

# Autonomous Mobile Robotics:

## A State of the art assessment

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December 2009

Robots are electromechanical machines that are built by humans for three purposes. More specifically, we are talking about microprocessor embedded machines that have the benefits of computer operated machines with high degrees precision, repeatability, and unfailing memory that is inaccessible to their human counterpart. The first intent for robots is **D<sup>3</sup> workers**. That is to relieve humans from dirty, dull, and dangerous chores. Examples of these can be found in factories, mines, war theaters, and extraterrestrial exploration. The second intent is to **Edutainment**. These robots are built as tools for training students in science and information technology. The gamut in Edutainment runs from low cost robot toy kits to research platforms that run in the range of \$3K-\$100K each. The third intent is **Creation**. These efforts are aimed at exploring the limits of human ability and understanding to invent entities that are independent of humans in sentience. At the contemporary level, automobile manufactures (e.g., Ford) claim that their use of radar and laser for adaptive cruise control exhibits sentience. At the science fiction front, for decades, Hollywood movies have purported futures with such robots such as in the 2005 movie, simply titled AI. Cognitive robotics endeavor to define that which would have to be synthesized were consciousness to be found in an engineered artifact. (Baars, 1998). Cognitive robotics exemplified at Utrecht and Toronto mimic animals and strives to embody sophisticated human reasoning. Finally, an example of sponsored research is Affective Intelligent Driving Agent (AIDA, <http://senseable.mit.edu/aida/>) is a driver assistant that makes driving comments accounting for emotional state of the driver. Of particular attention for near future funding is the projected global UAV market. Knowledge fusion and strategic decision making will continue to be a high priority research front. A group of UAVs are most usefully understood as a social network to be directed by human supervisors. As such much of the issues of crowds, networks, and markets are pertinent (Easley, et. al., 2010).

In part, our course aims to be a survey of state of the art robotics research. A parallel objective is introduction of algorithms and computational paradigms for autonomous robots. Lastly, we aim to offer a hands on appreciation for deciphering facts versus myths in robotics.

At the national level, D<sup>3</sup> is driven by financial investments and visions set forth by the private sector including automotive and food processing industries. The DoD is the other driving force. Wealthy schools rely on the auto industry for funding product driven objectives such as the Aida project at MIT. Edutainment is a byproduct of D<sup>3</sup> research. Creation is the least funded

byproduct and remain as pet projects of intellectuals. There are rare times which creation nears a tipping point of a promise to deliver human cognitive functionalities.

## References

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