

INNOVATIVE PASSIVE LINEAR ROBOT TRACKS WITHOUT SENSORS AND ACTUATORS AVAILABLE FOR LICENSE AGREEMENT

Fields of use

Process control equipment and systems, Robotics, Other industrial equipment and machinery, Automation, Robotics Control Systems, Machine Tools

Current state of technology

Prototype available for demonstration

Type of cooperation

Licensing agreement

Intellectual property

Secret Know-how

Developed by

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Summary

Slovenian researchers have developed an innovative passive linear robot track for use in industrial manufacturing processes. Solution enables the movement of the robot without the need of sensors and actuators. This primarily lowers the costs of assembling and manufacturing of the robot and later makes the robot purchase more accessible to companies to use it for the production of smaller series of (diversified) products. Researchers are looking for robot manufacturers for a license agreement.

Description of the invention

Manufacturing and production processes in industry today utilize robots for completing tasks. Main features are production on a large scale and small diversity between the products. Robots enable continuous production for longer periods of time, can move and lift heavy objects or parts according to the programmed instructions. When the batch of products is changed or some modifications are necessary on the products, the robots in most cases need to be at least re-programmed and sometimes (mechanical) parts of a robot need to be replaced as well. This usually involves special expertise and services of professionals. The costs with these adjustments are relatively high, especially when changes need to be made relatively often. The degree of modifications that robots allow can vary and, in some cases, only minor or no alterations are possible.

Considering these facts, small and medium-sized companies can benefit with introduction of robots in the manufacturing processes, but the costs are high due to the production of small series and diversified products. Batches of products can be of only 10 or even less pieces. Therefore, solutions are being sought, that would enable implementation of robots in productions processes in small and medium sized companies, while also allowing the modification of instructions and corresponding tasks in a short time. Commonly used solutions are linear tracks, where the robot is placed on a moving platform that changes the position for every single step of production process. This expands the working space of the robot and whenever this is a requirement, linear tracks are appropriate solution.

Researchers from a Slovenian public research institute with more than two decades of experience on almost all fields of robotics and automation, have developed innovative solution, appropriate for all types of the companies, even small and medium-sized ones. The system is constructed in a way, where the robot (arm) is located on a platform with two tracks that enable movement, but only when it is necessary.

The main innovative approach is that the robot moves itself along the tracks without the actuators and sensors, that are commonly used for movement and determination of appropriate position of the robot (arm). Measuring and actuation system in the robot are responsible for movement. In this regard, the solution provides specific level of autonomy during the production process, where it is used. The next position of the robot can be calculated in advance based on the information about robot kinematics and angles in the robot's joints.

Stability and accuracy of the robot (arm) during each step of production procedure are ensured with pneumatic brakes. The pneumatic brakes prevent moving of the platform, but when they are released, the platform/robot can move into the (next) desired position along the tracks. As a consequence, the production of this solution results in lower costs and wider availability to companies, although the performance is on par with other solutions that are based on the use of actuators and sensors. Tests were performed on the practical industrial examples where the applicative value of the solution was determined. Additionally, the innovative solution can constitute part of large systems of robot manufacturing with implementation in them.

The researchers are looking for manufacturers of robots for production processes, where their solution could be implemented into their existing or new systems they produce. Cooperation will be based on a license agreement. Since the approach lowers the costs, this is an opportunity for manufacturers of robots to offer their solutions to even wider range of customers (small and medium-sized companies), also because it takes into the account the facts of small products batches and diversified products. Researchers will provide required information and specification for implementation of the solution in partner's manufacturing processes.

Main Advantages

With innovative approach the passive linear robot tracks were developed to allow movement of robot/platform without the need of sensors and actuators. This results in several advantages:

- Absence of sensors and actuators lowers the costs of manufacturing the robot systems for the industry and it makes it more accessible to small and medium-sized companies regarding the final price of the system.
- The movement is relatively autonomous and this lowers the need for human involvement.
- The use of linear robot tracks expands the working space and with that also increases the number of steps that can be performed on the same robot/location.
- The solution can be integrated in larger systems as supporting part.

Partner Sought

Researchers are looking for experienced manufacturers of robot systems and solutions. Companies interested in licensing agreement, should be able to produce/integrate this innovative linear robot tracks in their existing and new robot systems and other solutions and bring the new solution to the market.