

## 17 ROBOTICS AND AI

PJD's opening remarks

Robots have fascinated human beings since well before the electronic computing age. You may remember the famous story of the Mechanical Turk, a robot invented in 1770 to play chess. (And it was pretty good.) Eventually it was exposed as a hoax – there was a human chess player hiding inside the cabinet. But even so, it inspired interest in the question of whether a chess-playing robot could be built. It took two hundred years to reach a positive answer to that question.

Science fiction writers have long been fascinated with robots. One of the most famous writers on the subject, Issac Asimov, in 1950 published a story "I, Robot" that postulated the Three Laws of Robotics. That is six years before AI was born a field of computer science. Asimov believed that robots designed to follow the three laws would never harm humans. Perhaps to keep our feet on the ground, many other writers have given us stories in which Three-Law robots were tricked into harming humans.

In our own time, militaries all over the world are pouring resources into robotics AI. They believe their weapons will be more precise and lethal if augmented with AI. And they fear that if they do not invest in AI, rivals will, and will gain an insuperable advantage. At NPS we have research groups looking into the question of AI control over unmanned systems, whether underwater, on land, or in the air.

Modern robots are automata with machine learning built in to enable them to be more autonomous. They are not simply neural networks in a mobile body. They are complex mechanical systems with sophisticated software components, which may include a neural network.

Today Professor Doug Horner will talk about robotics and AI. He is Research Assistant Professor in the Mechanical and Aeronautics Engineering Department and is Director of the NPS Center for Autonomous Vehicle Research. He will illustrate the complexity of autonomous robots and the sophisticated engineering needed to make them work well.