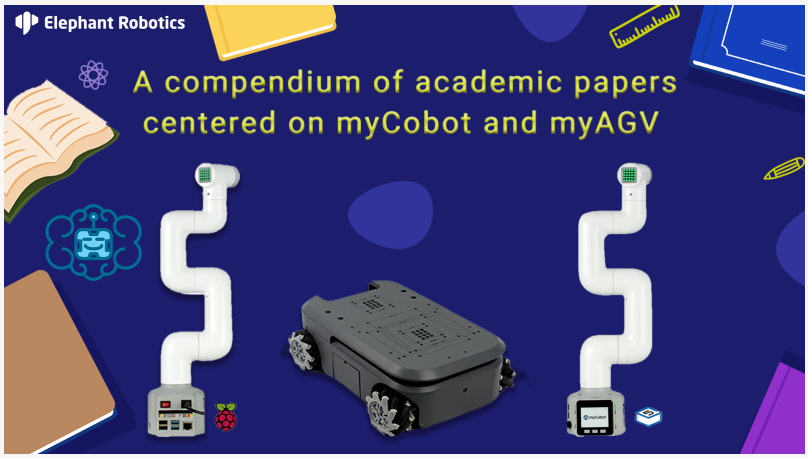
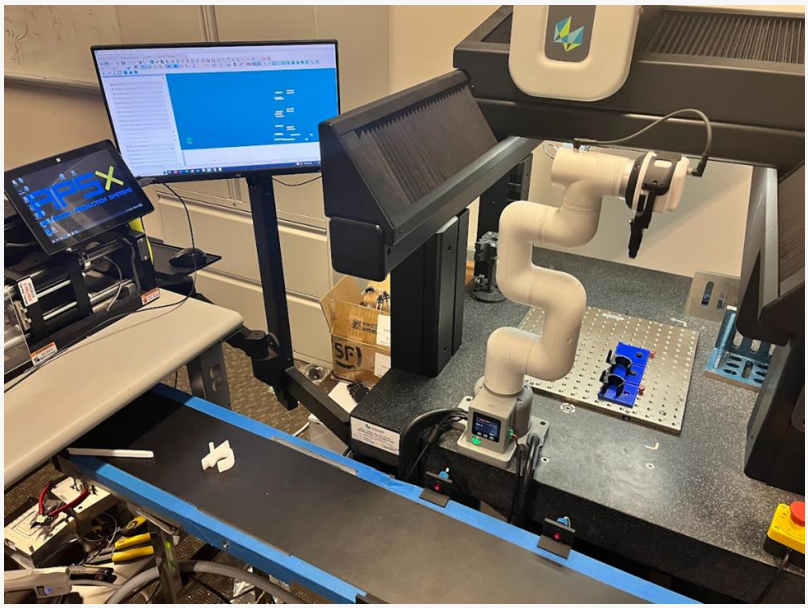
Exploring Innovations in Robotics: Range Applications of Cobots and AGVs

Elephant Robotics is excited to share a collection of 18 academic papers, providing a comprehensive view of advancements and applications in Cobots and AGVs.

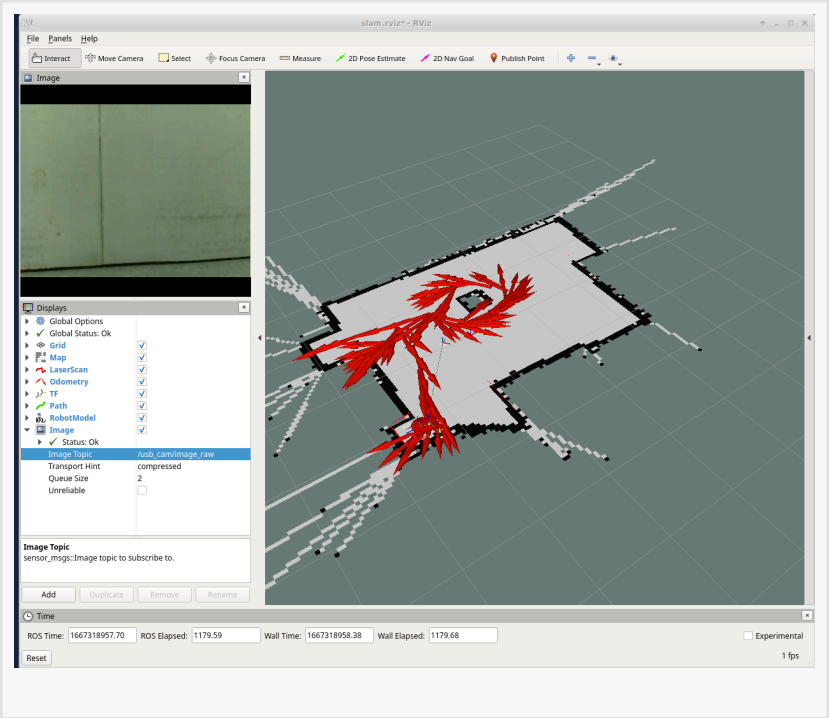




SHENZHEN, GUANGDONG, CHINA, December 21, 2023 / EINPresswire.com/ -- In the ever-evolving landscape of robotics, the symbiosis between humans and machines takes center stage, marking the advent of a new era of innovation. Today, Elephant Robotics is thrilled to introduce a pioneering collection of academic papers focusing on Collaborative Robots (Cobots) and Automated Guided Vehicles (AGVs) sourced from esteemed global universities such as The University of Sydney, Purdue University and Meijo University. This compilation delves into the transformative capabilities of Elephant Robotics' 6 DOF collaborative robots, myCobot series, and myAGV, exploring the practical applications and potential advancements in human-machine collaboration.

The comprehensive collection of 18 academic papers unveils profound insights across 3 pivotal dimensions. It delves into the forefront of artificial intelligence and explores the intricacies of robotics, encompassing deep learning, machine vision, robotic arms, programming, human-robot collaboration, and real-time monitoring. Additionally, it sheds light on advanced robot systems, including modular robots, reconfigurable robots, educational robots, and mobile robots

with a specific emphasis on SLAM navigation. It stands as a valuable knowledge repository, offering a multidimensional perspective on the advancements and applications within the fields of Cobots and AGVs. Tailored to enthusiasts, professionals, and researchers, this collection is an invaluable resource for staying informed about the latest developments and innovations in the dynamic realm of robotics.



Topic: AUTOMATION OF THE QUALITY CONTROL PROCESS WITH THE USE OF ROBOTICS AND A COORDINATE MEASURING MACHINE
Author: Alexander Hoang
University: Purdue University

Abstract: The research project explored the feasibility for MSMEs to integrate a robotic arm into a low-volume production line for seamless part transfer to a quality control system. The process aimed at achieving automatic quality control without disrupting manufacturing. It involved an injection molding machine producing parts, and a collaborative robotic system transferring these parts to a CMM for inspection. The study demonstrated that constructing an automated quality control work cell was effective for MSMEs, with the main tasks being programming the 6 DOF robotic arm myCobot 320 M5 and designing the work cell. The system consistently met metrics for realignment, movement, and inspection routines, showcasing its effectiveness, adaptability, and modularity.

Topic: High-throughput fabrication of soft magneto-origami machines
Author: Shengzhu Yi 1,7, Liu Wang 2,7, Zhipeng Chen 1,7, Jian Wang 1, Xingyi Song 1, Pengfei Liu 1, Yuanxi Zhang 1, Qingqing Luo 1, Lelun Peng 1, Zhigang Wu 3, Chuan Fei Guo 4,5,6 & Lelun Jiang 1

Abstract: The research introduces a fabrication strategy for soft magneto-active machines, enabling magnetically controllable shape-morphing and locomotion, with applications in biomedical robotics. The proposed approach utilizes origami folding to transform 2D magnetic sheets into 3D soft magneto-active machines through automated roll-to-roll processing. The study demonstrates applications such as a collaborate robot myCobot Pro 600 with on-demand deploying and wireless charging, a mechanical encoder, a quadruped robot for cargo-release tasks, and a magneto-origami arts/craft. The incorporation of origami principles allows for efficient creation of complex structures with customized geometries□retaining foldability and

providing magnetic responsiveness. The research addresses the need for automated origami folding for consistent shape and performance, suggesting future work on developing an automated line for folding origami with uniform results.

Topic: A Jacobian vector correction method for the force calibration of EIT-based tactile sensor
Author: Haofeng Chen, Xuanxuan Yang, Gang Ma, Xiaojie Wang

Abstract: This paper presents a Jacobian vector correction (JVC) method to calibrate tactile force in EIT-based tactile sensors. The JVC method effectively addresses non-uniform sensitivity distribution by creating a scaling vector based on the Jacobian vector, ensuring approximately constant sensitivity across all sensor locations. Phantom experiments with myCobot and sensor calibration evaluations confirm the method's accuracy in capturing strength information irrespective of location. The JVC method enhances the practicality and usability of EIT-based tactile sensors, providing precise force calibration with minimal data and control parameters. This improvement in force sensing capabilities makes EIT-based tactile sensors valuable for applications like safe human-robot interactions.

Topic: REPROGRAMMING OF AN AGV TO EXPAND ITS FUTURE AUTOMATION AND CONNECTIVITY
Author: Miriam Conde Montoya
University: Universitat Politècnica de Catalunya

Abstract: The project focuses on utilizing an AGV (Automatic Guided Vehicle) to capture and process the robot's data using MATLAB. The primary goal is to develop an application that presents myAGV's 2D mapping of the space, including the route taken and images captured by the robot's camera corresponding to its kinematic model's position the detailed real routes and images captured by the AGV's cinematic model. The application not only visualizes the data but also caters to the needs of users with limited MATLAB proficiency, making it a versatile tool for various projects. Ultimately, the project successfully achieved its main objective, resulting in a user-friendly application that enables individuals with limited MATLAB knowledge to visualize and analyze AGV-captured data for the specific projects.

Topic: SISTEMA DE GESTIÓN Y CONTROL REMOTO DE UN ROBOT AGV PARA APLICACIONES EN ALMACENES.
Author: Marc Nueno Montolio
University: Universitat Politècnica de Catalunya

Abstract: For many companies, warehouse automation is becoming a process key to improving efficiency, reducing costs and increasing safety. In this process, AGV mobile robot is a fundamental robotic tool. The project focused on developing a remote control and management system for a mobile robot myAGV tailored for warehouse automation. During the implementation of the project, the real-time data from Lidar, 2D camera, and myAGV sensors enabled successful navigation, goods transportation, and automated inventory management. In

a parallel experiment, the feasibility of implementing a robot arm for product transfer to a quality control system, specifically for MSMEs, was assessed. The project achieved its goal by utilizing real-time data, implementing a ROS platform, and developing programs for easy teleoperation and autonomous inventory.

This curated collection of academic papers is a journey through groundbreaking research, exploring innovative design tools for close proximity human-robot collaboration and the nuanced integration of proximity sensors in commercial robotic arms. Elephant Robotics will strive to continuously innovate and provide superior robotic products to meet evolving market needs and cultivate an environment of continuous robotics innovation.

For a complete view of the collection of academic papers, please click on the following link: https://shop.elephantrobotics.com/blogs/news/exploring-innovations-in-robotics-range-applications-of-cobots-and-agvs

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