

DISEÑO E IMPLEMENTACIÓN DE SISTEMA DE SENSORES QUE PERMITA EL USO DE ROBOTS TRADICIONALES EN AMBIENTES COLABORATIVOS

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RESUMEN

El proyecto es un esfuerzo para transformar el modo en que se emplean los robots industriales. El proyecto pretende superar las barreras físicas y los protocolos de seguridad que suelen separar a los robots de los trabajadores humanos, con el fin de mejorar la seguridad, la productividad y la flexibilidad laboral. Uno de los objetivos clave es convertir los robots no colaborativos en robots colaborativos. Para ello se utilizarán diversas tecnologías, como Raspberry Pi, Arduino, sensores de proximidad HW-201 y una webcam con OpenCV. Se instalarán sensores de proximidad HW-201 en los robots para detectar obstáculos y otros robots en el entorno. Esto permite a los robots evitar colisiones y trabajar con seguridad en proximidad unos de otros. Se integra una cámara web con OpenCV para obtener información visual y procesarla. Esto permite a los robots verse entre sí y a su entorno, lo que es esencial para la colaboración. También se establece una comunicación bidireccional entre la Raspberry Pi y el Arduino. Esto hace posible a los robots intercambiar datos y órdenes, lo que es necesario para la coordinación y la toma de decisiones. Además de los componentes de hardware y software, el proyecto también se centra en desarrollar algoritmos y lógica de programación que permitan a los robots colaborar eficazmente con las personas. Para ello se desarrollarán métodos de evasión de obstáculos, asignación de funciones y planificación de trayectorias. El proyecto también incluye pruebas exhaustivas para validar el rendimiento y la eficacia de los robots colaborativos en distintos escenarios y situaciones. Esto ayuda a contribuir a la seguridad y fiabilidad de los robots, y que pueden utilizarse para mejorar la productividad en diversos entornos industriales. Por último, se verificó que es factible desarrollar sistemas de sensores que permita trabajar a robots tradicionales en entornos colaborativos.

Palabras clave: Robots industriales, colaborativos, seguridad, sensores, COBOTS.

ABSTRACT

The project is an effort to transform the way industrial robots are used. The project aims to overcome the physical barriers and security protocols that often separate robots from human workers, in order to improve safety, productivity and labor flexibility. One of the key goals is to convert non-collaborative robots into collaborative robots. For this, various technologies will be used, such as Raspberry Pi, Arduino, HW-201 proximity sensors and a webcam with OpenCV. HW-201 proximity sensors will be installed on the robots to detect obstacles and other robots in the environment. This allows the robots to avoid collisions and work safely in close proximity to each other. A webcam is integrated with OpenCV to obtain visual information and process it. This allows the robots to see each other and their surroundings, which is essential for collaboration. Two-way communication is also

established between the Raspberry Pi and the Arduino. This makes it possible for the robots to exchange data and orders, which is necessary for coordination and decision making. In addition to hardware and software components, the project is also focused on developing algorithms and programming logic that allow robots to collaborate effectively with people. To this end, obstacle avoidance methods, assignment of functions and trajectory planning will be developed. The project also includes extensive tests to validate the performance and effectiveness of collaborative robots in different scenarios and situations. This helps contribute to the safety and reliability of robots, and they can be used to improve productivity in various industrial settings. Finally, it was verified that it is feasible to develop sensor systems that allow traditional robots to work in collaborative environments.

Keywords: Robots industriales, colaborativos, seguridad, sensores, COBOTS

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