

# New level of smart industrial robots

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Robot technicians from Far Eastern Federal University (FEFU) together with colleagues from the Far Eastern Branch of the Russian Academy of Sciences (FEB RAS) developed a command-and-control plugin for intelligent industrial robots. The new software allows the robots to build up high quality 3-D computer models of workpieces quickly, precisely, and in the fully automated mode. The related article was published in *International Journal of Mechanical Engineering and Robotics Research*.

The solution developed by FEFU scientists helps solve the issue of hard programming of [industrial robots](#) that prevents them from adapting to changing working conditions. From that point, there is no need for time-consuming manual re-adjustment of such robots to prepare them for production launch.

Thanks to the new software, one can fix the in-

process workpieces on universal positioning devices as opposed to large-scale equipment designed for rigid fixation. The plugin even allows for certain positioning aberrations and deformations while still saving time. The [robot](#) would take all spatial characteristics of a workpiece into consideration, automatically fix any scanning errors, and obtain a high-quality model to carry out other actions as indicated by their control programs. No fixation errors would prevent the robot from working correctly.

"When workpieces or large scale details are scanned in a production department, the point clouds used by the machine to build up 3-D CAD models often have critical gaps. Various factors, such as flares or distortions may cause that. As a result, a machine is unable to recognize and process a workpiece correctly. We have suggested a solution to this problem allowing a robot to detect such gaps automatically and to carry out additional scanning of the missing areas. We also managed to avoid the resource-consuming numerical processing of massive datasets that 3-D images are made of. Our software is fast and systemic and helps to obtain high-quality models and further process them in due order," said Alexander Zuev, Assistant Professor at the Department of Automation and Control, FEFU School of Engineering.

According to the scientist, the speed of data processing increases due to a special set of mathematical methods implemented in the software. The mathematical apparatus works with a large array of points forming a 3-D image, rearranges them on a plane, and then quickly analyzes possible scanning errors.

A demonstration robot working on the basis of this new technology is currently being launched in FEFU to show the representatives of the industry all processing possibilities of such devices.

The development of smart industrial robots is a massive international trend. The machines are

equipped with technical vision systems that allows them to understand what happens in their working zones and adjust their control programs in order to complete the required actions in the most efficient manner. Although industrial robots are quite slow to implement in Russia compared to the rest of the world, the team hopes that their development would help our country become a leader in this edge-cutting technologies field.

**More information:** Vladimir F. Filaretov et al.

"Developing Method of Automatic Gaps Finding in Workpieces Models Obtained by Means of Vision Systems" *International Journal of Mechanical Engineering and Robotics Research*, Vol. 8, No. 4, pp. 626-631, July 2019. [DOI: 10.18178/ijmerr.8.4.626-631](https://doi.org/10.18178/ijmerr.8.4.626-631)

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