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While more support for fields of application where robots could not be used previously is being demanded, products to be produced are also becoming more complicated and diversified. In these circumstances, demands for offline teaching where robots are taught using simple operations are increasing.

To expand the applications, we have worked on increasing the sophistication of offline teaching software utilizing 3-dimensional CAD.

Introduction

More and more companies are starting to use industrial robots to address the shortage of workers caused by the falling birthrate and the aging population and to reduce the variations in quality that manual production causes. Combined with the technical innovation in technologies related to robots, the application of robots is expected to expand to fields that were impossible to automate in the past.

1 Background

The manufacturing industry is currently experiencing a movement toward mass customization to address individual customer requirements such as variable production amounts of diversified products that have a complicated shape. In this context, one of the challenges for expanding the application of robots is how easily you can operate the robot in producing increasingly complicated and diversified products.

More and more customers use offline teaching software that leverages 3-dimensional CAD to solve this issue. The offline teaching software allows the user to examine the layout of robots and peripheral equipment and generate robot operation programs based on the 3-dimensional CAD data on the PC. The software can automatically create robot operation programs even for complicated shapes and reduce variations in quality and robot systems with the optimal configuration for customers.

The following section describes KCONG.

3 Automatic robot operation program generation software, KCONG

(1) Concept

KCONG is offline teaching software that can automatically create robot operation programs with intuitive operations, that is, selecting working positions on 3-dimensional CAD data of the product and teaching it the process conditions.

(2) Overview

KCONG is offline teaching software that includes 3-dimensional CAD. Therefore, you can start using KCONG

at the product design phase. That is to say, you can seamlessly design the product shape and teach the robot how to work on the product for robotic processing as shown in .

The user finds the work procedure that will achieve the

(ii) G-code conversion function

KCONG has a function to convert the industry standard format known as G-code, which is output from the CAM

curved surface is largely changed. The accuracy drops particularly when these operations are performed above a

(3) Assembly procedure specification function

Since products from home appliance manufacturers have relatively short life cycles, manual work is more applicable and efficient than robot production. For this reason, not many home appliance manufacturers have adopted automation.

Recently, more and more users use the DMU tool to solve quality problems when assembling multiple parts in the upstream design process. The DMU tool enables the user to check the assembly procedure in animation using the 3-dimensional CAD by specifying the layout of parts, assembly order, and used tools. By applying assembly information configured with this DMU tool to creation of robot operation programs, you can reduce the startup time of robot system.

(i) Features

As the DMU tool is mainly intended to improve the efficiency of human work, we developed the function to specify information on tools required for robot automation and product assembly positions.

The workflow is as shown below.

① Prepare 3-dimensional CAD data of the product.
② Load the CAD data into the DMU tool and specify the assembly procedure.
③ Check the assembly procedure with simulation.
④ Specify tool information and product assembly

Conclusion

Tablets and other new input media are recently widespread and leveraged, replacing PCs. It is expected that new application fields of robot will increase as the offline teaching technology develops, absorbing these technologies. Using the offline teaching software as a differentiator from other robot manufacturers, we will continue to sophisticate teaching automation, responding to market needs. We will advance automation of teaching that users can use without being aware of robots.

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