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# CHALLENGES OF AUTONOMOUS SYSTEMS

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The Center for Air and Space Law is leading research efforts to provide viable solutions that assure that humans take full advantage of the many benefits offered by drone technologies, while preserving privacy, safety and security.

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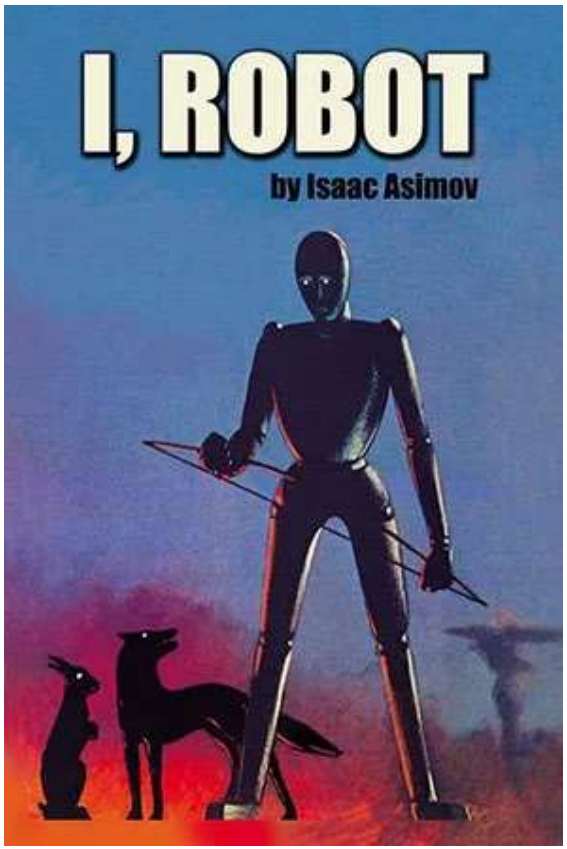
# Three Fundamental Rules of Robotics




One, a robot may not injure a human being, or, through inaction, allow a human being to come to harm. . ..

Two, ... a robot must obey the orders given it by human beings except where such orders would conflict with the First Law.

And three, a robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

ISSAC ASSIMOV, Roundabout, in I. ROBOT (1950).

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# What is AI?

Nersessian and Mancha thoughtfully categorize AI as follows:

- (i) Automation AI: Characterized by known pathways and defined characteristics, replacing known and repetitive human activities (e.g. sales chatbots, or repetitive tasks in manufacturing).
- (ii) Augmentation AI: Designs based on known interactions with human operators-helping workers to recall and analyze data but leaving judgment and strategizing to necessary human counterparts (e.g. surgical robots, or the augmented reality game Pokemon Go).
- (iii) Autonom[ous] AI: Machine learning based on unknown interactions and environments, where the machine itself makes important, high stakes decisions-only primitive forms currently exist (e.g., today's "self-driving" vehicles), but autonomy will be the inevitable result of AI increasingly gaining the ability to deal with unstructured data and complex settings.

# Primary AAI Vulnerabilities

- Loss of Privacy and Data Security
- Manipulation and hijacking
- The Black Box of Machine Learning
- Bias
- Phantoms and Hallucinations


https://www.nbcnews.com/tech/tech-news/self-driving-uber-car-hit-killed-woman-did-not-recognize-n1079281

https://www.brookings.edu/articles/how-emergency-responders-are-using-drones-to-save-lives/