

What is CS and Robotics?

GWU Pre-College Summer
Robotics

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Robotics

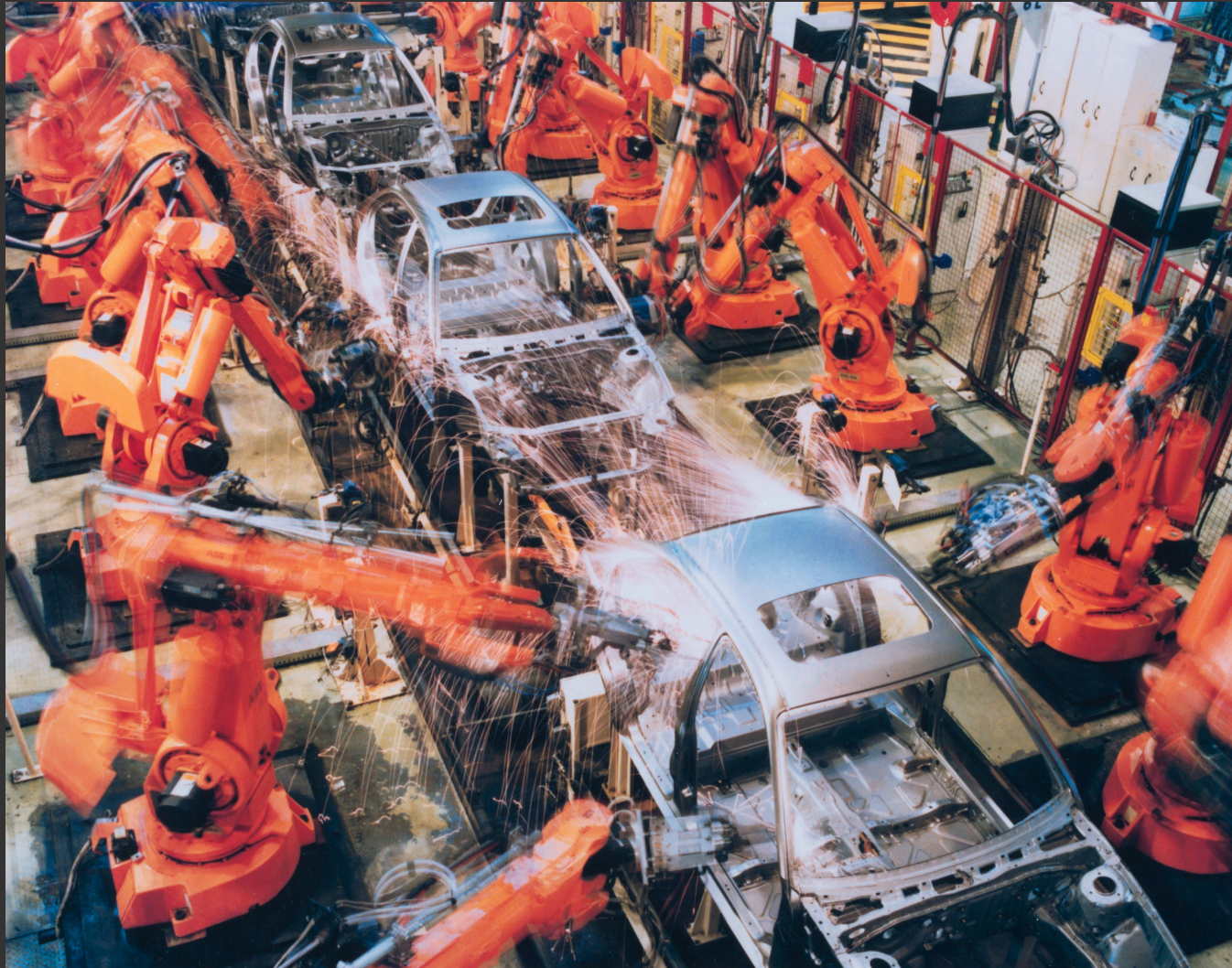
- Broad sense:
 - A machine controlled by a computer
 - Programmable
 - Autonomous
 - Can change the environment
 - Must adapt to the environment
- Not precisely defined
- Everywhere!

Roomba



From: <http://irobotathome.com/> By: Penni Dutton

Manufacturing Robots



From: www.abb.com

Humanoid



From: <http://world.honda.com/>

General Purpose Robots

- What we are interested in
- Why? They are difficult.
- Similar to humans

Human Metaphor

- Throughout this class, we will be using a common metaphor: Robots as Humans
- A natural comparison for general purpose robots
- NOT always accurate

Computer Science

- A broad field
- Our interest is in it's application to robotics
- Control, perception, and decision making
- For our humanoid robots: Artificial Intelligence
 - How robots “think”

"Computer science is no more about computers
than astronomy is about telescopes."
- Edsger Dijkstra

So, what is it then?

- Originally a sub-field of mathematics
 - Not calculus!
 - Algorithms, logic, discrete
- Information
 - Representation
 - Processing
- Software Engineering
 - Design large, complex systems

Robotics

- Minds and Bodies
- Bodies
 - The physical aspects of a robot: arms, wheels
 - The basic control system: wires, sensors
- Mind
 - What we are interested in
 - How to decided what to do, with the given sensor input (Artificial Intelligence)

Important to you

- Computer Science is a deep field, we are merely scratching the surface
- We are interested in the Intelligence side of Robotics
- This class is a jumping off point.