
SYNOPSIS:

It was just over forty years ago that the first industrial robot was “employed” in an automobile assembly plant. Robots have since made their way doing hazardous and difficult tasks in agriculture, entertainment, the medical field, and even space exploration. Welding robots have increased assembly plant efficiency with robot technologies such as touch sensing and seam tracking. In medicine, surgeons have pioneered robotic surgery to give patients less pain, quicker recovery and shorter hospital stays. NASA brought us one step closer to understanding our solar system when they sent the robotic rovers Spirit and Opportunity to explore and research the existence of water on Mars. Other industries, such as the Honda Motor Company, are creating more humanoid robots for human assistance. Honda’s ASIMO robot can walk and run, recognize people, and identify sounds and voices.

CURRICULUM UNITS:

Computer Engineering
Engineering
Mechanical Engineering
Robotics

CAREER OPPORTUNITIES:

Mechanical Engineer
Robot Technician
Software Engineer
Industrial Engineer

PROGRAM OVERVIEW:

Scientists and engineers from every aspect of research find uses for their inventions in manufacturing, medicine, oceanography, space exploration and more. Robots assist us by performing primarily detail-driven, repetitive and often hazardous tasks. Consistency is what makes these robots so efficient. A robot can make a series of spot welds in a short period of time with a gun that might weigh from 45 to 90 kilograms. Impervious to the heat, gases, fumes and sparks, robot arc-welders display an impressive 85% arc-time spent actually welding. But no matter how sophisticated the robots become, they will still need H.M.I., or human machine interface. They need to be programmed and maintained by knowledgeable engineers and support staff.

ISSUES & CRITICAL THINKING:

- 1) Discuss the characteristics of a robot; what makes a machine a robot?
- 2) Ask students to list some possible tasks that might utilize robots in hazardous conditions.
- 3) Discuss with students the possibility of nanorobotics and what help they might offer in the future.
- 4) Have students to design their own robot. What would it do? What purpose would it serve?

GLOSSARY:

Aerogel- A highly porous solid formed from a gel, such as silica gel, in which the liquid is replaced with a gas.

Anthropomorphic- Ascribing human form or attributes to a being or thing not human.

Cosmesis- Concern in therapeutics, especially in surgical operations, for the appearance of the patient; a resort to an operation which improves the appearance.

Human Machine Interface- In the case of robotic devices, the need to be programmed by a human.

Seam Tracking- Process that helps a robot stay within a seam as it is welding.

Teleoperation- Operations from a robotic device controlled by a person from a distance.

Touch Sensing- Using sensors, a robot can record positional data and perform tasks using trigonometric calculations.

Trigonometric Calculations- Branch of mathematics that deals with the relationship between the sides and angles of plane or spherical triangles, and the calculations based on them.

Welder-robots- Robots designed to join metals by applying heat, sometimes with pressure and an intermediate or filler metal having a high melting point.



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ROBOTICS-ADVANCES IN ENGINEERING

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