Artificial Intelligence and Robot Law ,
autonomous vessels
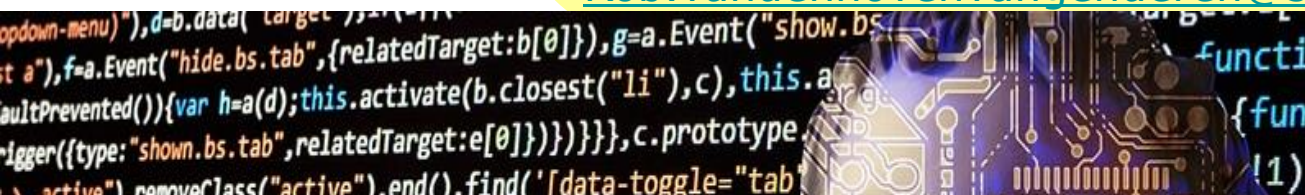IVR Congres, Strasbourg,17 May 2018

Dr. Rob van den Hoven van Genderen

Director Center for Law & Internet,
Vrije Universiteit Amsterdam
r.vanden.hovenvangenderen@vu.nl
SwitchLegal International Lawyers
Rob.vandenhovenvangenderen@switchlegal.nl

vrije Universiteit   amsterdam

Status Quo and Plans?

- Unmanned Surface Vessels (USV's) are widely used in ocean research, coast guard and military applications

- De Vlaamse Waterweg NV – the Flemish inland waterway authority – has the ambition to enable the use of commercial unmanned ships on the inland waterways by 2020.

- distinction between the 'technical' and 'human factor' will blur; the more autonomous the vessel, the more likely it is that product liability issues will arise. :integrated sensor technology, automated collision avoidance.

subjects

- Is the autonomous ship a robot
- Ethical /privacy aspect
- Legal framework for the future

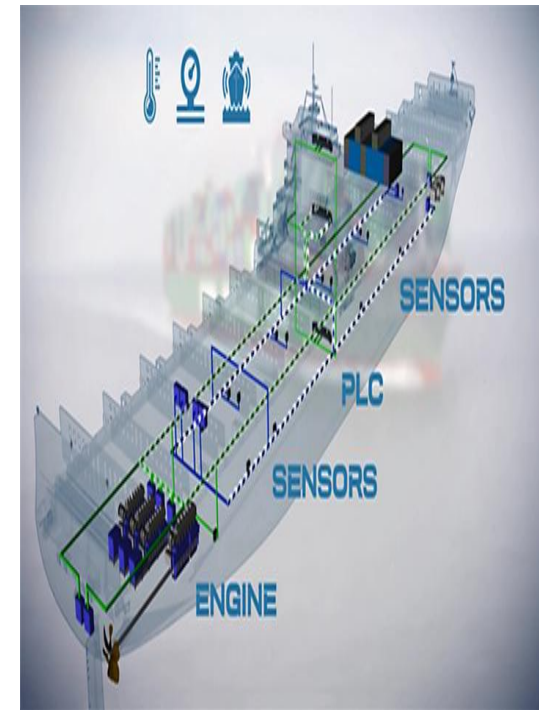- Conference 27-29 june RAI Amsterdam, no legal aspects

Steve Hawking, Elon Musk, Bill Gates: 'The development of full

artificial intelligence could spell the end of the
human race.' Putin: who leads AI, leads the world
Musk: subject of WW III
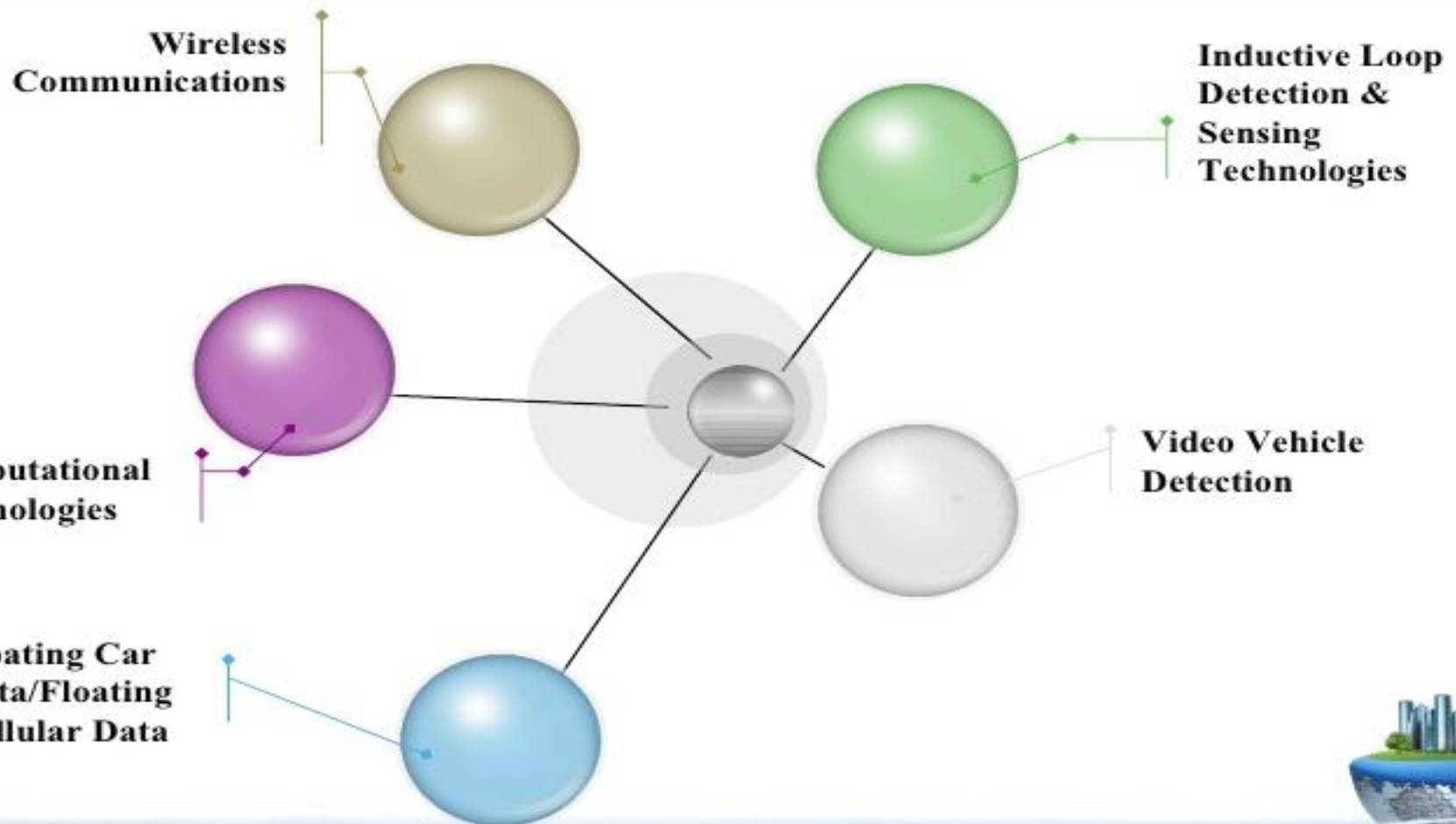Warning for "Killer robots"

https://youtu.be/QaoDXYYtgK0

http://www.independent.co.uk/life-style/gadgets-and-tech/news/spacex-launch-elon-musk-car-instagram-picture-photo-earth-space-asteroid-a8200366.html

evolution Robots

- 1^e industrial robot 1956, Joseph Engelberger:unimate
- 2015 (*lethal autonomous robotics*, LARs)
- Take over by AI?

https://youtu.be/hVqiuf0p8ec

AI as the end?

- *an ultraintelligent machine be defined as a machine that can far surpass all the intellectual activities of any man however clever. Since the design of machines is one of these intellectual activities, an ultraintelligent machine could design even better machines; there would then unquestionably be an 'intelligence explosion,' and the intelligence of man would be left far behind. Thus the first ultraintelligent machine is the last invention that man need ever make. I.J. Good (1965)*

37,000 kilometres of waterways, smart ships?

- Directive (EU) 2017/2397 of the European Parliament and of the Council of 12 December 2017 on the recognition of professional qualifications in inland navigation and repealing Council Directives 91/672/EEC and 96/50/EC
- Directive (EU) 2016/1629 of the European Parliament and of the Council of 14 September 2016 laying down technical requirements for inland waterway vessels, amending Directive 2009/100/EC and repealing Directive 2006/87/EC
- Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC
- 2006/87/EC Directive of the European Parliament and of the Council of 12 December 2006 laying down technical requirements for inland waterway vessels and repealing Council Directive 82/714/EEC
- Summaries of EU legislation: Technical requirements for inland waterway vessels
- Directive 2005/44/EC on harmonised river information services (RIS) on inland waterways in the Community
- Directive 96/50/EC on the harmonisation of the conditions for obtaining national boatmasters' certificates for the carriage of goods and passengers by inland waterway in the Community
-

Technology development:old rules adapted

new rules harmonization

outdated rules new technology

DRIVERLESS

Intelligent Cars and the Road Ahead

Hod Lipson and Melba Kurman

- *Autonomous ship as a robot?*

- "*a* robot is an *autononomous machine capable to perform human* autonomy: in robotics it means the capability of carrying out an action on its own, namely, without human intervention. Autonomy is usually assumed to be a key factor in qualifying a thing as a "robot" or as "robotic". [ad: the (super) intelligence to learn to adapt and develop behaviour to varying circumstances and sitations]

Europa, *Guidelines for regulating Robotics*, www.robolaw.eu.

- https://youtu.be/K6vaqVNB3QI

'I can't define a robot, but I know one when I see one' (Engelberger , 1989)

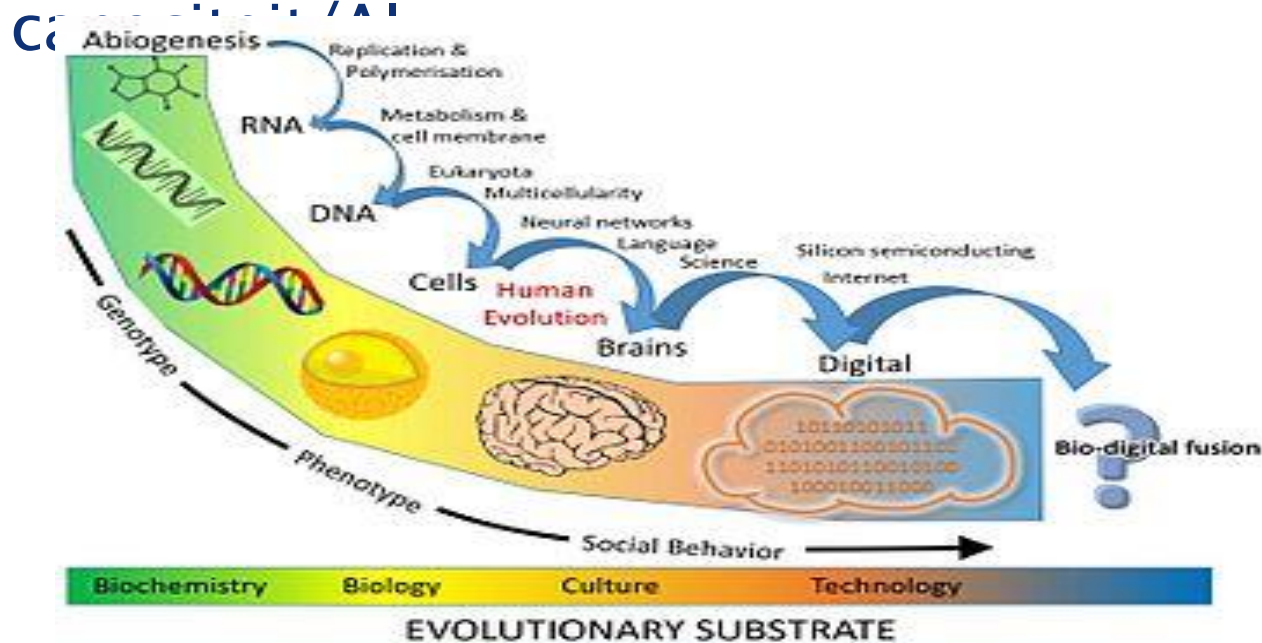A.I:the capacity of a computer to perform operations analogous to learning and decision making in humans

https://www.youtube.com/watch?v=CP2iiP7YTg

Fear or presumptious human superriority?

https://youtu.be/vtX-qVUfCKI

Singulariteit 2029 Ray Kurzweil/Vinge: wet van Moore : exponentiele toename (transistor) capaciteit/AI

based on: Gilings, M. R., Hilbert, M., & Kemp, D. J. (2016). Information in the Biosphere: Biological and Digital Worlds. Trends in Ecology & Evolution, 31(3), 180–189, http://escholarship.org/uc/item/3884b791
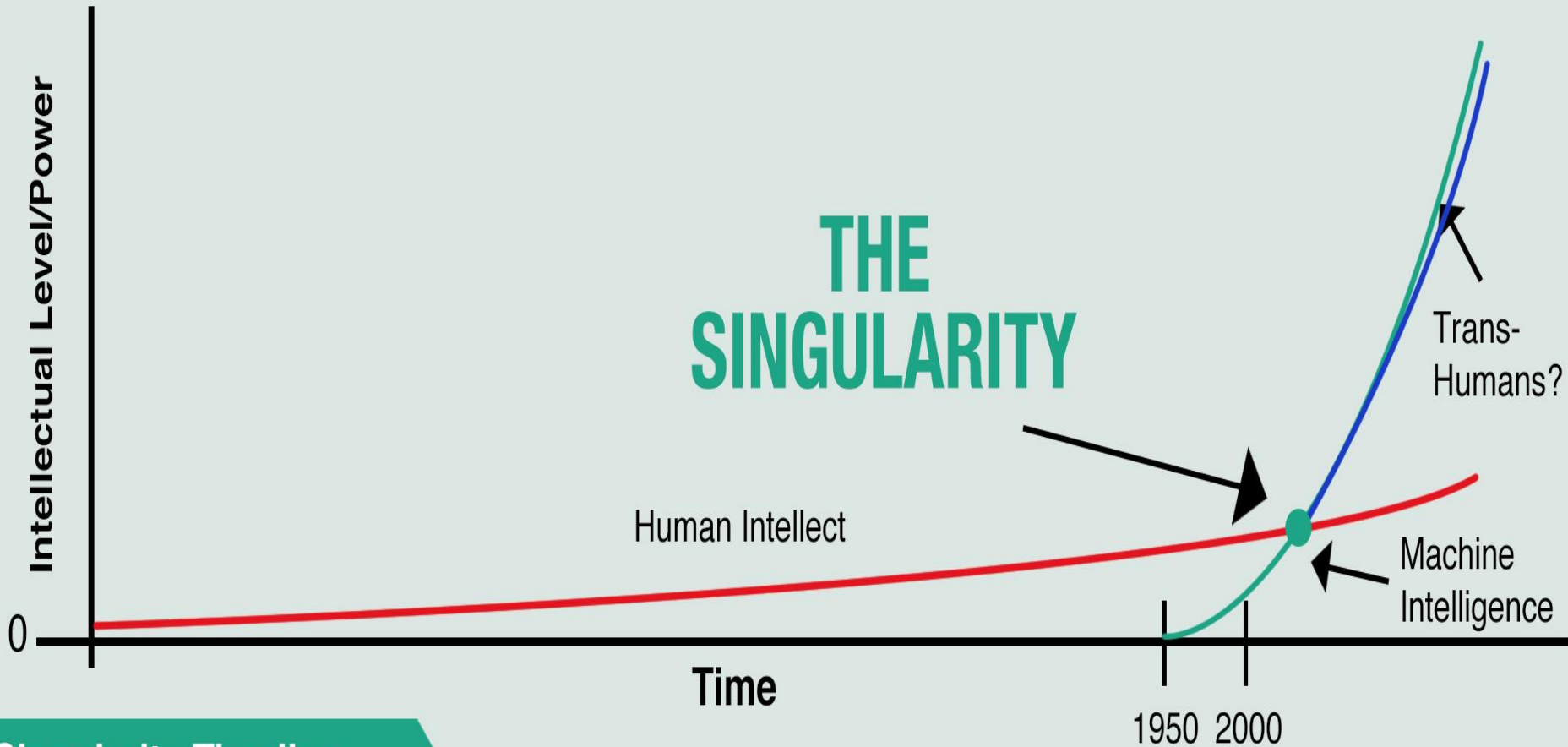
Singularity Timeline

Rise in human intellect could be driven by integrating with machines in the future

SAE Level	Name	Narrative Definition	Execution of Steering/ Acceleration/ Deceleration	*Monitoring* of Driving Environment	Fallback Performance of *Dynamic Driving Task*	System Capability (*Driving Modes*)
Human driver monitors the driving environment						
0	No Automation	the full-time performance by the *human driver* of all aspects of the *dynamic driving task*, even when enhanced by warning or intervention systems	Human driver	Human driver	Human driver	n/a
1	Driver Assistance	the *driving mode*-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	Human driver and system	Human driver	Human driver	Some driving modes
2	Partial Automation	the *driving mode*-specific execution by one or more driver assistance systems of both steering and acceleration/deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	System	Human driver	Human driver	Some driving modes
Automated driving system ("system") monitors the driving environment						
3	Conditional Automation	the *driving mode*-specific performance by an *automated driving system* of all aspects of the *dynamic driving task* with the expectation that the *human driver* will respond appropriately to a *request to intervene*	System	System	Human driver	Some driving modes
4	High Automation	the *driving mode*-specific performance by an *automated driving system* of all aspects of the *dynamic driving task*, even if a *human driver* does not respond appropriately to a *request to intervene*	System	System	System	Some driving modes
5	Full Automation	the full-time performance by an *automated driving system* of all aspects of the *dynamic driving task* under all roadway and environmental conditions that can be managed by a *human driver*	System	System	System	All driving modes

© Copyright 2014 SAE

Autonomous vessel

- *Next generation modular control systems and communications technology will enable wireless monitoring and control functions both on and off board. These will include advanced decision support systems to provide a capability to operate ships remotely under semi or fully autonomous control.*

- the automated ship where advanced decision support systems on board undertake all the operational decisions independently without intervention of a human operator.*(munin)*
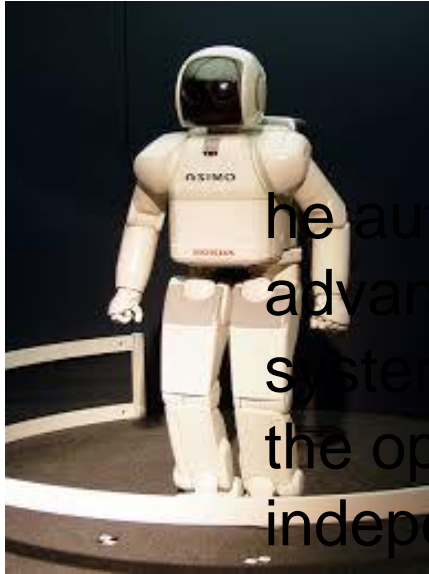
he automated ship where advanced decision support systems on board undertake all the operational decisions independently without intervention of a human operator.

Actual

Manned Ship

Radar
ECDIS
Visual
...

On Board

Action

Generic Alternatives

Remote Ship

Radar
ECDIS
Visual
...

Ashore

Action
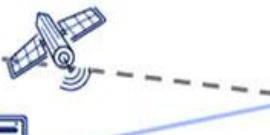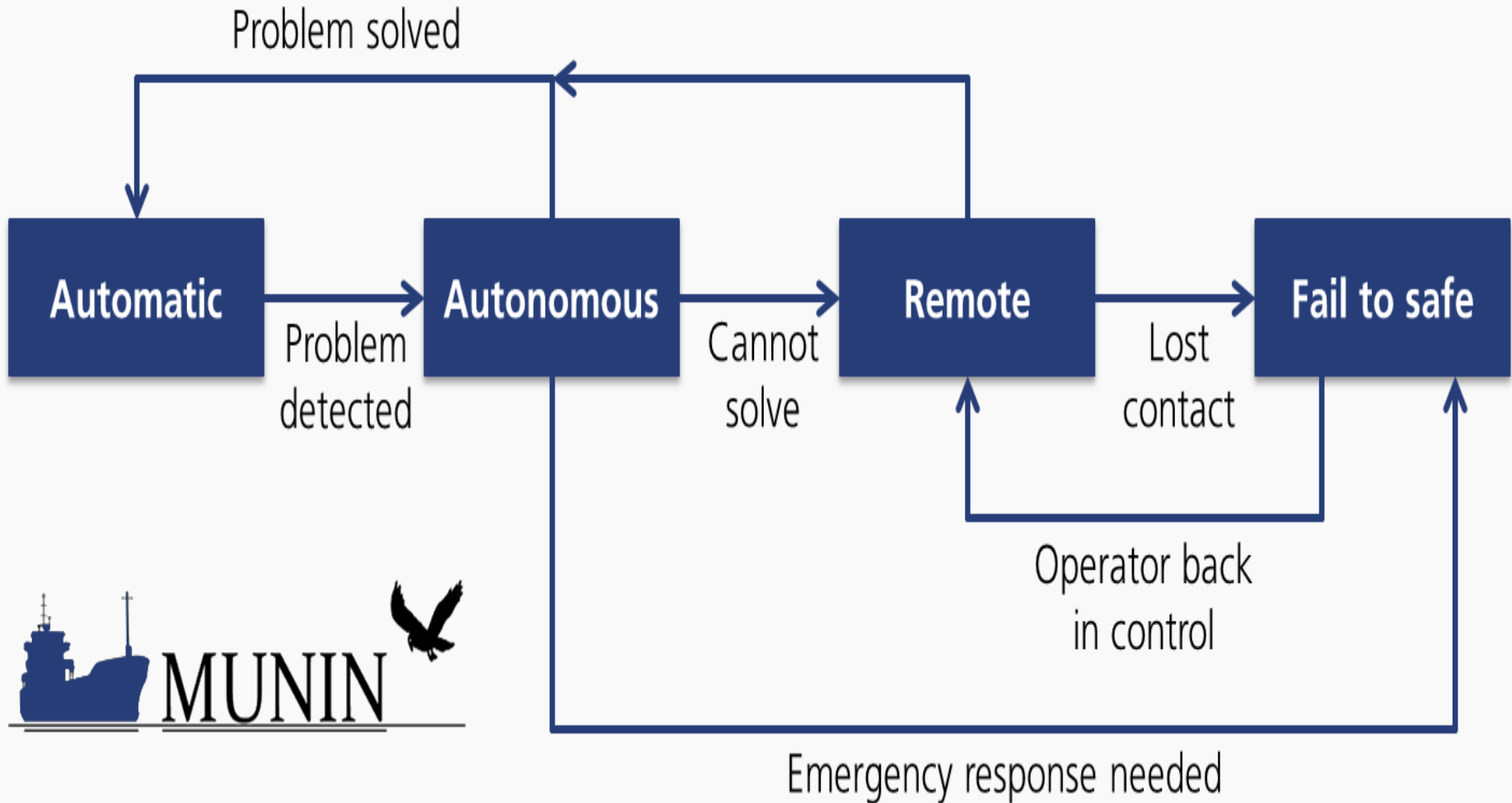
Automated Ship

Radar
ECDIS
Visual
...

Action

Symbiosis

Autonomous Ship

Radar
ECDIS
Visual
...

Action

vrije Universiteit   amsterdam
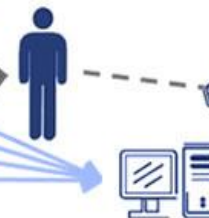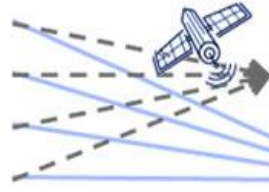
RIVER WITH LEGAL PERSONALITY NZ ; INDIA

The Whanganui River has gained its own legal identity with all the corresponding rights, duties and liabilities of a legal person.

It recognised the river as an indivisible and living whole from the mountains to the sea.

A court in northern Indian has given the Ganges and Yamuna rivers the status of "living human entities".

- whereas a robot's autonomy can be defined as the ability to take decisions and implement them in the outside world, independently of external control or influence; whereas this autonomy is of a purely technological nature and its degree depends on how sophisticated a robot's interaction with its environment has been designed to be (advice Mady Delvaux EP)
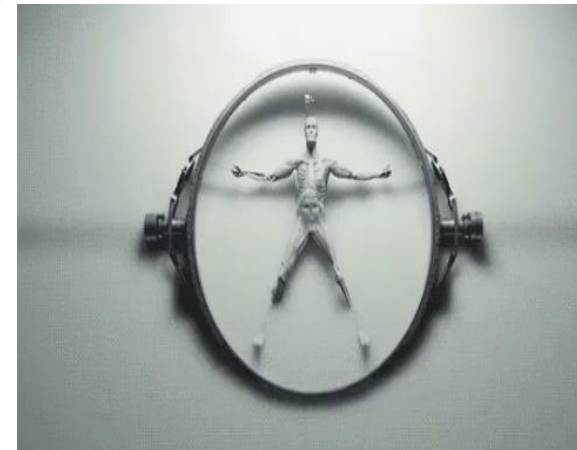
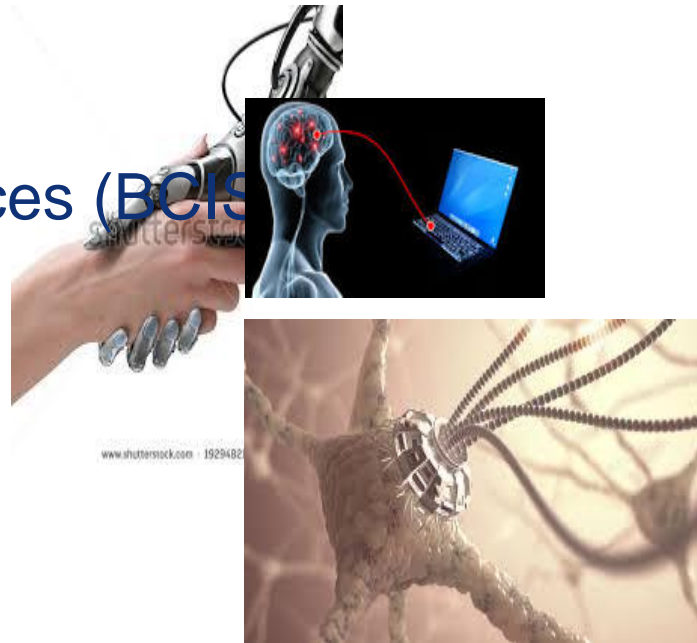What should the self-driving car do?
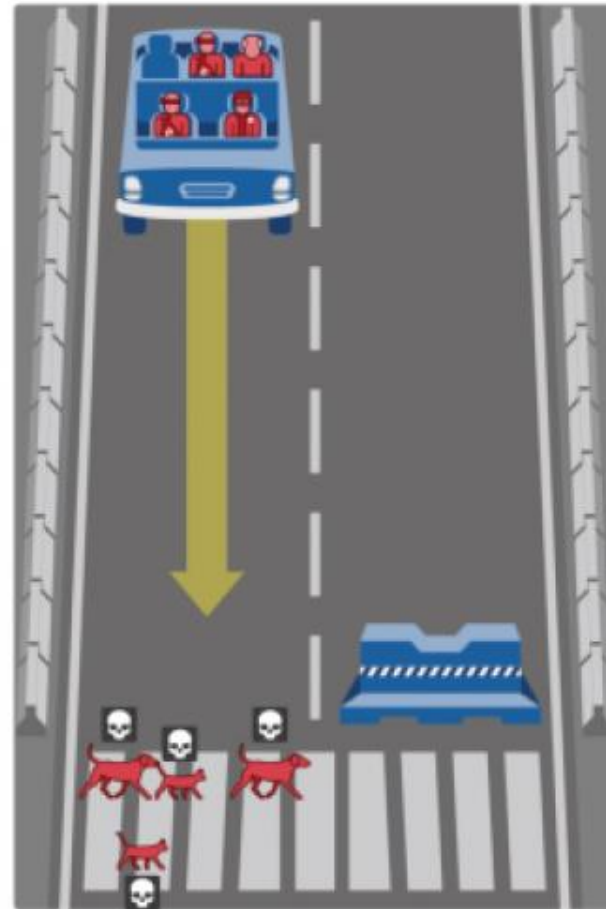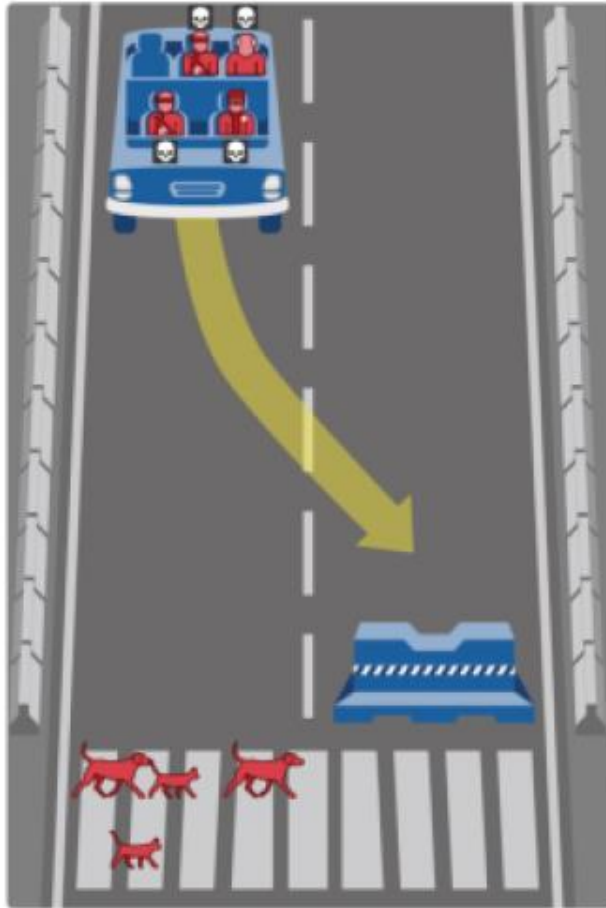
In August 2017 almost half a million pace-makers were "recalled" by the US FDA because of the risk they were "hackable.

Brain-computer interfaces (BCIS

Questions for the future

- Will the frontiers between natural and artificial persons be clear for social and companion robots, integrated links with ?;

- If parts of brain and body will be replaced by artificial elements; human enhancement as divide in society?

- How will society integrate the increasing introduction of social robots and robots in the industrial and knowledge based services?

- What dangers are there for privacy and your personal data? Companion and Pleasure robots: safety, ethical issues;

- Do we need robot law? Liability, punishment.
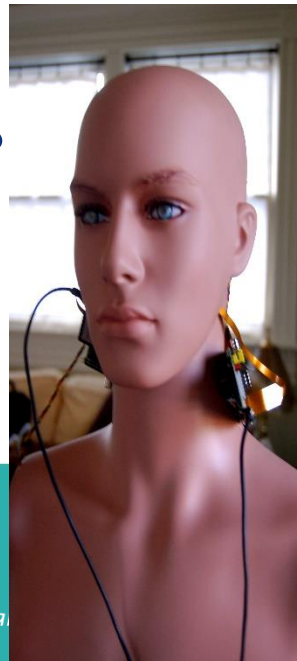
Dangers for privacy?

- Loss, compromised or detoriation of personal data

- Sharing and transfer of information

- Databreach: Misuse of personal data by different parties: producer, owner, developer, hacker

- Use of super-intelligence? What will they do with our sensitive information?

- How to create informed consent and transparancy of processing?

- How to recognize privacy by robots? https://youtu.be/Udwf-9iwmvY

- Art.22 GDPR: information logic decision

Murphy&Woods, "Beyond Asimov: The Three Laws of Responsible Robotics"

- (1) systems safety in terms of the responsibilities of those who develop and deploy robotic systems,

- (2) robots' responsiveness as they participate in dynamic social and cognitive relationships, and

- (3) smooth transfer of control as a robot encounters and initially responds to disruptions, impasses, or opportunities in context.

Essentials for legal personhood robots

- Necessity in the 'Human''society, socio-economic relevance; need for legal certification:
  - determination of *autonomous intelligence*. Turing testlike, 'human impression' level sufficient
  - *social intelligence*. The robot must be able to understand the socio-emotional and moral value of statements by other parties to respond appropriately so that there is an equivalent basis for consensus.
  - be able to respond to changing circumstances. This aspect I would call '*adaptive or dynamic* ' *intelligence.*

EP advice MP Mady Delvaux

- whereas in the scenario where a robot can take autonomous decisions, the traditional rules will not suffice to activate a robot's liability, since they would not make it possible to identify the party responsible for providing compensation and to require this party to make good the damage it has caused;

- X. whereas the shortcomings of the current legal framework are apparent in the area of contractual liability insofar as machines designed to choose their counterparts, negotiate contractual terms, conclude contracts and decide whether and how to implement them make the traditional rules inapplicable, which highlights the need for new, more up-todate ones;

FUTURE