

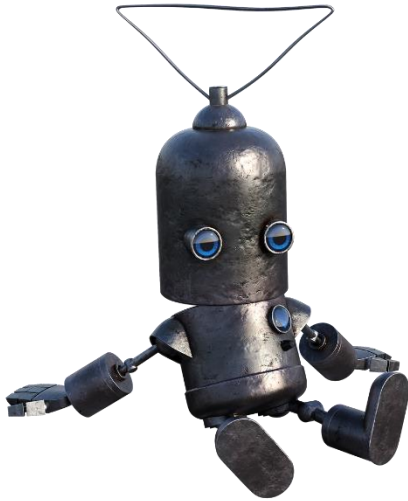


JOINING
INNOVATION
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Artificial intelligence: friend or foe?

Sue Wellings, Information Scientist

Presentation overview



- Brief overview of TWI
- What is AI?
 - What is intelligence?
 - Key terminology
 - A (very) brief history
- How is it/can it be used?
 - Applications
 - TWI Information Service
- Ethics
- Friend or foe?

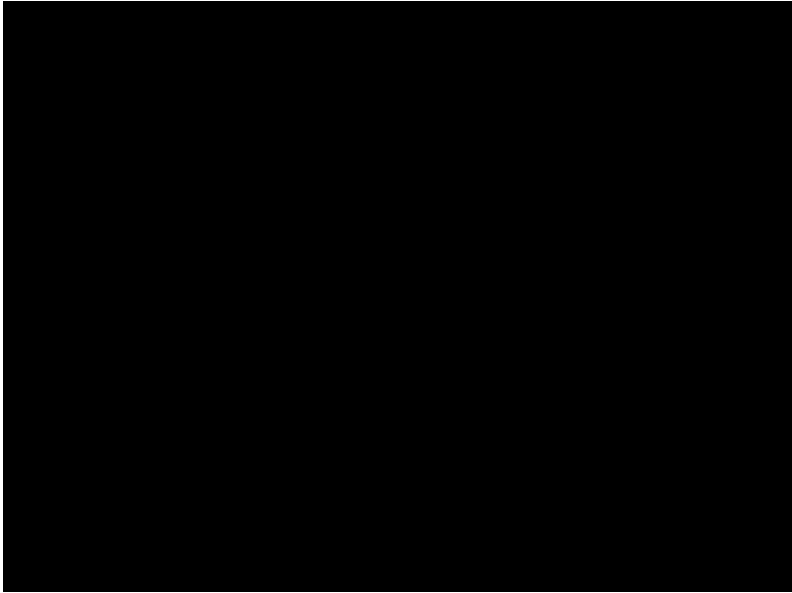
TWI UK Offices

TWI is a Research & technology organisation

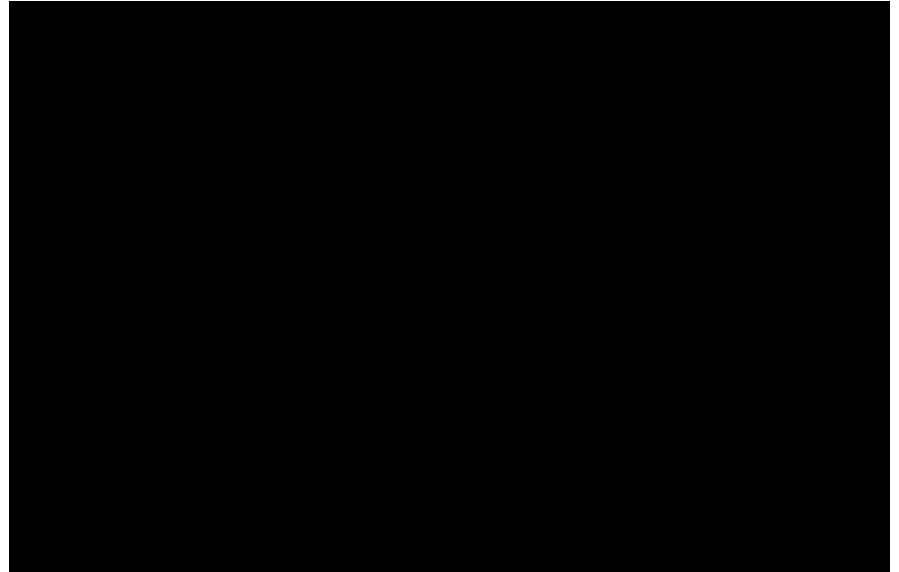
- 6 UK offices
- Over 800 consultants, scientists, engineering & support staff
- PhD and MSc programs in structural integrity (NSIRC)



Friction stir welding

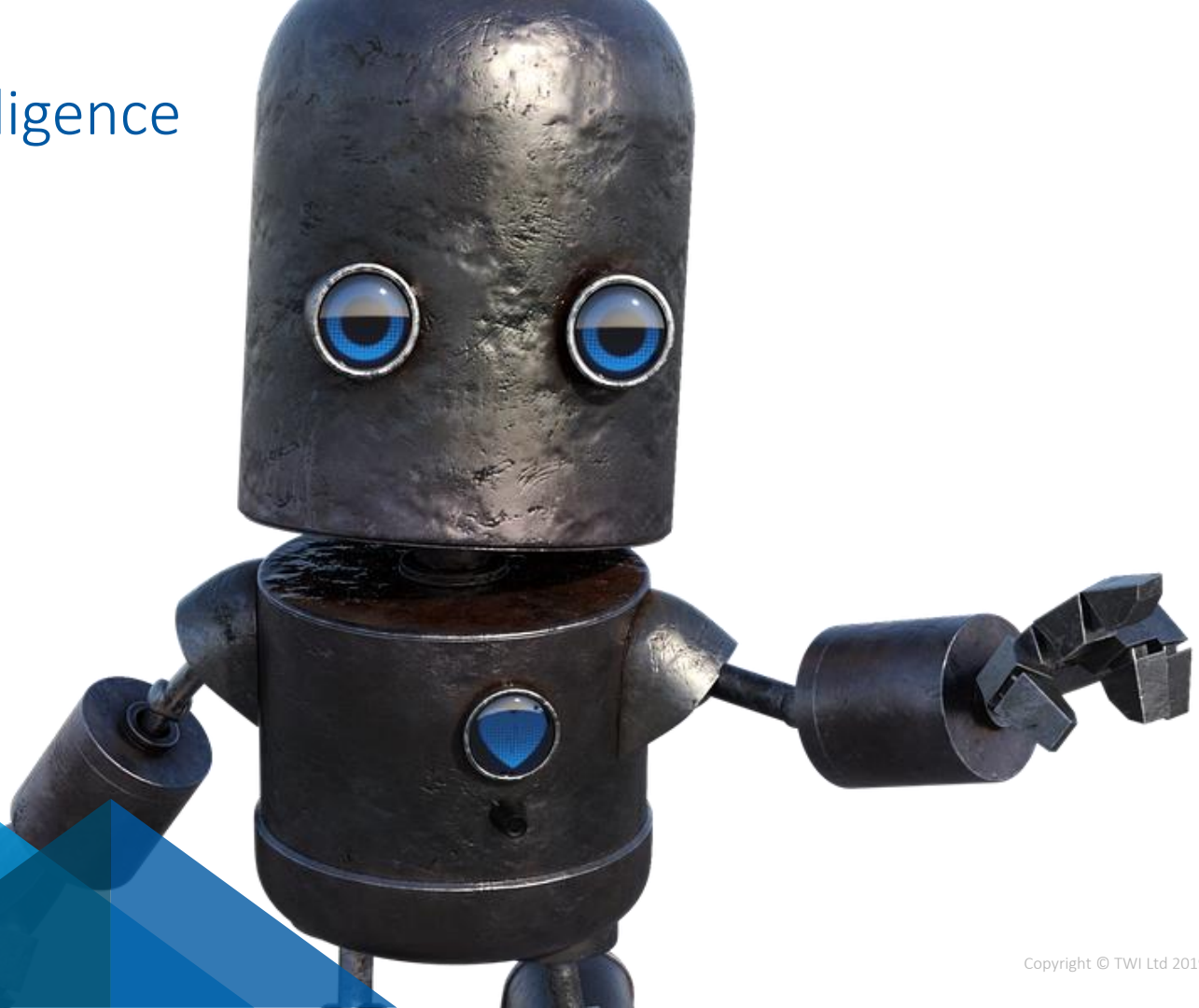


Robotic ultrasonic inspection



More videos at [TWI's YouTube channel](#)

Artificial Intelligence



What is it?

- “The science and engineering of making intelligent machines”
 - John McCarthy
- “[AI] is about machines which act intelligently”
 - Alan Turing Institute
- “The ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings”
 - Encyclopaedia Britannica (Copeland, 2019)
- “Pursuing computing advances to create intelligent machines that complement human reasoning”
 - Microsoft
- “The field of computer science dedicated to solving cognitive problems commonly associated with human intelligence”
 - Amazon

What is intelligence?



- “an extremely complex and multi-faceted entity...also subjective” (*Warwick, p.18*)
- The ability to learn and reason, i.e. think
- Turing test
 - can a computer fool a human into thinking it is a human?

Key terminology

- Strong AI & weak AI
 - Exhibit 'intelligent' behaviour (*Lucci & Kopec, section 1.2*)
- Expert system
 - Computer program that uses AI to solve problems that usually require human expertise (*Zwass, 2016*)
- Machine learning
 - Branch of AI that allows computers to learn
- Data mining
 - Trawling through data to find relationships & make predictions
- Natural Language Processing (NLP)
 - Helps computers communicate with humans

A (very) brief history

1950 “Computing machinery and intelligence” paper published by Turing

- Alan Turing

1955/56 term “artificial intelligence” born

- John McCarthy

1959 “machine learning” phrase coined

- Arthur Samuel

1965 & 1972 early expert systems developed at Stanford University

- DENDRAL & MYCIN

1980s & 1990s AI starts being used in industry

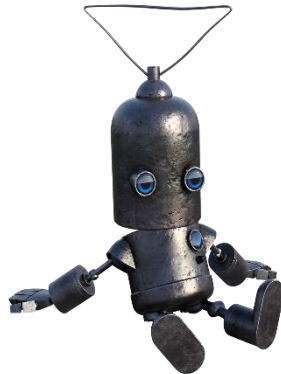
1997 IBM’s Deep Blue beat Kasparov at chess

2016 Google’s AI self driving car system can be considered a driver

Applications

Characteristics of problems suitable for AI*

- Usually large & complex
- Cannot be solved by straightforward algorithms
- Involve a large amount of human expertise



Examples

- Finance sector
- Legal sector
- Retail
- Medical

*(Lucci & Kopec, section 1.4)

TWI Information Service

Completed/ongoing projects

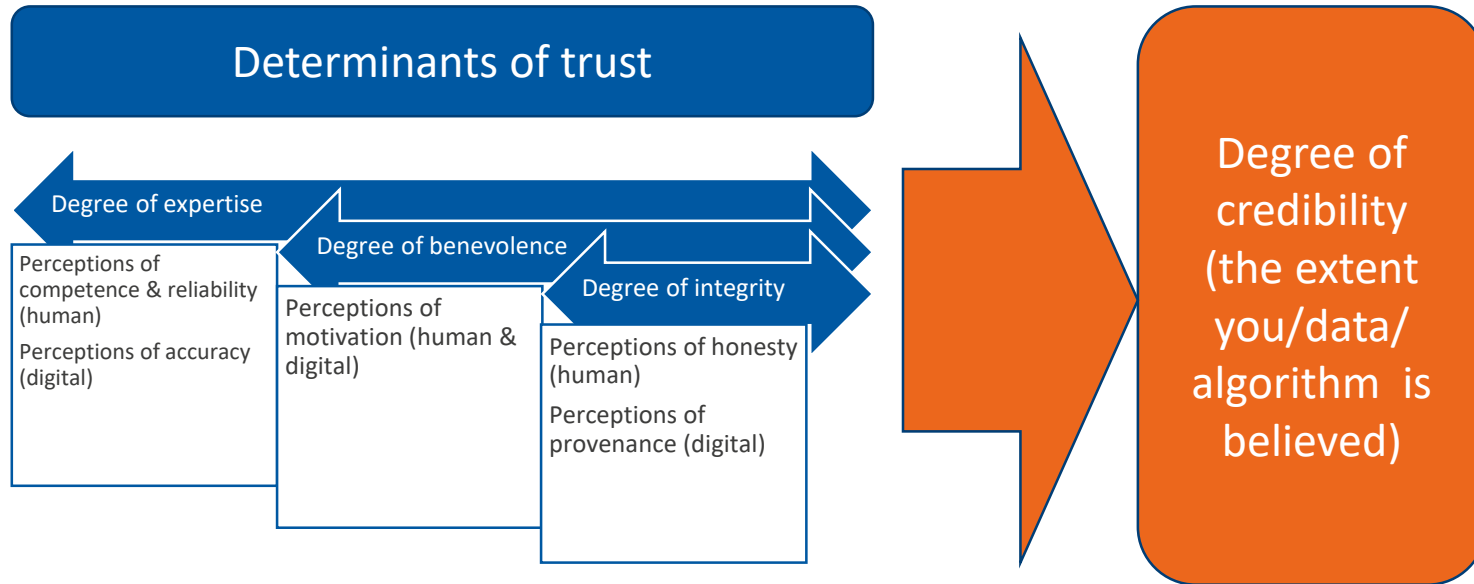
- Intelligent Knowledge Asset Sharing (INKASS) project
 - (2002-2004)
- Automated keywording of technical articles
 - (2018-2019)
- Weldgalaxy project
 - (2018-2021)



Ideas going forward

- Auto-abstract writing
- Searching, retrieving & sense making of structured & unstructured data
- Auto-news gathering
- Creating basic search strings

Trust & credibility in humans and digital



Ethics

“AI ethics is a set of values, principles, and techniques that employ widely accepted standards of right and wrong to guide moral conduct in the development and use of AI technologies”, Turing Institute



Potential harm*

- Bias & discrimination
- Denial of rights
- Lack of transparency
- Invasion of privacy
- Isolation
- Poor quality outcomes

**(Leslie, p.4-5)*

Friend or foe?



- Friend?
- Foe?
- Both?
- Don't know!

Thank you!

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