



# Overview & Objectives

1. Ethics in Practice
  2. Care, Disclosure, and Whistleblowing
  3. Professional Codes of Ethics
  4. Designing the Future: Self-driving vehicles, Artificial Intelligence and Robotics
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# Ethics in Practice

## **The Challenger Space Shuttle**

### Background concerns

- Loss of public interest in the U.S. Space Program
- Political pressures
- Industrial consideration
- Launch previously delayed

### Conditions on day of launch (28 Jan. '86)

- Cold:  $-2^{\circ}\text{C}$

# Ethics in Practice

## **The Challenger Space Shuttle**

Cause:

An O ring sealing the field joint of one of the solid fuel rocket boosters, made more brittle by the cold, failed.

Day before launch

- Project engineers , concerned that the O rings would not withstand such cold conditions, strongly recommended that the launch should be delayed
- They were overruled by management, many of whom were themselves trained engineers

# Ethics in Practice

Questions for all of us.

When there are safety concerns, what is an engineer's moral responsibility?

- How are we to weigh moral and prudential reasons when they are in conflict?
- How are we to resolve conflicts between personal and professional ethics? And, between sectional interests and public interests?

Is ethics endlessly demanding?

# Codes of Ethics

## **Consult Australia**

1. Members shall at all times place their responsibility for the welfare, health and safety of the community before their responsibility to sectional or private interests, or to other members;
2. Members shall act with honour, integrity and dignity in order to merit the trust of the community;
3. Members shall act only in areas of their competence and shall practice in a careful and diligent manner;
4. Members shall act with honesty, good faith and without discrimination towards all in the community, including clients, employers and colleagues;
5. Members shall apply their skill and knowledge in the interest of their employer or client for whom they shall act with integrity, without compromising any other obligation to these Tenets;
6. Members shall take all reasonable steps to inform themselves, their clients and employers and the community of the social and environmental consequences of the actions and projects in which they are involved;
7. Members shall express opinions, make statements or give evidence with fairness and honesty and only on the basis of adequate knowledge;
8. Members shall continue to develop relevant knowledge, skill and expertise throughout their careers and shall actively assist and encourage those under their direction to do likewise; and
9. Members shall not assist, induce or be involved in a breach of these Tenets and shall support those who seek to uphold them.

# Codes of Ethics

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# Ethics in Practice

## Whistleblowing

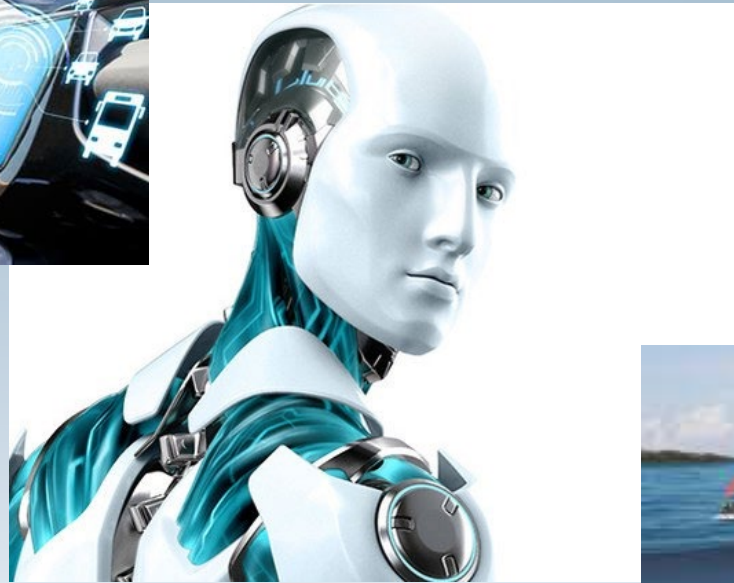
Someone who reveals wrongdoing within an organisation to the public or to those in positions of authority

- *Internal*: the alarm about wrongdoing stays within the organisation
- *External*: the whistle is “blown” publicly, usually to a regulatory authority or the media, and this may occur anonymously (“leaking”), or openly

Should managers expect their engineers to be *loyal*?

- No. Employment relationships aren’t the right kind of relationship for loyalty to exist.

# Designing the Future: Self-driving vehicles, Artificial Intelligence and Robotics



# Driverless Vehicles

## Road traffic accidents (2017)

- 1.25 million people killed every year in road traffic accidents
- The leading cause of death among people aged 15-29 years
- Costs governments approximately 3% of GDP
- Over 90% of all road traffic accidents are caused by human error and behaviour
  - Drink driving, inattention, speeding, drug use...

## Autonomous vehicles (the future)

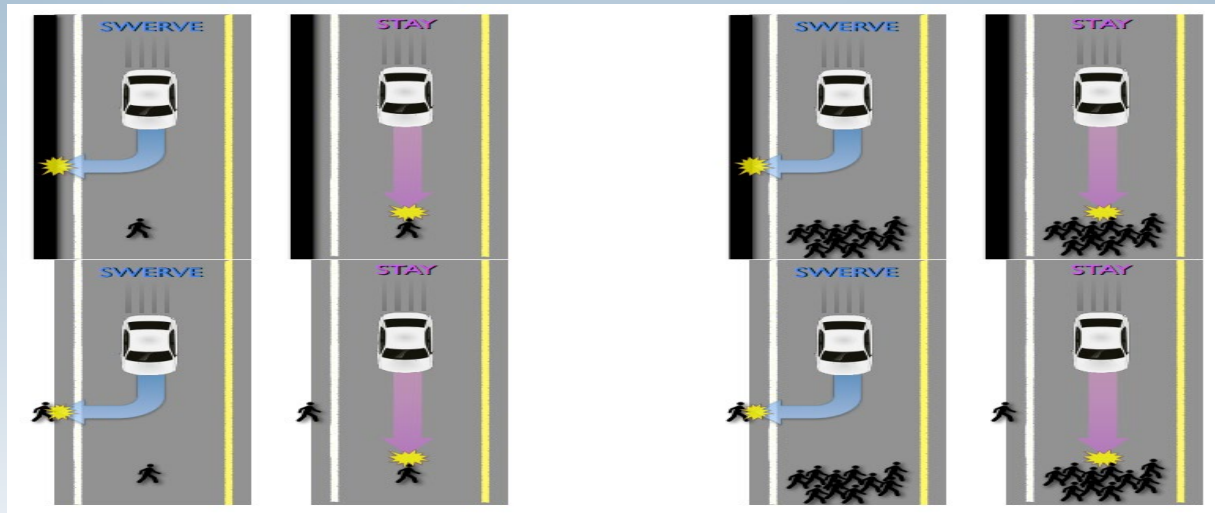
- Engineers tell us autonomous vehicles can do better, they will save lives
- At some point, they will become safer than human drivers



# Driverless Vehicles

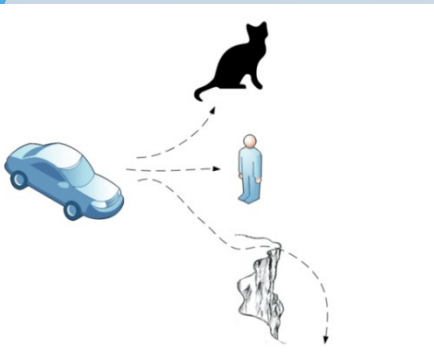
## Crash Systems and the Trolley Problem

- How do you embed moral principles into a driverless vehicle?
  - Are utilitarian crash systems the only option to make the problem tractable?
  - This conclusion requires a willingness to trade-off the interests of different individuals of the sort that utilitarianism is notorious for and for which it has been roundly criticised
- Situations of unavoidable harm
  - The trolley problem for crash system engineers.



# Driverless Vehicles

- Limit the harm done
  - Self-sacrificing crash systems
    - We would be trading off their safety for benefits that will accrue to others.
    - If adequately informed would we still wish to travel in a driverless vehicle?
    - Serious implications of poor sensor design or cost cutting
  - Unfair discrimination?
    - Helmeted or non-helmeted motorcyclists
    - Grandmother or child (see Lin)



# COLOUR-BLIND CRASH AVOIDANCE ALGORITHMS?

Some American researchers recently argued that the ‘machine vision’ systems they examined – designed for use in driverless cars,

- ‘were consistently better at identifying pedestrians with lighter skin tones than darker. And not by a little bit: one headline comparison suggests that a white person was 10% more likely to be correctly identified as a pedestrian than a black person’



# Driverless Vehicles



## Driverless vehicles and “Crash Systems”

- Defining the algorithms that direct DV’s how to behave in crash scenarios is formidable
  - Being consistent (non-arbitrary)
  - Being acceptable to the public (properly compelling)
  - Remaining marketable

# Unmanned Undersea Vehicles

## Geneva Conventions

### Article 18:

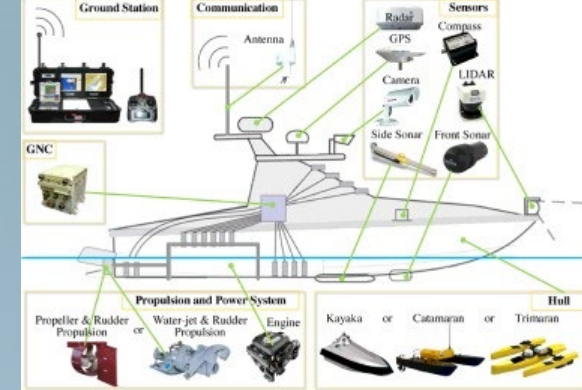
After each engagement, Parties to the conflict shall, without delay, take all possible measures to search for and collect the shipwrecked, wounded and sick, to protect them against pillage and ill-treatment, to ensure their adequate care, and to search for the dead and prevent their being despoiled...

## Submarines and rescue

International law of submarine warfare



# Unmanned Maritime Vehicles



## Ethical design, social policy and duty of rescue

- Professional code of ethics of the (IEEE)
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# Artificial Intelligence



## A 'biometric mirror'

- 'In a world-first, University of Melbourne researchers have designed an artificial intelligence (AI) system to detect and display people's personality traits and physical attractiveness based solely on a photo of their face.'
- 'When someone stands in front of Biometric Mirror, the system detects a range of facial characteristics in seconds. It then compares the user's data to that of thousands of facial photos, which were evaluated for their psychometrics by a group of crowd-sourced responders.'
- 'Biometric Mirror displays 14 characteristics, from gender, age and ethnicity to attractiveness, weirdness and emotional stability. The longer a person stands there, the more personal the traits become.'
- <https://www.youtube.com/watch?v=-LF65LKJdkY>
- <https://about.unimelb.edu.au/newsroom/news/2018/july>

## Biometric Mirror

Camera



Information Display

Attribute	Value	Conf
Gender	FEMALE	-
Age	37	-
Ethnicity	CAUCASIAN	84%
Emotion	HAPPINESS	97%
Kindness	AVERAGE	92%
Happiness	HIGH	99%
Commonness	AVERAGE	31%
Responsibility	LOW	31%
Attractiveness	AVERAGE	79%
Sociability	HIGH	78%
Introversion	LOW	48%
Aggressiveness	LOW	91%
Weirdness	AVERAGE	100%
Emotional Stability	AVERAGE	99%

COVER FACE-Exit

more information via <http://go.unimelb.edu.au/vi56>