CPE/EE 322
Engineering Design VI
Lesson 8: Ethics and Product Liability

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Outline

1. Ethical and legal considerations in design
2. Modern engineering codes of ethics: self-regulation
3. Common violations
4. Resolving conflicts among the guidelines
5. Product liability: the legal costs of failure
6. Principles of product liability law
7. Designing against foreseeable uses and misuses
8. Anticipating the effects of change in a product

Objectives

G. Voland, Engineering by Design, Chapter 8

- Explain the practical value of professional codes of ethics
- Describe early forms of guidelines for engineering practice
- Discuss the legal obligations and requirements that must be satisfied by professional engineers
- Describe various cases in which ethical violations occurred
- Apply the National Society of Professional Engineers (NSPE) Code of Ethics to hypothetical situations in which one is confronted by an ethical choice or dilemma
- Explain the need for design engineers to be familiar with product liability law
- Distinguish between manufacturing, design, and warning defects
- Define the three major categories under which product liability lawsuits are filed: negligence, strict liability and implied warranty, and express warranty and misrepresentation
- Discuss the need to design against foreseeable uses and misuses of a product
- Explain why changes in a product during its useful lifetime must be anticipated in the design process

Lab 8 — Data Analysis

- Study the GitHub repository Lesson 8
- Install Python packages
- Save the Lab 7 Google sheet in CSV format to ~/demo
- Copy ~/iot/lesson8/plt_final.py and plt_cv2.py to ~/demo
- Edit plt_final.py and plt_cv2.py to read the CSV file with customized plot titles
- Run plt_final.py and plt_cv2.py

Assignment 8 — Ethics and Liability

Identify any potential hazards in the proposed design
8.1. Ethical issues, e.g., foreseeable misuses
8.2. Product liability, e.g., changes that may occur during the useful lifetime
8.3. Social impact, e.g., disposal after the useful life has ended

Program Outcome 4: (Ethical and Professional Conduct)
4.2 (Ethics and morals) Students will be able to understand the associated ethical issues.
4.3 (Professionalism) Students will be able to understand the associated professional responsibilities.
Program Outcome 2: (Design)
4.1 (Social issues) Students will be able to explore the non-technical space of social requirements, with a particular concern for the social impacts (both favorable and unfavorable) of their project "product."

Ethical and Legal Considerations in Design

- Engineers are legally and morally liable for the consequences of their work
- Unethical actions often are unintentional
- Ethical codes provide guidelines for dealing with dilemmas in which the ethical action may not be obvious
- Legal constraints and practical guidelines include
  - Professional registration
  - Federal, state, or local laws, regulations, and ordinances
  - Contract law
  - Tort (non-contract) law

The Code of Hammurabi

- The sixth Babylonian king, Hammurabi circa 1810 BC — 1750 BC, enacted the code, and partial copies exist on a 2.25-m (7.38-ft) stone stele and various clay tablets, dating back to about 1754 BC
- The code consists of 282 laws including those for builders such as

  229. If a builder builds a house for someone, and does not construct it properly, and the house falls in and kills its owner, then the builder shall be put to death

  230. If it kills the son of the owner, the son of the builder shall be put to death

  231. If it kills a slave of the owner, then the builder shall pay, slave for slave, to the owner of the house

  232. If it ruins goods, the builder shall make compensation for all that has been ruined, and inasmuch as the builder did not construct properly the house and it fell, the builder shall re-erect the house from his own means

  233. If a builder builds a house for someone, even though he has not yet completed it; if then the walls seem toppling, the builder must make the walls solid from his own means

Modern Engineering Codes of Ethics: Self-Regulation

Professional engineering societies such as the National Society of Professional Engineers (NSPE) and the Institute of Electrical and Electronics Engineers (IEEE) set codes of ethics to

- Encourage engineers to behave according to the accepted standards of the profession
- Provide guidelines about these standards and their application
- Assure lawmakers that engineering societies can be trusted to regulate the actions of their own members
- Encourage professional societies to support those members who do act in an ethical manner but then suffer negative consequences, e.g., loss of employment because of this action

NSPE Code of Ethics (CoE)

https://www.nspe.org/resources/ethics/code-ethics

Fundamental canons, including rules of practice:
Engineers, in the fulfillment of their professional duties, shall

1. Hold paramount the safety, health, and welfare of the public
2. Perform services only in areas of their competence
3. Issue public statements only in an objective and truthful manner
4. Act for each employer or client as faithful agents or trustees
5. Avoid deceptive acts
6. Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession

NSPE Professional Obligations

https://www.nspe.org/resources/ethics/code-ethics

1. Engineers shall be guided in all their relations by the highest standards of honesty and integrity
2. Engineers shall at all times strive to serve the public interest
3. Engineers shall avoid all conduct or practice that deceives the public
4. Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve
5. Engineers shall not be influenced in their professional duties by conflicting interests
6. Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods
7. Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action
8. Engineers shall accept personal responsibility for their professional activities, provided, however, that engineers may seek indemnification for services arising out of their practice for other than gross negligence, where the engineer's interests cannot otherwise be protected
9. Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others

IEEE Code of Ethics

http://www.ieee.org/about/corporate/governance/p7-8.html

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

I. To uphold the highest standards of integrity, responsible behavior, and ethical conduct in professional activities.
II. To treat all persons fairly and with respect, to not engage in harassment or discrimination, and to avoid injuring others.
III. To strive to ensure this code is upheld by colleagues and co-workers.

Scientific Publishing Ethics

- D. Resnik, "What Is Ethics in Research and Why Is It Important?" December 23, 2020. [Online]. Available: https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm
- IEEE Author Center
- IEEE author ethics guidelines include authorship, citations, and data reporting

NCEES

The National Council of Examiners for Engineering and Surveying (NCEES) provides leadership in professional licensure of engineers and surveyors through excellence in

- Uniform laws, i.e., Model Laws
- Licensing standards, e.g., Fundamentals of Engineering Exam and Principles and Practice of Engineering Exam
- Professional ethics, i.e., Model Rules

to safeguard the health, safety, and welfare of the public and to shape the future of professional licensure

Institutional Review Board

- An institutional review board (IRB), also known as an independent ethics committee (IEC), ethical review board (ERB), or research ethics board (REB), is a type of committee that applies research ethics by reviewing the methods proposed for research to ensure that they are ethical
- Such boards are formally designated to approve (or reject), monitor, and review biomedical and behavioral research involving humans
- They often conduct some form of risk-benefit analysis in an attempt to determine whether or not research should be conducted
- The purpose of the IRB is to assure that appropriate steps are taken to protect the rights and welfare of humans participating as subjects in a research study
- Along with developed countries, many developing countries have established national, regional, or local Institutional Review Boards in order to safeguard ethical conduct of research concerning both national and international norms, regulations, or codes

Age Appropriate Design Code

- 5Rights Foundation articulates the rights of children in the digital environment:
  - The right to remove
  - The right to know
  - The right to safety and support
  - The right to informed and conscious use
  - The right to digital literacy
- 5Rights Foundation proposes seven pillars upon which the government's internet safety strategy could be built:
  - Parity of protection
  - Design standards
  - Accountability
  - Enforcement
  - Leadership
  - Education
  - Evidence-based interventions

Global Digital Cooperation

- The Age of Digital Interdependence submitted by the United Nations (UN) Secretary-General's High-level Panel on Digital Cooperation on 2019-06-10 has three main sections:
  - Leaving No One Behind: a landscape of how digital technology can support achieving the Sustainable Development Goals (SDGs) and how to ensure a more inclusive digital economy
  - Individuals, Societies, and Digital Technologies: a review of issues related to human rights, human agency and security in the digital realm
  - Mechanisms for Global Digital Cooperation: an analysis of current gaps and proposals for how to improve our global digital cooperation architecture
- It makes five sets of recommendation:
  - Build an Inclusive Digital Economy and Society
  - Develop Human and Institutional Capacity
  - Protect Human Rights and Human Agency
  - Promote Digital Trust, Security, and Stability
  - Foster Global Digital Cooperation

Thinking Any of These Things?

- Just this once
- I'm still doing a good job
- It won't hurt anyone
- I trust my own judgment
- No one will know
- I'm doing it for the good of _____

It's time to stop, think, and ask

Take Action When Needed

- Seek guidance
  - Get a second opinion
  - Look at the Code of Ethics
  - Refer to the _____ Policies
  - Talk to the _____ Legal and Compliance
- Choose ethics first
  - If unsure which course is the ethical one, ask the _____ Legal and Compliance
- Know when to speak up
  - Doing the right thing means speaking up when something feels or sounds wrong

Common Ethical Violations

- Failing to protect the public
- Unethical disclosure of facts and information
- Failure to include all pertinent information in professional reports
- Performing work for which one is not qualified
- Expressing a professional opinion that is not founded on both adequate knowledge of facts and technical competence in the field
- Issuing a statement or other communication without identifying all interested parties
- Failing to act as a faithful agent or trustee of one's employer or client

Resolving Conflicts Among the Guidelines

- Engineers' foremost responsibility is to act in the best interest of the public
- All other considerations are secondary to this goal

Product Liability: the Legal Costs of Failure

- The majority of product liability laws are determined at the state level and vary widely from state to state
- The claims most commonly associated with product liability are negligence, strict liability, breach of warranty, and various consumer protection claims
- Three major types of product defects
  - Manufacturing defects
  - Design defects
  - Failure-to-warn defects
- Under strict liability, the manufacturer is liable if the product is defective, even if the manufacturer was not negligent in making that product defective
- Strict liability thus causes manufacturers to evaluate the full costs of their products including the litigation costs

Removed Privity Protection

- Referring to a direct contractual relationship between two parties, privity used to shield manufacturers from lawsuits by requiring that the product had to have been purchased by buyer directly from the defendant
  - If the manufacturer sold its products through a distributor, only the distributor (who had sold the product directly to the buyer) could be sued in the event of a mishap
  - The distributor could claim that the product was sold in good faith and therefore was not responsible for the injury or loss
- The following cases removed privity protection from cases involving negligence, implied warranty (contract law), or strict liability (tort law)
  - MacPherson v. Buick Motor Company (1916)
  - Henningsen v. Bloomfield Motors, Inc. (1960)
  - Greenman v. Yuba Power Products, Inc. (1963)
- By reason of its existence and sale, every product is now expected to be safe to use, and most product liability lawsuits are now filed under the tort category of strict liability

Force Majeure

- Force majeure is a common clause in contracts that essentially frees both parties from liability or obligation when an extraordinary event or circumstance beyond the control of the parties, such as a war, strike, riot, crime, hurricane, flood, earthquake, volcanic eruption, *etc*., prevents one or both parties from fulfilling their obligations under the contract
- In practice, most force majeure clauses do not excuse a party's non-performance entirely, but only suspend it for the duration of the force majeure
- Force majeure is generally intended to include occurrences beyond the reasonable control of a party, and therefore would not cover:
  - Any result of the negligence or malfeasance of a party, which has a materially adverse effect on the ability of such party to perform its obligations
  - Any result of the usual and natural consequences of external forces
  - Any circumstances that are specifically contemplated (included) in the contract—for example, if the contract for the outdoor event specifically permits or requires cancellation in the event of rain

General Data Protection Regulation

- The General Data Protection Regulation (GDPR) was designed to
  - Harmonize data privacy laws across Europe
  - Protect and empower all European Union (EU) citizens data privacy
  - Reshape the way organizations across the region approach data privacy
- It also addresses the export of personal data outside the EU
- Among their provisions, the rules include the right to be forgotten that people can ask companies to remove certain online data about them
- The rules also require anyone under 16 to obtain parental consent before using popular digital services
- Effective 2018-05-25, if companies do not comply, they could face fines up to 4% of their annual global revenue or €20 Million, whichever is greater

California Consumer Privacy Act

- The California Consumer Privacy Act (CCPA) of the Assembly Bill (AB-375) applies to any for-profit entity that collects consumers' personal data, does business in California, and satisfies at least one of the following:
  - Has annual gross revenues in excess of $25 million
  - Possesses the personal information of 50,000 or more consumers, households, or devices
  - Earns more than half of its annual revenue from selling consumers' personal information
- Organizations are required to "implement and maintain reasonable security procedures and practices" in protecting consumer data
- Effective 2020-01-01, companies have 30 days to comply with the law once regulators notify them of a violation
- If the issue isn't resolved, there's a fine of up to $7,500 per record
- In November 2020, the California Proposition 24, also known as the California Privacy Rights Act (CPRA), amends and expands the CCPA

Design Against Misuses

- Anticipate foreseeable uses and misuses of the product by the user, e.g., texting while driving
- Although one can not expect to eliminate all possible misuses of a product, the attempt must be made
- Design against any misuse of a product and make it impossible for such misuses to occur

Anticipating the Effects of Change in a Product

- All products age with resultant changes in their characteristics that may result in injury or loss
- Engineers must
  - Anticipate the change that may occur in a product during its useful lifetime
  - Consider the disposal of a product after its useful life has ended
  - Protect both people and the environment from the disposal of a hazardous product

Artificial Intelligence (AI) Tenets

The tenets of the Partnership on AI founded by Amazon, Apple, DeepMind, Google, Meta Platforms, IBM, and Microsoft

1. We will seek to ensure that AI technologies benefit and empower as many people as possible.
2. We will educate and listen to the public and actively engage stakeholders to seek their feedback on our focus, inform them of our work, and address their questions.
3. We are committed to open research and dialogue on the ethical, social, economic, and legal implications of AI.
4. We believe that AI research and development efforts need to be actively engaged with and accountable to a broad range of stakeholders.
5. We will engage with and have representation from stakeholders in the business community to help ensure that domain-specific concerns and opportunities are understood and addressed.
6. We will work to maximize the benefits and address the potential challenges of AI technologies, by:
    a. Working to protect the privacy and security of individuals.
    b. Striving to understand and respect the interests of all parties that may be impacted by AI advances.
    c. Working to ensure that AI research and engineering communities remain socially responsible, sensitive, and engaged directly with the potential influences of AI technologies on wider society.
    d. Ensuring that AI research and technology is robust, reliable, trustworthy, and operates within secure constraints.
    e. Opposing development and use of AI technologies that would violate international conventions or human rights, and promoting safeguards and technologies that do no harm.
7. We believe that it is important for the operation of AI systems to be understandable and interpretable by people, for purposes of explaining the technology.
8. We strive to create a culture of cooperation, trust, and openness among AI scientists and engineers to help us all better achieve these goals.

AI Thematic Pillars

https://www.partnershiponai.org/thematic-pillars

1. Safety-critical AI
2. Fair, transparent, and accountable AI
3. Collaborations between people and AI systems
4. AI, labor, and the economy
5. Social and societal influences of AI
6. AI and social good
7. Special initiatives

Ethically Aligned Design (EAD)

- IEEE Ethics in Action in Autonomous and Intelligent Systems
  - *IEEE Financial Playbook Version 1.0: Trusted Data and Artificial Intelligence Systems (AIS) for Financial Services*
  - *IEEE Ethically Aligned Design: A Vision for Prioritizing Human Well-Being With Autonomous and Intelligent Systems, First Edition (EAD1e)*
  - IEEE 7000 series of standards
  - IEEE Ethics Certification Program for Autonomous and Intelligent Systems (ECPAIS)
- The Open Community for Ethics in Autonomous and Intelligent Systems (OCEANIS)

IEEE Standards and Projects

7000-2021 Standard Model Process for Addressing Ethical Concerns During System Design
7001-2021 Standard for Transparency of Autonomous Systems
7002-2022 Standard for Data Privacy Process
P7003 Standard for Algorithmic Bias Considerations
P7004 Standard for Child and Student Data Governance
P7004.1 Recommended Practices for Virtual Classroom Security, Privacy and Data Governance
7005-2021 Standard for Transparent Employer Data Governance
P7006 Standard for Personal Data Artificial Intelligence Agent
7007-2021 Ontological Standard for Ethically Driven Robotics and Automation Systems
P7008 Standard for Ethically Driven Nudging for Robotic, Intelligent and Autonomous Systems
P7009 Standard for Fail-Safe Design of Autonomous and Semi-Autonomous Systems
7010-2020 Recommended Practice for Assessing the Impact of Autonomous and Intelligence Systems on Human Well-Being
P7010.1 Recommended Practice for Environmental Social Governance (ESG) and Social Development Goal (SDG) Action Implementation and Advancing Corporate Responsibility
P7011 Standard for the Process of Identifying and Rating the Trustworthiness of News Sources
P7012 Standard for Machine Readable Personal Privacy Terms
P7013 Inclusion and Application Standards for Automated Facial Analysis Technology
P7014 Standard for Ethical considerations in Emulated Empathy in Autonomous and Intelligent Systems
P7015 Standard for Data and Artificial Intelligence (AI) Literacy, Skills, and Readiness
P7016 Standard for Ethically Aligned Design and Operation of Metaverse Systems

Lesson 8 Summary

- Codes of ethics provide guidelines for dealing with various types of professional dilemmas
- The ancient code of Hammurabi for builders and the United States marine safety code are early guidelines for acceptable engineering practice
- Professional engineers must follow specific legal obligations and requirements
- The NSPE Code of Ethics can be helpful if one is confronted by an ethical choice or dilemma
- Design engineers must be familiar with product liability law to understand the legal boundaries for socially acceptable products
- Manufacturing defects in a product is localized to a single unit, whereas warning and design defects affect the entire product population
- Negligence, strict liability and implied warranty, and express warranty and misrepresentation are the three major categories of product liability lawsuits
- Privity no longer serves to protect manufacturers from lawsuits
- One must design against foreseeable uses and misuses of a product
- Possible changes in a product during its useful lifetime must be anticipated in the design process

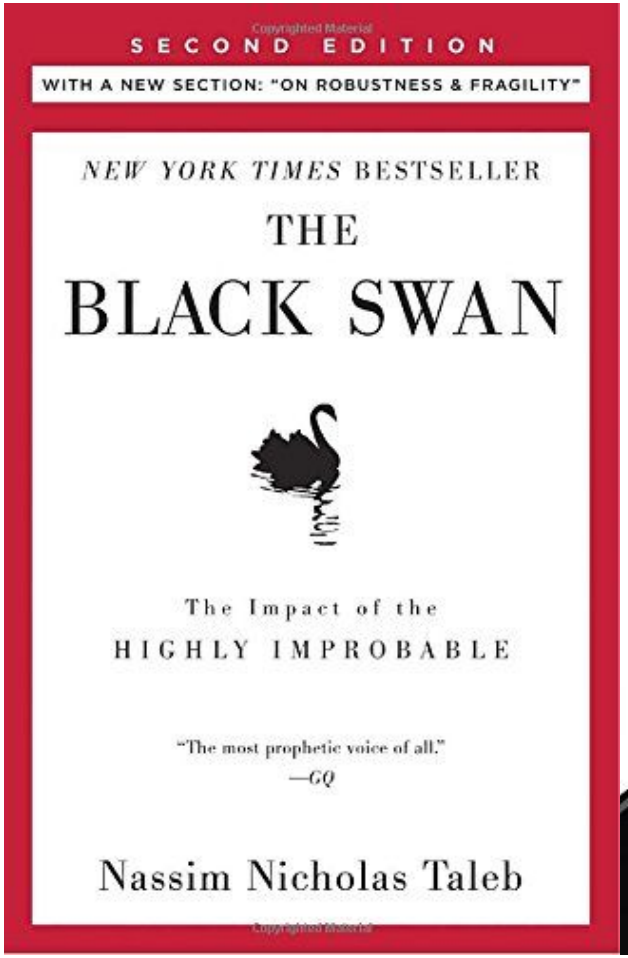
The Stevens Honor System

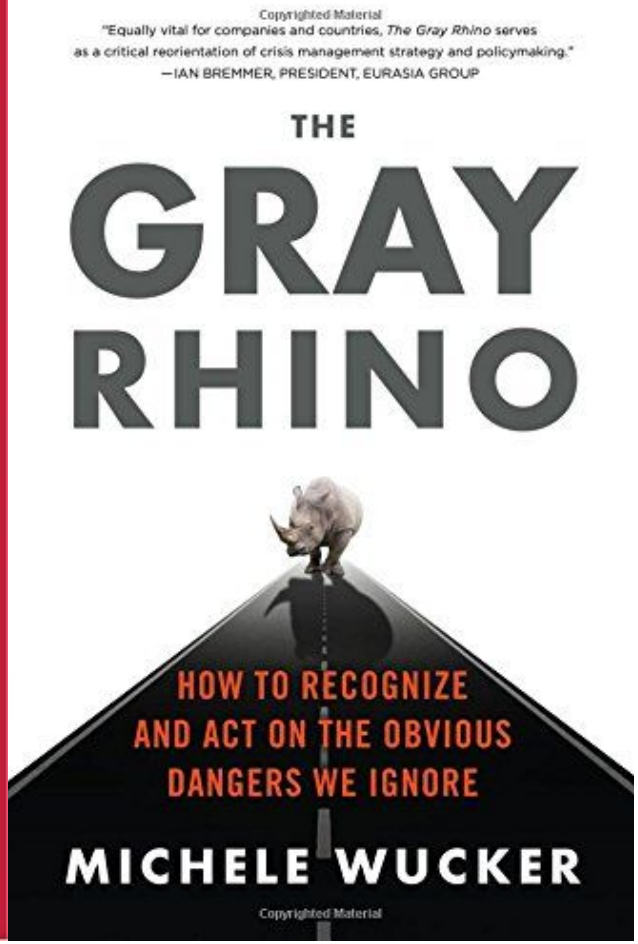
- The Stevens Honor System, est. 1908, has two objectives
  - To ensure that work submitted by students can be trusted as their own and was performed in an atmosphere of honesty and fair play
  - To promote, both on the campus and in the individual student, a sense of honor in preparation for the professional world
- "The measure of a man's real character is what he would do if he knew he would never be found out."
  - Thomas Babington Macaulay 1800—1859
  - Singular *they*

The Torch Bearers

- Anna Hyatt Huntington 1876—1973 designed *Los Portadores de la Antorcha* (*The Torch Bearers*) from 1949 to 1954 with the theme of passing the lit torch of ethics, learning, and values from one generation to the next
- Donated the original aluminum cast sculpture to la Universidad Complutense de Madrid (est. 1293) in Spain on May 15, 1955, and one of the replicas to Stevens in April 1964

Black Swan and Gray Rhino



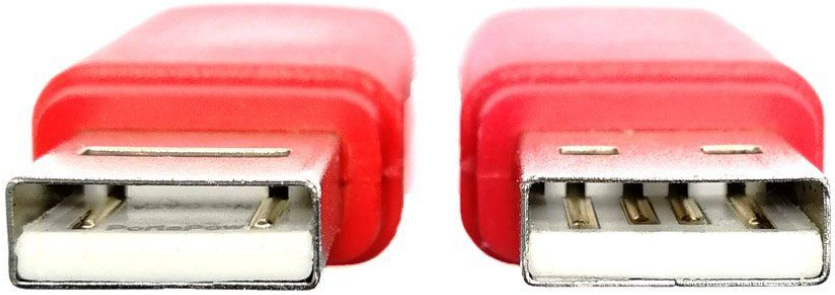


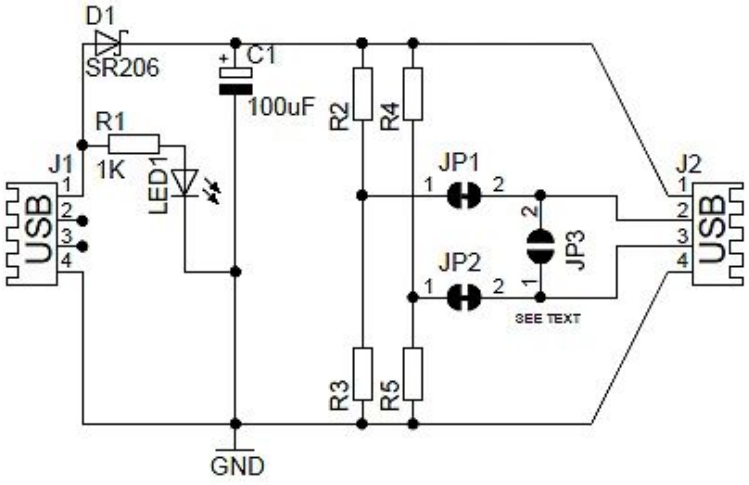
- "A black swan is an event, positive or negative, that is deemed improbable yet causes massive consequences"
- "A gray rhino is a highly probable, high impact yet neglected threat: kin to both the elephant in the room and the improbable and unforeseeable black swan"
- "Gray rhinos are not random surprises, but occur after a series of warnings and visible evidence"

Bladeless Fan

USB Data Blocker

Data Blocker vs. Standard USB-A Socket





- Juice jacking is a type of cyber attack involving a charging port that doubles as a data connection, typically over USB
- This often involves either installing malware or surreptitiously copying sensitive data from a smartphone, tablet, or other computer devices
- The data blocker circuit takes its input through the male jack (J1), and outputs the usb charging supply through the female jack (J2)
- The red lamp (LED1) is the “power-in” indicator
- By default, jumper pads JP1 and JP2 are bridged and JP3 is opened

IEEE Standards for Wireless Access in Vehicular Environments (WAVE)

- IEEE 1609.0-2019 IEEE Guide for WAVE Architecture
- IEEE 1609.2b-2019 IEEE Standard for WAVE—Security Services for Applications and Management Messages—Amendment 2: Protocol Data Unit (PDU) Functional Types and Encryption Key Management
- IEEE 1609.2.1-2022 IEEE Standard for WAVE—Certificate Management Interfaces for End Entities
- IEEE 1609.3-2020 IEEE Standard for WAVE—Networking
- IEEE 1609.4-2016/Cor 1-2019 IEEE Standard for WAVE—Multi-Channel Operation—Corrigendum 1: Miscellaneous Corrections
- IEEE 1609.11-2010 IEEE Standard for WAVE—Over-the-Air Electronic Payment Data Exchange Protocol for Intelligent Transportation Systems (ITS)
- IEEE 1609.12-2019 IEEE Standard for WAVE—Identifiers

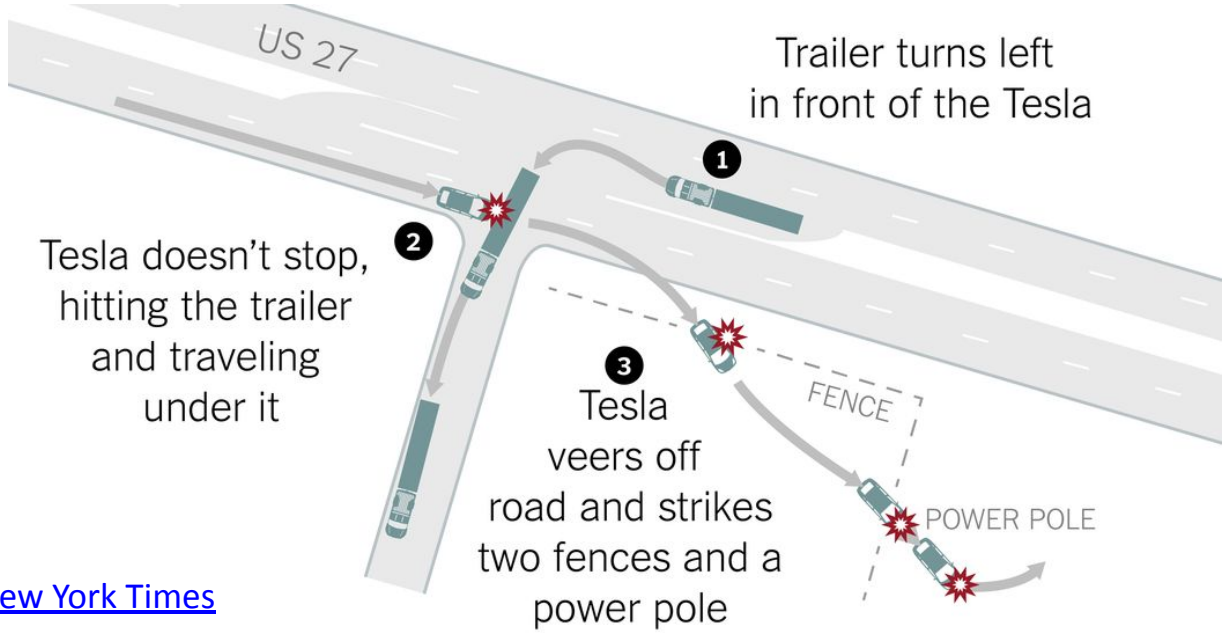
Levels of Driving Automation

SAE J3016_201806: [Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles]

Level	Name	Narrative definition	DDT		DDT fallback	ODD
			Sustained lateral and longitudinal vehicle motion control	*OEDR*		
Driver* performs part or all of the *DDT						
0	**No Driving Automation**	The performance by the *driver* of the entire *DDT*, even when enhanced by *active safety systems*.	*Driver*	*Driver*	*Driver*	n/a
1	**Driver Assistance**	The *sustained* and *ODD*-specific execution by a *driving automation system* of either the *lateral* or the *longitudinal vehicle motion control* subtask of the DDT (but not both simultaneously) with the expectation that the *driver* performs the remainder of the *DDT*.	*Driver* and *System*	*Driver*	*Driver*	Limited
2	**Partial Driving Automation**	The *sustained* and *ODD*-specific execution by a *driving automation system* of both the *lateral* and *longitudinal vehicle motion control* subtasks of the *DDT* with the expectation that the *driver* completes the *OEDR* subtask and *supervises* the *driving automation system*.	***System***	*Driver*	*Driver*	Limited
***ADS* ("*System*") performs the entire *DDT* (while engaged)**			*System*	***System***	*Fallback-ready user (becomes the driver during fallback)*	Limited
3	**Conditional Driving Automation**	The *sustained* and *ODD*-specific performance by an *ADS* of the entire DDT with the expectation that the *DDT fallback-ready user* is *receptive* to *ADS*-issued *requests to intervene*, as well as to *DDT performance-relevant system failures* in other *vehicle* systems, and will respond appropriately.				
4	**High Driving Automation**	The *sustained* and *ODD*-specific performance by an *ADS* of the entire *DDT* and *DDT fallback* without any expectation that a *user* will respond to a *request to intervene*.	*System*	*System*	***System***	Limited
5	**Full Driving Automation**	The *sustained* and unconditional (i.e., not *ODD*-specific) performance by an *ADS* of the entire *DDT* and *DDT fallback* without any expectation that a *user* will respond to a *request to intervene*.	*System*	*System*	*System*	**Unlimited**

Self-Driving Car Accidents

- Cars driven under traditional human control are currently involved in approximately 1.18 fatalities for every 100 000 000 mi (160 934 400 km) driven
- Distance driven by Tesla Model S cars at the time of the 2016-05-07 driver fatality in Williston, Florida, was 130 000 000 mi (209 214 720 km)

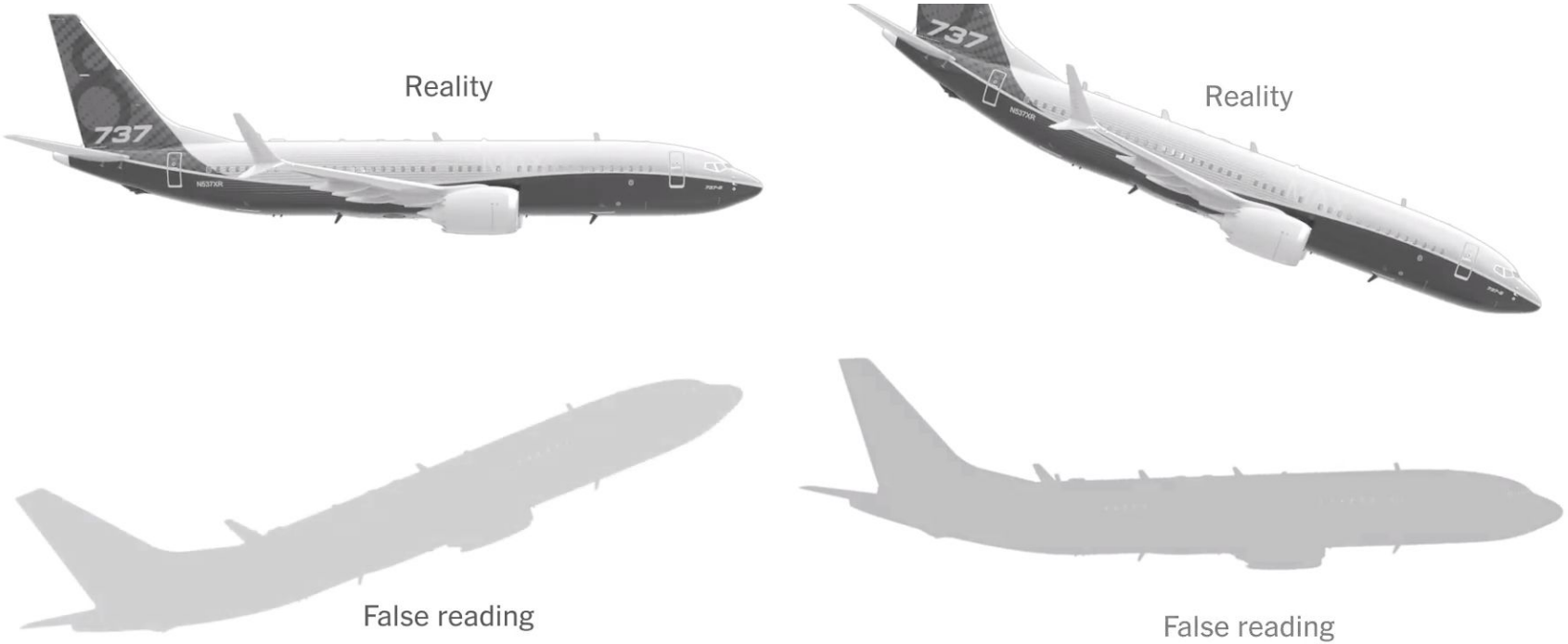


Source: The New York Times

Flaws in Automated Systems

The Boeing 737 MAX Maneuvering Characteristics Augmentation System (MCAS) used to rely on one of two angle of attack (AOA) sensors and stabilizers on the tail to push the nose back down to avoid a stall

Source: The New York Times



9-Volt Battery Safety

- 9-volt batteries that power smoke alarms, household items, and toys can be found in most homes and can be a fire hazard if not stored safely or disposed of with care
- To store, keep in original packaging or keep ends covered
- For disposal, make sure that the positive and negative posts are safely wrapped in electric tape

Recycling Symbols on Plastics

https://en.wikipedia.org/wiki/Recycling_codes

PETE (polyethylene terephthalate)
HDPE (high-density polyethylene)
PVC (polyvinyl chloride)
LDPE (low-density polyethylene)
PP (polypropylene)
PS (polystyrene)

Clogs in Sewer Systems

Fatberg, a portmanteau of fat and berg as in iceberg, is a congealed lump of fat with wet wipes and similar items that do not break down like toilet paper, thereby clogging sewer systems

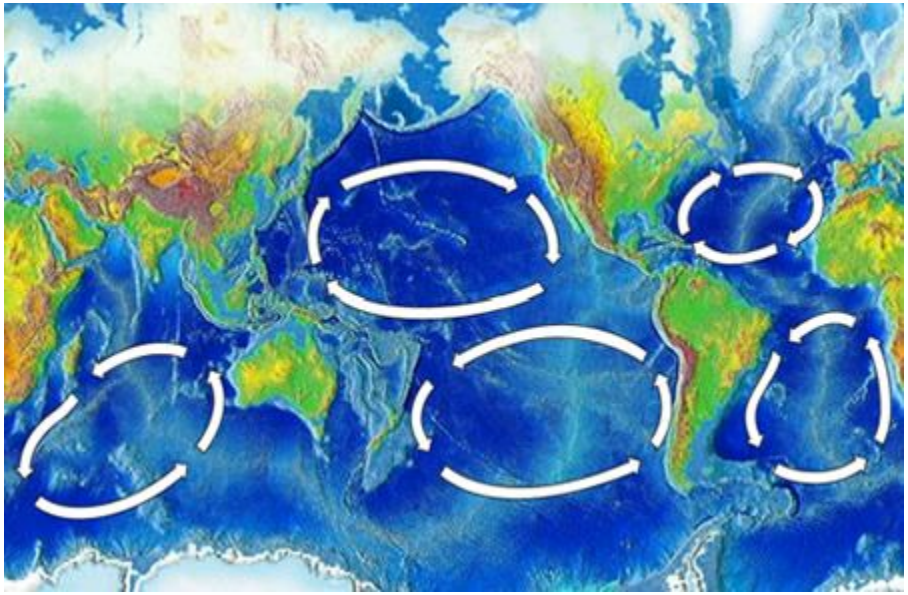
E-Waste

Shredded material goes on the belt, where an overhead electromagnet removes material containing iron as the e-waste moves along

Marine Debris

https://en.wikipedia.org/wiki/Marine_debris

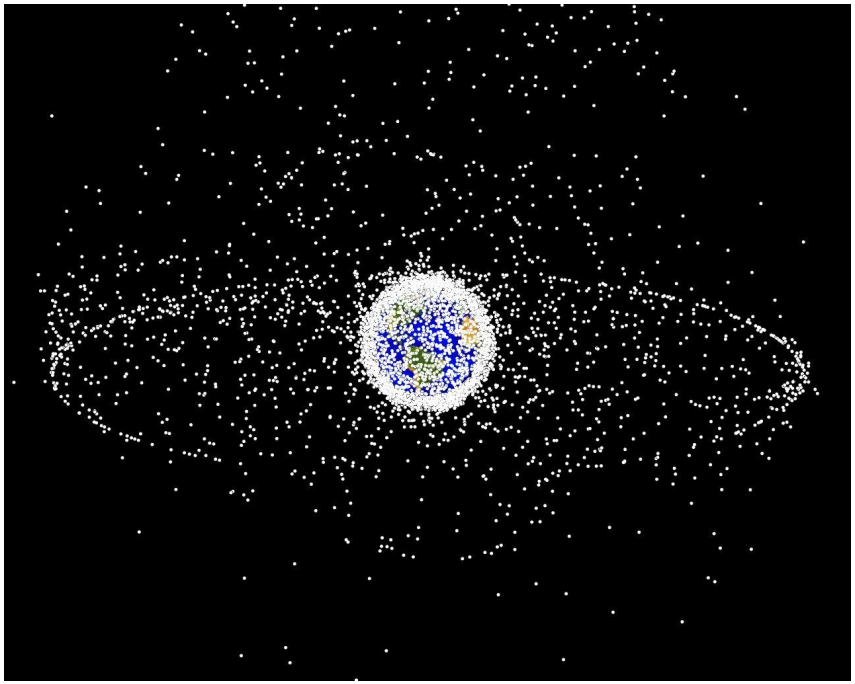
- Marine debris is defined as any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes
- Floatable marine debris items, once they enter the ocean, are carried via oceanic currents and atmospheric winds

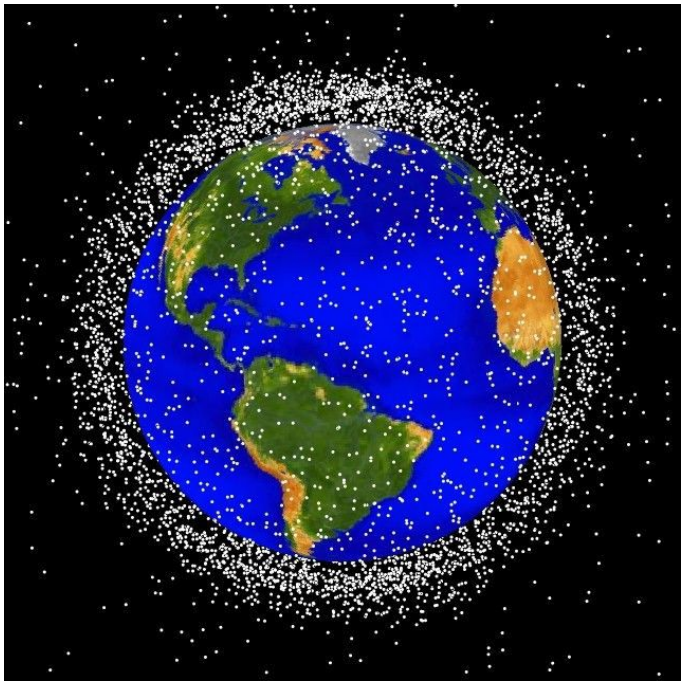


Orbital Debris

https://en.wikipedia.org/wiki/Space_debris

- Orbital debris is any man-made object, mission-related or fragmentation, in orbit about the Earth that no longer serves a useful function
- Traveling at speeds up to 17,500 mph, even tiny paint flecks can damage a spacecraft — the greatest risk to space missions comes from non-trackable debris





False Information

- Web contents can be false, fabricated, manipulated, or misleading
- The International Federation of Library Associations and Institutions (IFLA) published an Infographic "How to spot fake news" on 2017-01-27
- Facebook prioritizes news reports in its news feed from publications that users have rated in Facebook surveys as trustworthy
- Google published a paper titled "Knowledge-based Trust: Estimating the Trustworthiness of Web Sources" on 2015-02-12 about a new method of scoring webpages based on the accuracy of the facts presented through understanding a page's context without the use of third-party signals

Fear of Missing Out (FOMO)

- Fear of missing out (FOMO) is anxiety stemming from the belief that others might be having fun while one is not present
- FOMO is associated with a fear of regret, which may lead to concerns that one might miss an opportunity for social interaction, a novel experience, a memorable event, or a profitable investment
- It is characterized by a desire to stay continually connected with what others are doing, and can be described as the fear that deciding not to participate is the wrong choice
- Social networking sites creates many opportunities for FOMO
- While it provides opportunities for social engagement, it offers a view into an endless stream of activities in which a person is not involved
- Psychological dependence on social media can lead to FOMO or even pathological internet use
- FOMO is associated with worsening depression and anxiety, and a lowered quality of life
- Joy of missing out (JOMO) is "the emotionally intelligent antidote to FOMO"

Deepfakes

- Deepfake is a portmanteau of deep learning and fake
- Deepfakes leverage powerful techniques by training generative neural network architectures such as autoencoders or generative adversarial networks (GANs) to manipulate or generate synthetic media of visual and audio content with a high potential to deceive
- Nvidia introduced StyleGAN in 2018 and StyleGAN2 in 2019
- Generative Pre-trained Transformer 3 (GPT-3) is an autoregressive language model that uses deep learning to produce human-like text
- Lyrebird is an AI research division within Descript
- Sensity.ai provides a database of detected deepfakes

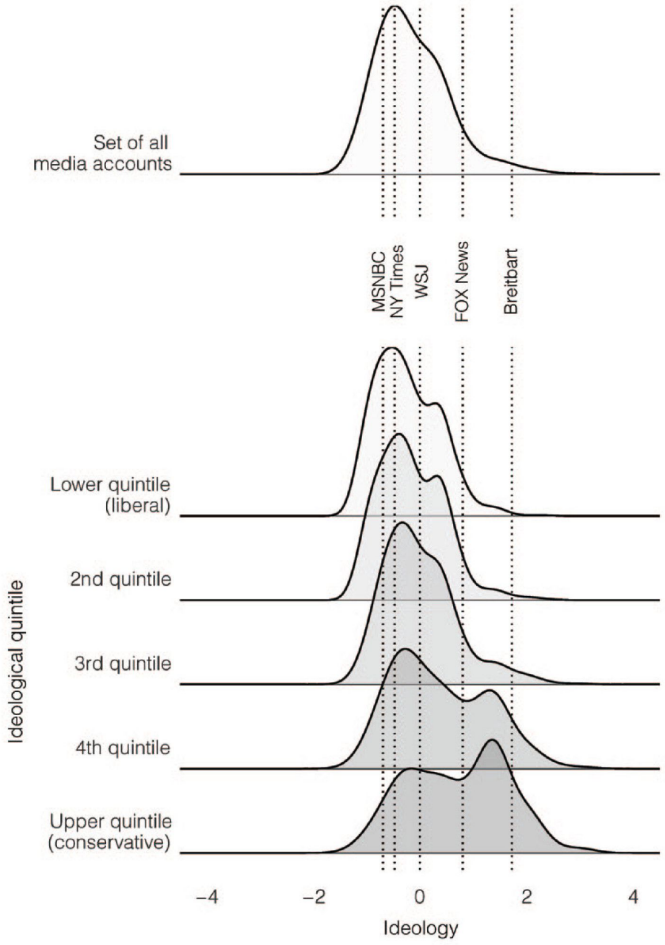
Red Herring

- Max Tegmark, Life 3.0: "The fear of machines turning evil is another red herring. The real worry isn't malevolence, but competence. A superintelligent AI is by definition very good at attaining its goals, whatever they may be, so we need to ensure that its goals are aligned with ours."
- A red herring refers to a particularly strong kipper, a fish (typically a herring) that has been strongly cured in brine (a high-concentration solution of salt in water) and/or heavily smoked with its flesh turning reddish and smelling
- In a figurative sense, a red herring is a logical fallacy or a literary device that misleads or distracts from a relevant or important issue
- The earliest reference to using a red herring for distracting hounds in pursuit of a hare is an article published on 1807-02-14 by William Cobbett 1763—1835 in *Political Register*
- *The Gentleman's Recreation* (1686) by Nicholas Cox referred to using herrings that was not to distract the hounds from a trail, rather to guide horses and hounds along a trail according to Michael Quinion

Echo Chamber

How Many People Live in Political Bubbles on Social Media

- By visiting an echo chamber or a filter bubble, people are able to seek out information that reinforces their existing views, potentially as an unconscious exercise of confirmation bias
- Another emerging term for this echoing and homogenizing effect on the internet within social communities is cultural tribalism
- This may increase social and political polarization and extremism [Ref]
- Cass Sunstein of Harvard has suggested a serendipity architecture (or algorithm) that expands the breadth of news sources for any given headline, thereby exposing readers to diverse and distinct perspectives and helping them form rational and informed opinion rather than succumbing to their own biases



Blinded Experiment

- In a blinded experiment, information that may influence the participants of the experiment is withheld until the experiment is complete
- Blinding can reduce experimental biases that arise from participant expectations, observer effect on the participants, observer bias, confirmation bias, etc.
- A blind can be imposed on any participant of an experiment, including subjects, researchers, technicians, data analysts, and evaluators
- In some cases, while blinding would be useful, it is impossible or unethical, e.g., it is not possible to blind a patient to their treatment in a physical therapy intervention
- A good clinical protocol ensures that blinding is as effective as possible within ethical and practical constraints
    - Single-blind studies blind patients to their treatment allocation
    - Double-blind studies blind both patients and researchers to treatment allocations
    - Triple-blind studies blind patients, researcher, and other third party (such as a monitoring committee) to treatment allocations

EAD Pillars ⟶ General Principles

EAD General Principles	EAD Pillars: Universal Human Values	EAD Pillars: Political Self-Determination Data Agency	EAD Pillars: Technical Dependability
Human Rights	■	■	
Well-being	■	■	
Data Agency	■	■	■
Effectiveness			■
Transparency	■	■	■
Accountability	■	■	■
Awareness of Misuse			■
Competence			■

■ Indicates General Principle mapped to Pillar.

EAD General Principles → Chapters

EAD General Principles	EAD Chapters: General Principles	Classical Ethics in A/IS	Well-being	Affective Computing	Data & Individual Agency	Methods A/IS Design	A/IS for Sustainable Dev.	Embedding Values into A/IS	Policy	Law
Human Rights	■	■	■	■	■	■	■	■	■	■
Well-being	■	■	■ ■	■	■		■	■	■	■
Data Agency	■		■	■	■ ■	■	■	■	■	
Effectiveness	■			■		■		■	■	■
Transparency	■			■		■		■	■	■
Accountability	■			■		■	■	■	■	■
Awareness of Misuse	■	■		■		■		■	■	■
Competence	■			■		■		■	■	■

■ Indicates General Principle mapped to Chapter.

■ Indicates primary EAD Chapter providing elaboration on a General Principle.

EAD Conceptual Framework

The autonomous and intelligent systems shall be trustworthy, provable, and accountable; and shall align to explicitly formulated human values from principles to practice