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Group 8

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Theme 1 : Robot Operating Technlogies

Contents

Definition of "Robot Safety"

Robot Safety is one of the most important things to think about when considering robotic industrial automation.

Work spaces need to be clearly marked, Many times, a short safety training session is necessary to make sure that workers are aware of the robot.

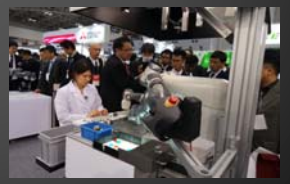
This will save manufacturers from possible injuries and production slowdowns.

How did it appeared?

For the past years, Robots was only used for manufacturing goods only inside the factories.

About 10 years later, Robots and human beings are having a deep relationship because tasks which robots and humans should work together has appeared.

In the future, Human and Robots Co-Working will become common. And then, Robots will be the human worker's Co-Worker.



Humans and Robots working together

Collaborative Robots

Critics says that almost 90% of Worldwide electronic factories will use Robots whether its size is huge or small.

But, small factories could not dedicate their own workspace to each robots so they must work together with humans.

Also, Robot tasks has a limit to follow Human skills so Collaborative Working will be universalized.

Collaborative Robots Examples

1

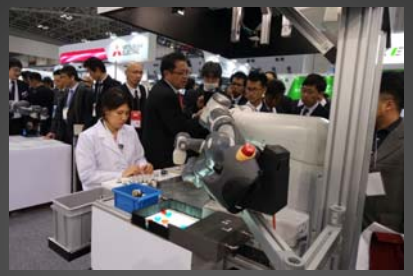


ABB : Collaboration Robot called "YuMi"

YuMi is a collaborative, dual-armed robot that includes flexible hands and advanced robot control. It can collaborate with humans in a normal manufacturing environment. YuMi' s unique feature is that it can work along without posing any risk.

Collaborative Robots Examples

2

IPA : Collaboration Robot called "PowerMate"

It expands its power as moving heavy parts by small power, and safety buttons, laser cutting, vision sensing technologies are embedded with the robot.

Collaborative Robots Examples

3

IPA : Direct Teaching Welding Robot called Rob@Work

- By entering welding pendant to the direct teaching robot, it repeatedly performs its saved task with humans as a collaborative robot.

Collaborative Robots Examples

4

KUKA : Collaborative Robot called "IIWA"

IIWA is the primary Collaborative Robot with sensory capabilities for safety. Fast teaching, simple operating and Collision preventing algorithms are the advantages as a collaborative robot.

Robot Safety Technologies
(How to protect human worker during collaboration)

While Robot Safety receives attention technicians started to study for Safety Technologies, it can be classified into three parts.

Predicting and avoiding collision

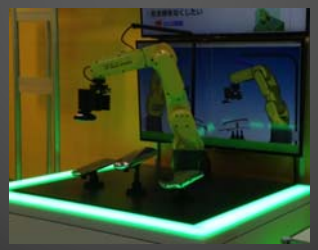
Absorbing collision Techniques

Algorithms

1. Techniques to predict and avoid collision

Firstly, there is Techniques to predict and avoid collision. When human invaded into the robot workspace, robot should know to aware by itself and then it should make its new working path. It usually works with Sensors such as ultrasonic, infrared, PIR, and Force sensors or current control elements.

FANUC : Dual Checking Robot



Force Sensing Technology

NACHI : MZ-04E

this robot incorporates optional Force sensing technology that senses danger when the robot thinks it will be in danger. Nachi Software Packages including palletizing, force sensing and vision sensing programs.

Incoming Current Control

Korea University : Industrial Robot
If human touches the robot , the current control element detects Micro currents which is flowing inside human bodies, So it could prevent Safety-danger while operating the Robot and Production Slowdowns.

2. Algorithms & Programs

Secondly, there is Algorithms. Without using difficult sensors, If you have a perfect program which has every variable s, it could make your Robot move as you hoped.

KUKA : High Technology Programs

3. Absorbing collision Techniques

Lastly, there is absorbing collision Techniques. The technology actually activates by only machinery parts. This part more ensures high reliability then safety system control which is called Active Safety System.

NACHI : Sponge Covered Robot

Thank You