex industrial assembly task performance.

https://link.springer.com/article/10.1007/s13369-021-06138-w

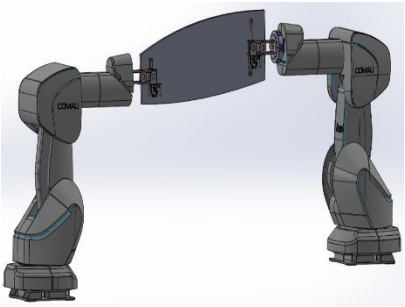
SECCIÓN II. ROBÓTICA COLABORATIVA

NOTICIAS

19/07/2021

Solución flexible, reconfigurable y colaborativa para operaciones de aplicación de sellante y de soldadura

Investigadores de TECNALIA y de la Universidad de Patras en colaboración con el fabricante de robots COMAU y las empresas AERNNOVA y KEYTECH, usuarios finales, están desarrollando varias aplicaciones para proveer una solución flexible, reconfigurable y colaborativa capaz de manejar y sujetar componentes complejos de gran pesaje y volumen para operaciones de aplicación de sellante y de soldadura. Para ello se están utilizando además de robot convencionales antropomórficos, robots colaborativos capaces de soportar pesos que podrían alcanzar 250 kg. El manejo de estas piezas de grandes dimensiones se realiza de manera sincronizada por dos robots que soportan hasta 170kg cada uno.



https://www.hisparob.es/solucion-flexible-reconfigurable-y-colaborativa-para-operaciones-de-aplicacion-de-sellante-y-de-soldadura/

22/07/2021

Airbus automatiza la producción de paneles solares

Airbus ha culminado con éxito la automatización completa de su fábrica de Ottobrunn (Alemania), con lo que se convierte en la primera fábrica de paneles solares totalmente automatizada de Europa. Para ello, el fabricante aeronáutico ha invertido más de 15 millones de euros en la instalación de una nueva línea de producción, que consta de 18 robots y que sirve como proyecto insignia de la estrategia industrial de la compañía.

https://actualidadaeroespacial.com/airbus-automatiza-la-produccion-de-paneles-solares/

10/08/2021

KUKA diseña una celda de soldadura robotizada para grandes piezas

KUKA integra con éxito una célula robotizada de grandes proporciones para automatizar el proceso de soldadura de los ventiladores industriales que fabrica STELA. La compañía alemana STELA se dedica a crear plantas de secado para diferentes industrias, como la agricultura, la industria maderera o de alimentos, entre otras. Para lograrlo utiliza generadores de aire de grandes dimensiones que dependiendo de las características de la planta de secado puede disponer de diferentes tamaños. Con más de 500 kg y 1.6 m de longitud, los ventiladores generan una corriente de aire caliente que es utilizada para el secado de las materias primas.

https://www.hisparob.es/kuka-disena-una-celda-de-soldadura-robotizada-para-grandes-piezas/

01/09/2021

ABB muestra en MindTech última tecnología en robots colaborativos

Del 14 al 16 de septiembre, ABB estuvo presente en MindTech 2021 (Instituto Ferial de Vigo - IFEVI), la feria bienal de referencia de la industria del metal en la zona norte ibérica. En su stand E06, dio a conocer su portafolio de soluciones de robótica colaborativa y los softwares de simulación y programación RobotStudio con realidad aumentada y Wizard Easy Programming. MindTech congrega a profesionales del sector del metal y sus tecnologías asociadas, entre ellas, la robótica y automatización. En el stand E06 de ABB, se presentaron 5 soluciones innovadoras con las que llevar un negocio al siguiente nivel.

https://www.infoplc.net/noticias/item/110075-abb-muestra-en-mindtech-ultima-tecnologia-en-robots-colaborativos

PUBLICACIONES CIENTÍFICAS

Julio/2021

Collaborative robot task allocation on an assembly line using the decision support system

N. Gjeldum, A. Aljinovic, M. Crnjac Zizic & M. Mladineo

Human-robot collaboration (HRC), as a part of Industry 4.0 strategy, requires a completely new type of robots able to co-work with humans, called collaborative robots or cobots. This kind of collaboration is especially needed in assembly systems, which are known for having a low level of automation. For some assembly tasks human is still an irreplaceable factor. On the other hand, some assembly tasks are monotonous and tiring for humans. Therefore, the different approaches to cope with the challenge of identification and selection of proper task allocation between human worker and cobots are reported by many researchers. It is not an easy task since multiple and often conflicting criteria need to be taken into account. Some kind of artificial decision support is needed, to successfully solve this problem. In this research, task allocation procedure is presented for identification of different improvement options that utilize cobots into the assembly line for different tasks to be performed. The decision support system based on the HUMANT algorithm has been used for selection of the option which represents the best compromise solution. The procedure is experimentally tested on the assembly line with car gearboxes as a real product.

https://www.tandfonline.com/doi/abs/10.1080/0951192X.2021.1946856?journalCode=tcim20&

Septiembre 2021

Optimizing Collaborative Robotic Workspaces in Industry by Applying Mixed Reality

Dietmar Siegele, Dieter Steiner, Andrea Giusti, Michael Riedl, Dominik T. Matt

Collaborative robots (cobots) find increased use in industrial workspaces. The aspects of safety and ergonomics are important challenges when designing such workspaces. In this work Mixed Reality (MR) and Virtual Reality (VR) are used for the design of cobot workspaces in industrial environments. ROS (Robotic Operating System) together with Unity is used to simulate and visualize cobot applications. Simulated and real robotics are merged into one tool developed for Extended Reality (XR). To allow early planning in VR, existing industrial environments are reconstructed digitally using state-of-the-art 3-D laser scanners. VR and MR are then applied to test the developed scenarios in various environments, like variation of workspace or robot. In addition, an external tracking system allows us to monitor a human operator and to visualize ergonomics and to mitigate potential safety risks.

https://link.springer.com/chapter/10.1007/978-3-030-87595-4_40

Septiembre 2021

Introduction to the focused section on flexible mechatronics for robotics

Jiajie Guo, Zheng Chen, Qining Wang, Li Wen, Jun Zhang & Jianguo Zhao

Flexible mechatronics have been playing a critical role for intelligent robots in unstructured environments and extreme conditions that needs efficient task performance, adaptability to handle nonlinear behaviors and robustness to unpredictable disturbances. To achieve these goals, robotic systems with compliant mechanical structures and flexible electronic components must be properly designed, where challenges in precise modeling, efficient analysis, smart sensing and actuation, and effective control schemes have attracted broad attention from researchers. With the emerging applications to robotics, this focused section competitively selects the 10 research papers covering a spectrum of theoretical backgrounds and applications including industrial automation, infrastructure monitoring, wearable technologies, bio-inspired and biomimetic robots. Although boundaries among the papers can depend on multi-metrics, they are categorized from the perspectives to promote flexible mechatronics for intelligent robotics and applications spanning theoretical modeling, system identification and feature recognition, novel control methods for flexible systems, and smart sensing/actuation in promising applications of human-centered and autonomous robots

https://link.springer.com/article/10.1007/s41315-021-00202-2

SECCIÓN III. EVENTOS INDUSTRIA 4.0

Global Industrie 2021

6 –9 septiembre 2021, Lyon

Global Industrie 2021 es un evento de referencia para el sector industrial. Cubrirá a toda la industria y le permitirá descubrir todas las soluciones, tecnologías, servicios y conocimientos técnicos que necesita para la industria de hoy y mañana. Global Industrie 2021 acoge cuatro salones en su interior: MIDEST, referencia internacional para la subcontratación; SMART INDUSTRIES, espacio para la fábrica inteligente conectada, colaborativa y eficiente, INDUSTRIE, el mayor evento para tecnologías de producción y equipos, y TOLEXPO, la feria internacional para trabajar metal en láminas, bobinas, tubos y secciones.

https://global-industrie.com/fr

Mindtech 2021

14-16 septiembre 2021, Vigo

Organizada por Asime, se celebrará del 14 al 16 de septiembre de 2021. Metal Industry and Technologies

International Trade Fair, Mindtech, es la feria referente del sector industrial del Polo Ibérico, de periodicidad bienal, en la que están presentes las empresas líderes del sector industrial del metal y sus tecnologías asociadas, a nivel nacional e internacional. En Mindtech podrás mantener encuentros comerciales B2B con otras empresas, asistir a conferencias sobre las últimas novedades del sector, participar en eventos de networking, y exponer tus últimos productos y soluciones a potenciales compradores nacionales e internacionales.

https://mindtechvigo.com/

International Robot Safety Conference

20-22 septiembre 2021, Evento virtual

Demand for robotics is at an all-time high and robot safety is paramount to your success. Hosted by the Association for Advancing Automation, the International Robot Safety Conference (IRSC) will offer conference sessions and workshops that examine key issues in robot safety and provides an in-depth overview of current industry standards. IRSC is the leading robot safety conference. Companies have relied on this event to help improve their safety programs for 33 years. For the second year, IRSC will be a virtual event in 2021. This essential conference is normally priced at over $1,000, but thanks to our sponsors, we can offer this great content virtually for just $395 for A3 members and $495 for non-members. Register today to join hundreds of your peers at IRSC!

https://www.automate.org/a3-content/international-robot-safety-conference

EMO Milán 2021

4-9 octubre 2021, Milán

Promovida por CECIMO, la exposición mundial de máquina herramienta se llevará a cabo del 4 al 9 de octubre en el centro de exposiciones de Fiera Milano. La exposición presenta las últimas novedades para la formación de metal y máquinas herramientas de corte de metal, máquinas para soldar, para tratamientos térmicos y superficiales, robots, automatización de hardware y software, montaje, herramientas, partes, componentes, accesorios, metrología, control de calidad y sistemas de seguridad. El foco estará en la amplia oferta de máquinas de herramientas disponibles, capaces de atraer a los usuarios de todos los sectores principales que utilizan sistemas de trabajo de metal.

https://emo-milano.com/en/homepage-4/

AI & Big Data Congress 2021

14-15 septiembre 2021, Barcelona

Los días 14 y 15 de septiembre de 2021 se celebrará en el Auditorio AXA Barcelona la 7ª edición del congreso de referencia sobre Inteligencia Artificial y Big Data en el sector empresarial organizado por CIDAI, Centre of Innovation for Data Tech and Artificial Intelligence. El congreso se podrá seguir en formato presencial y en línea (live streaming). En esta edición se reforzarán los contenidos sobre Inteligencia Artificial cada vez más presente y convergente. De nuevo ofrecerán sesiones de estrategia, tecnología y workshops especializados. El congreso

será de nuevo el punto de encuentro entre profesionales, proveedores y empresas que quieren o están realizando proyectos en el ámbito AI & Big Data.

https://aicongress.barcelona/es/

Webinar: CRX: Una nueva era de Robótica Colaborativa Industrial

23 septiembre 2021, Webinar

Desde el inicio de la pandemia, FANUC Iberia organizó una serie de webinars como parte de su estrategia de promoción del conocimiento en el área de automatización industrial. Viendo el éxito que ha tenido la iniciativa, la compañía ha decidido seguir organizando webinars durante el año de 2021. El próximo webinar tendrá lugar el 23 de septiembre a las 10:00h y tendrá como tema: "CRX: una nueva era de Robótica Colaborativa Industrial". En este webinar presentarán el CRX-10iA, la nueva variante de los robots colaborativos FANUC, un robot ligero y fácil de programar que está disponible en dos versiones: un modelo estándar con un alcance de 1.249 mm y un modelo de brazo largo con alcance de 1.418 mm.

https://fibwebinars.fanuc.eu/

Salón Innovatlántico 4.0

5-6 octubre 2021, Salón virtual

Innovatlántico 4.0 Salón de las nuevas soluciones tecnológicas prevista para los días 5 y 6 octubre 2021, ha decidido utilizar el formato online. Todo ello para garantizar la seguridad de expositores y visitantes dada la situación actual de incertidumbre provocada por la COVID-19. Innovatlántico 4.0 en su formato online será de nuevo el encuentro de los líderes industriales presentando las últimas soluciones en sistemas de automatización industrial, robótica, inteligencia artificial, software industrial, soluciones de visión artificial y simulación virtual, Big Data, IoT, ciberseguridad, Industrial Cloud Computing, Machine Learning y todas las tecnologías 4.0 asociadas al digital manufacturing.

https://saloninnovatlantico.com/

VISION 2021

5-7 octubre 2021, Stuttgart

Experience the latest products, technologies and trend themes of machine vision such as embedded vision, hyperspectral imaging and deep learning! At VISION, you'll learn all about the innovative possibilities presented by current and upcoming machine-vision technologies. More than 460 world-leading exhibitors will be on hand to unveil the latest systems and components. In no time, you'll have an overview of key technologies related to Industry 4.0 and automated processes. This top international trade fair will also offer plenty of inspiration in

examples of real-world scenarios. Discuss your activities and requirements with the experts and gather ideas for innovative applications.

https://www.messe-stuttgart.de/vision/en/

IV Congreso de Industria Conectada 4.0

13-14 octubre 2021, Congreso virtual

El Ministerio de Industria, Comercio y Turismo organiza el IV Congreso de Industria Conectada 4.0, los próximos 13 y 14 de octubre de 2021. Este 2021, más que nunca, en un contexto mundial de disrupción y todavía de incertidumbre por la pandemia sanitaria, el IV Congreso CIC 4.0 se reafirma como el espacio referente, y reúne a todos los líderes y protagonistas comprometidos con la recuperación para dar un nuevo impulso a la digitalización de nuestra industria poscovid. Además, este año el CIC 4.0 tiene una dimensión internacional privilegiada con Francia como país invitado, principal socio comercial y con importante presencia en la industria española, y reafirma su consolidación con la entrega de la Tercera Edición de los Premios Nacionales Industria Conectada 4.0.

https://cic40.es/