RESPONSIBLE ARTIFICIAL INTELLIGENCE

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RESPONSIBLE AI: WHY CARE?

- AI systems act autonomously in our world
- Eventually, AI systems will make *better* decisions than humans

AI is designed, is an artefact

- We need to sure that the purpose put into the machine is the purpose which we really want

Norbert Wiener, 1960 (Stuart Russell)

King Midas, c540 BCE

RESPONSIBLE AI

- AI can potentially do a lot. Should it?
- Who should decide?
- Which values should be considered? Whose values?
- How do we deal with dilemmas?
- How should values be prioritized?
- …..

AI AND ETHICS - SOME CASES

- Self-driving cars
  - Who is responsible for the accident by self-driving car?
  - (How) Can a car decide in face of a moral dilemma?
- Automated manufacturing
  - How can technical advances combined with education programs (human resource development) help workers practice new sophisticated skills so as not to lose their jobs?
- Chatbots
  - Mistaken identity (is it a person or a bot?)
  - Manipulation of emotions / nudging / behaviour change support

WHAT WE TALK ABOUT WHEN WE TALK ABOUT AI

- Autonomy
- Decision-making
- Algorithms
- Robots
- Data
- Learning
- End of the world!?
- A better world for all?

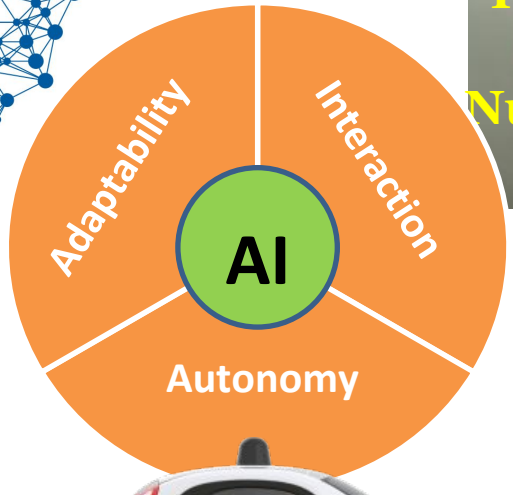
WHAT ABOUT OUR OWN ETHICS?

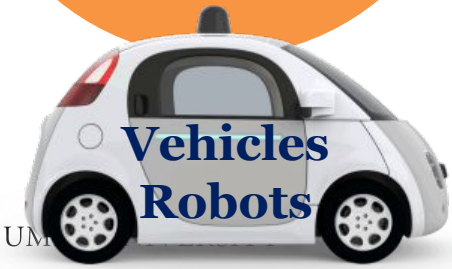
"All my decisions are well thought out."

WHAT IS AI?

- Not just the algorithm
  - Algorithm is the recipe
  - Result is dependent on more
- Not just machine learning / deep learning
  - Current successes are in perception / pattern recognition
  - (Human) intelligence is more
- Not just data
  - Big data is big headache: governance, sustainability
  - Responsible AI demands more

ARTIFICIAL INTELLIGENCE



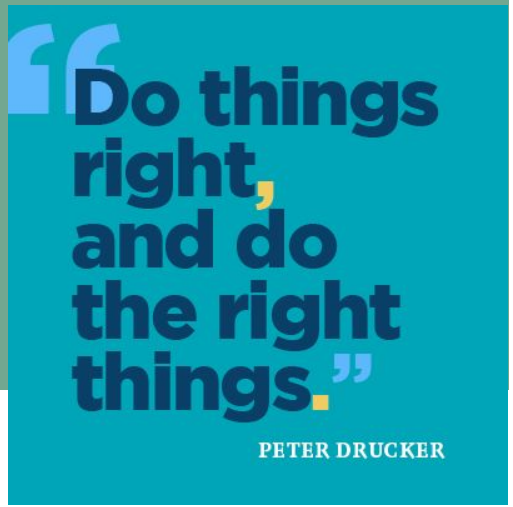


TAKING RESPONSIBILITY

- **in** Design
  - Ensuring that development processes take into account ethical and societal implications of AI as it integrates and replaces traditional systems and social structures
- **by** Design
  - Integration of ethical reasoning abilities as part of the behaviour of artificial autonomous systems
- **for** Design(ers)
  - Research integrity of researchers and manufacturers, and certification mechanisms

ETHICS *IN* DESIGN

- **Doing the right thing**
- **Doing it right**
- **Design for values**
- **Design for all**

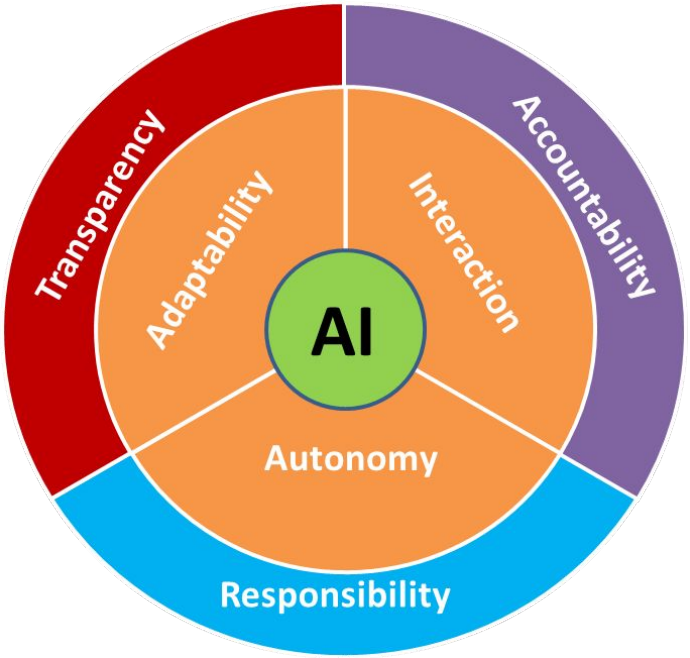


ETHICS *IN* DESIGN– DOING IT RIGHT

- Principles for Responsible AI = ART
  - **A**ccountability
    - Explanation and justification
    - Design for values
  - **R**esponsibility
    - Autonomy
    - Chain of responsible actors
    - Human-like AI
  - **T**ransparency
    - Data and processes
    - Not just about algorithms

- AI systems (will) take decisions that have ethical grounds and consequences
- Many options, not one ‘right’ choice
- Need for design methods that ensure

RESPONSIBLE ARTIFICIAL INTELLIGENCE



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ART IS ABOUT BEING EXPLICIT

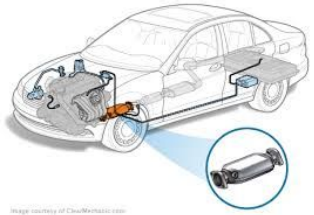
- Question your options and choices
- Motivate your choices
- Document your choices and options
- Regulation
  - External monitoring and control
  - Norms and institutions
- Engineering principles for policy
  - Analyze – synthetize – evaluate - repeat

https://medium.com/@virginiadignum/on-bias-black-boxes-and-the-quest-for-transparency-in-artificial-intelligence-bcde64f9f5b

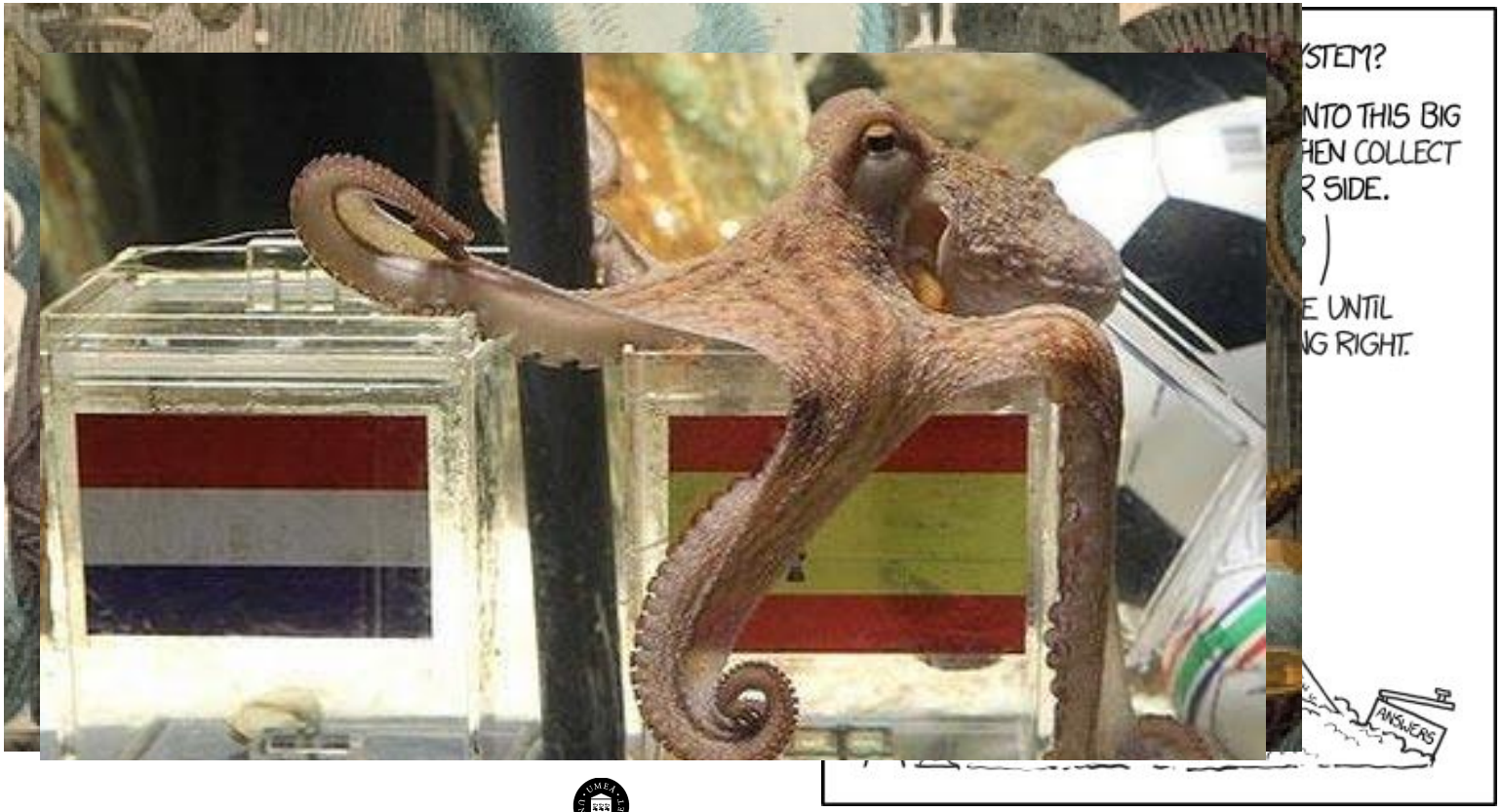
ETHICS *IN* DESIGN - DOING THE RIGHT THING

- Taking an ethical perspective
  - Ethics is the new green
  - Business differentiation
  - Certification to ensure public acceptance

- Principles and regulation are drive for transformation
  - Better solutions
  - Return on Investment

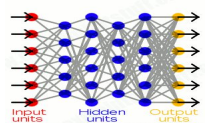


DESIGN CHALLENGES



WHY EXPLAINABLE AI

AI System



- Machine learning is currently the core technology
- Machine learning models are opaque, non-intuitive, and difficult for people to understand

Watson

AlphaGo

Sensemaking

Operations

User

- Why did you do that?
- Why not something else?
- When do you succeed?
- When do you fail?
- When can I trust you?
- How do I correct an error?

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WHAT IS AN EXPLANATION?


Terms and Conditions

Correct
Compreensible
Timely
Complete
Parsimonous

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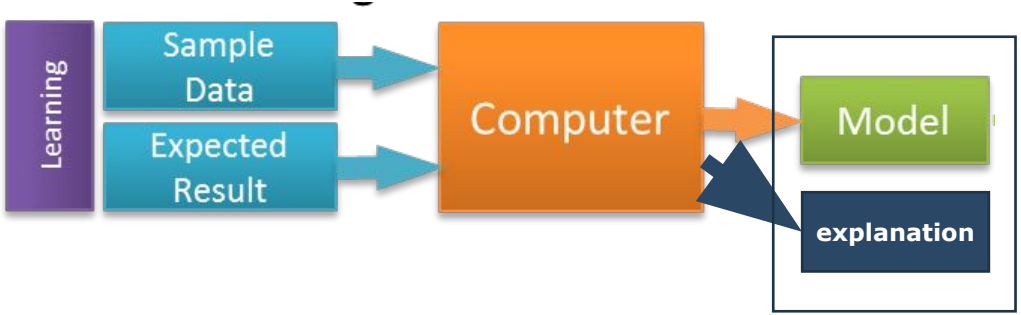
NO AI WITHOUT EXPLANATION



- XAI is for the user:
  - Who depends on decisions, recommendations, or actions of the system
  - Just in time, clear, concise, understandable
- XAI is about:
  - provide an explanation of individual decisions
  - enable understanding of overall strengths & weaknesses
  - convey an understanding of how the system will behave in the future
  - convey how to correct the system's mistakes

DESIGN FOR ALL

- Inclusion
- Diversity
- Dialogue

Optimal AI
=
AI for Good
=
AI for All
=
AI by All

Concerns

- Safety
- Replacement
- Awareness
- Privacy
- Bias
- Human dignity

Danger is not AI taking over the world, but misuse and failures

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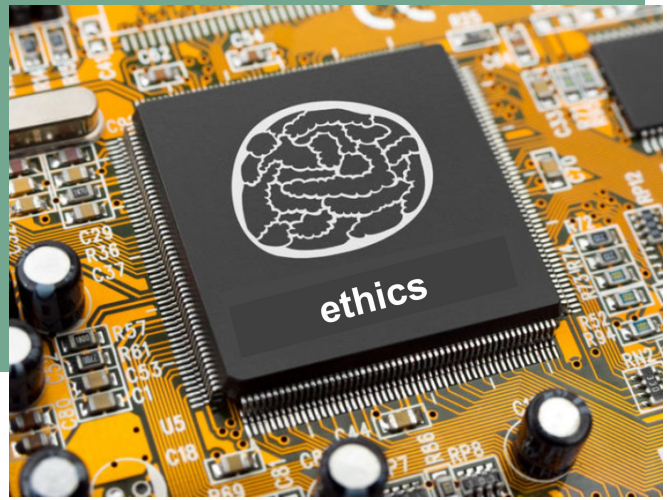
ETHICS BY DESIGN – ETHICAL ARTIFICIAL AGENTS

- **Can AI artefacts be build to be ethical?**
  - What does that mean?
  - What is needed?

- **Understanding ethics**
- **Using ethics**
- **Being ethical**



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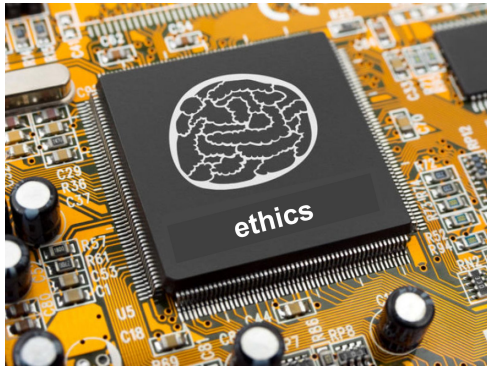
ETHICS BY DESIGN

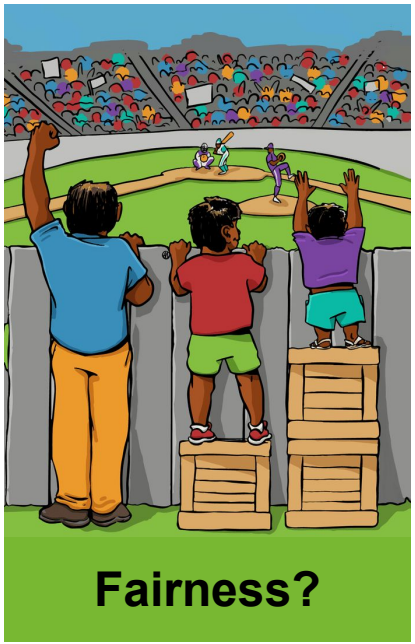


1. **Value alignment**
   - Identify *relevant* human values
   - Are there universal human values?
   - Who gets a say? Why these?

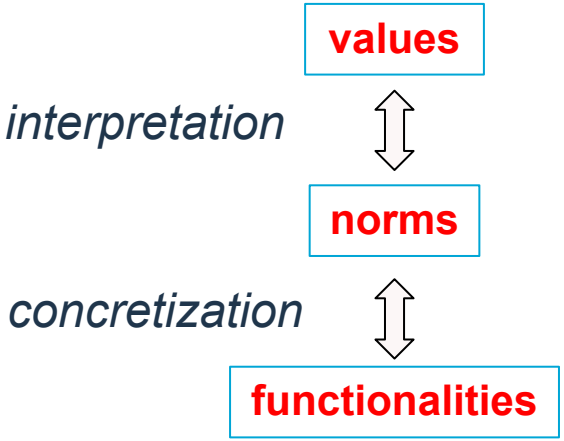
2. **How to behave?**
   - Ethical theories: How to behave according to these values?
   - How to prioritize those values?

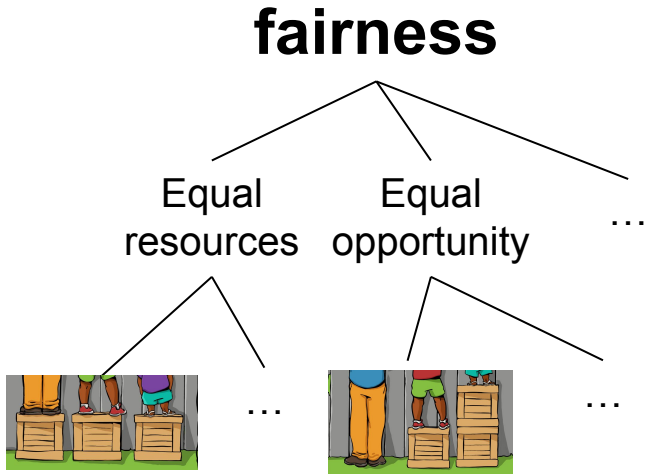
3. **How to implement?**
   - Role of user
   - Role of society
   - Role of AI system

VALUES AND CONTEXT



DECISIONS MATTER!





ETHICAL REASONING? - AN EXAMPLE

Ethical theories

- Many different theories, each emphasizing different points
  - Utilitarian, Kantian, Virtues….
- Highly abstract
- None provide ways to resolve conflicts
- Deontology and Virtue Ethics focus on the individual decision makers while Teleology considers on all affected parties.

- Design a self-driving can that makes ethical decisions
- Value: “human life”
- Implementation?
- Utilitarian car
  - The best for most; results matter
  - **maximize lives**
- Kantian car
  - Do no harm
  - **do not take explicit action if that action causes harm**
- Aristotelian car
  - Pure motives; motives matter
  - **Harm the least; spare the least advantaged (pedestrians?)**

RESPONSIBILITY CHALLENGES

- Chain of responsibility
  - researchers, developerers, manufacturers, users, owners, governments, …

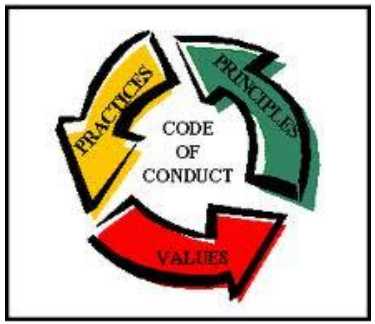
- Levels of autonomy
  - Operational autonomy: Actions / plans
  - Decisional autonomy: Goas/ motives
  - Attainable autonomy: dependent on context and task complexity

ETHICS *FOR* DESIGN(ERS)

- **Regulation**
- **Certification**
- **Standards**
- **Conduct**

ETHICS *FOR* DESIGN(ERS) – REGULATION, CONDUCT

- A code of conduct clarifies mission, values and principles, linking them with standards and regulations
  - Compliance
  - Risk mitigation
  - Marketing
- Many professional groups have regulations
  - Architects
  - Medicine / Pharmacy
  - Accountants
  - Military
- Is what happens when society relies on you!



EU HIGH LEVEL EXPERT GROUP ON AI

- Ethical Guidelines
  - Guiding principles
    - Respecting Fundamental Rights, Principles and Values - Ethical Purpose
    - Critical concerns
  - Implementation
    - Realising trustworthy AI
    - Assessing Trustworthy AI

- Investment and policy strategy
  - Using AI to build an impact in Europe
    - Transforming Europe's Business landscape
    - Catalyzing Europe's Public Sector
    - Attaining World-Class Research Capabilities
    - Accomplishing Citizen's Benefits and Engagement
  - Leveraging Europe's enablers of AI
    - Attracting Funding and Investments in AI
    - Enabling AI with Data and Physical Infrastructure
    - Generating appropriate Skills and Education for AI
    - Ensuring an appropriate policy and regulatory framework

AI4EU

AI4EU is a collaborative H2020 Project which aims to

- **Mobilize the entire European AI community** to make AI promises real for the European Society and Economy
- Create a leading **collaborative AI European platform** to nurture economic growth.

Key figures

- **79 members** (60 leading research institutes)
- **21 partnering countries**
- **3 M€ Cascade Funding**

Fed by 8 pilots experiments

- Citizen, Robotics, Industry, Healthcare, Media, Agriculture, IoT, Cybersecurity

Based on 5 Research Areas

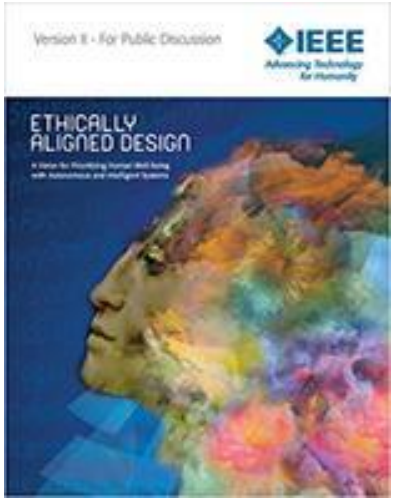
Ethical Observatory

Strategic Research and Innovation agenda

IEEE

Global initiative for
ethically aligned design of autonomous and intelligent systems

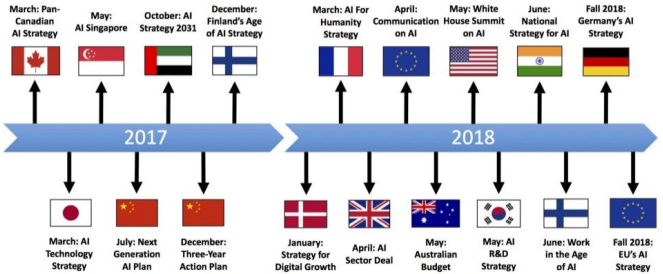
- since 2015
- identify and find broad consensus on pressing ethical and social issues and define recommendations regarding development and implementations of these technologies
- Standards
  - System design
  - Dealing with transparency
  - Dealing with privacy
  - Dealing with algorithmic bias
  - Data protection
  - Robotics
  - …
- Auditing
  - Certified agency



https://ethicsinaction.ieee.org/

MANY MORE (AND COUNTING…)

- Initiatives
  - CLAIRE (and ELLIS): https://claire-ai.org/
    - Confederation of Laboratories for Artificial Intelligence Research in Europe
  - AI4EU: on demand platform
  - ALLAI (NL)
- Strategies / positions
  - Council of Europe
  - OECD
  - National strategies: cf. Tim Dutton, https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd
  - …
- Declarations
  - Asilomar
  - Montreal
  - …



TAKE AWAY MESSAGE

- AI influences and is influenced by our social systems
- Design in never value-neutral
- Openness and explicitness are key!
  - Accountability, Responsibility, Transparency
- Optimal AI is explainable AI
- Optimal AI is AI for all
- AI systems are artefacts built by us for our own purposes
- We set the limits

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