

# Big Data and Al Principles in Engineering

Promoting responsible conduct of Big Data and AI

innovation and application in Engineering

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www.wfeo.org

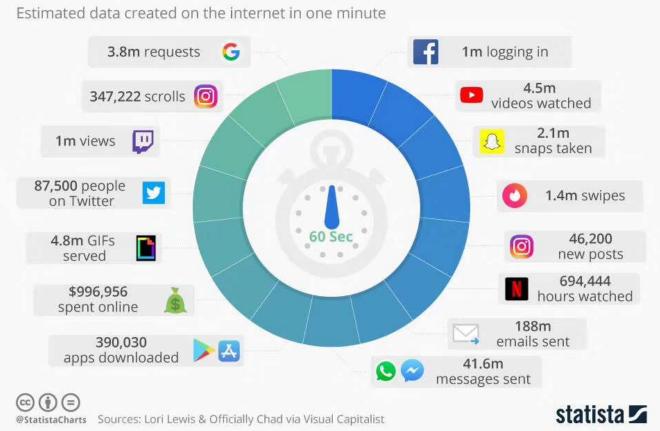
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### **Big Data and Artificial Intelligence (AI) are developing fast**



A Minute on the Internet in 2019

### **Background**



As general purpose technology...

### **Tremendous opportunities**

#### Hold great promise for

.....

- empowering people, raising quality of lives
- fostering economic and social ٠ development
- addressing critical global challenges (climate change, food, inequality, health, and education)
- promoting the achievement of SDGs

- **Substantial risks**
- **Technical challenges** •
  - data capture/ storage
  - machine learning
  - .....

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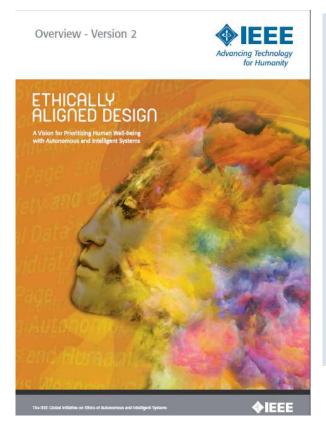
- **Ethical challenges** 
  - privacy violations
  - inexplicability
  - bias, Inequality
  - malicious use

driving force for the 4th Industrial Revolution



For the purpose of maximize benefit while minimize negative impact, Efforts have been made by relative parties

#### **IEEE: Ethically aligned design**



General principles for AI design & use (version 2, on Dec.,2017) (HWATA Principles)

• Human right

Institute of electrical and electronics engineering

- Well-being
- Accountability
- Transparency
- Awareness of misuse



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#### **OXFORD: Al governance**

University of OXFORD

#### AI Governance: A Research Agenda

Allan Dafoe Governance of Al Program Future of Humanity Institute University of Oxford

> First draft July 2017 v1.0 August 27 2018



A Research Agenda (v1.0, on Aug.,2018) , addressing the urgent need.

- Technical landscape
- Al Politics
- Al ideal governance



#### EU: White paper on AI

EUROPEAN COMMISSION		
Brussels, 19.2.2020 COM(2020) 65 final		
WHITE PAPER		
On Artificial Intelägence - A European approach to excellence and trust		
EN	EN	

A European approach to excellence and trust (COM(2020) 65, final, Feb. 2020)

- Al is a strategic technology
- Promoting the uptake of AI
- Addressing the risks associated with certain uses of it

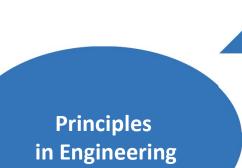
Big Data and Al in Engineer



#### **WFEO:** Principles in Engineering



Engineering societies, major practitioners responsibility to promote the innovation,



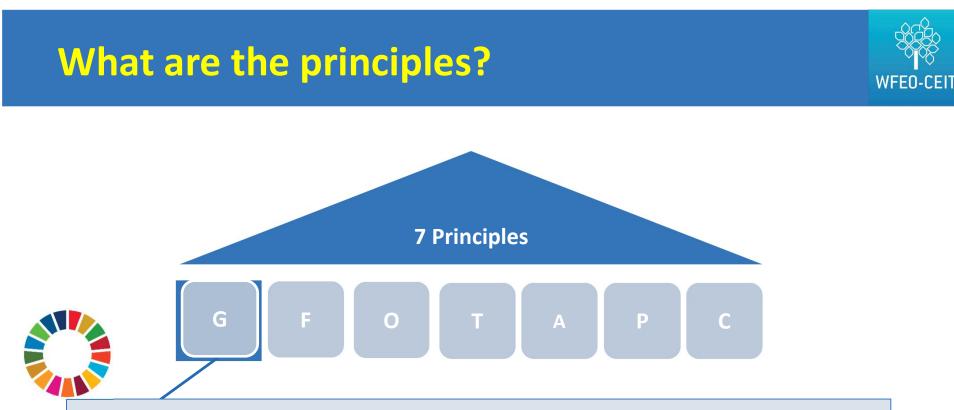
Maximize

benefit







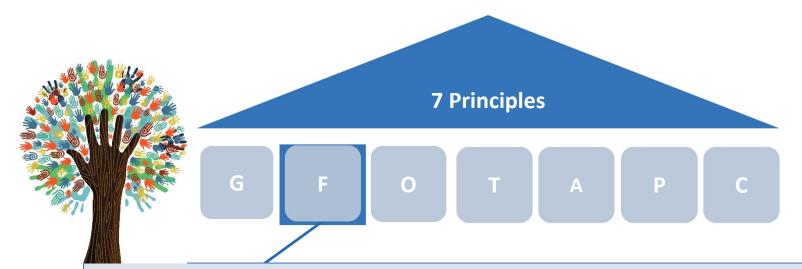


#### Good for Humanity and Its Environment

- Adopt Sustainable Development of Humanity and the Planet as Primary Success Criterion
- *Respect, Promote, and Protect Human Dignity and Autonomy*
- Follow Cultural, Social, and Legal Norms
- Serve Social and Environmental Good, especially Cultural Continuity and Ecological Diversity.

### What are the principles?

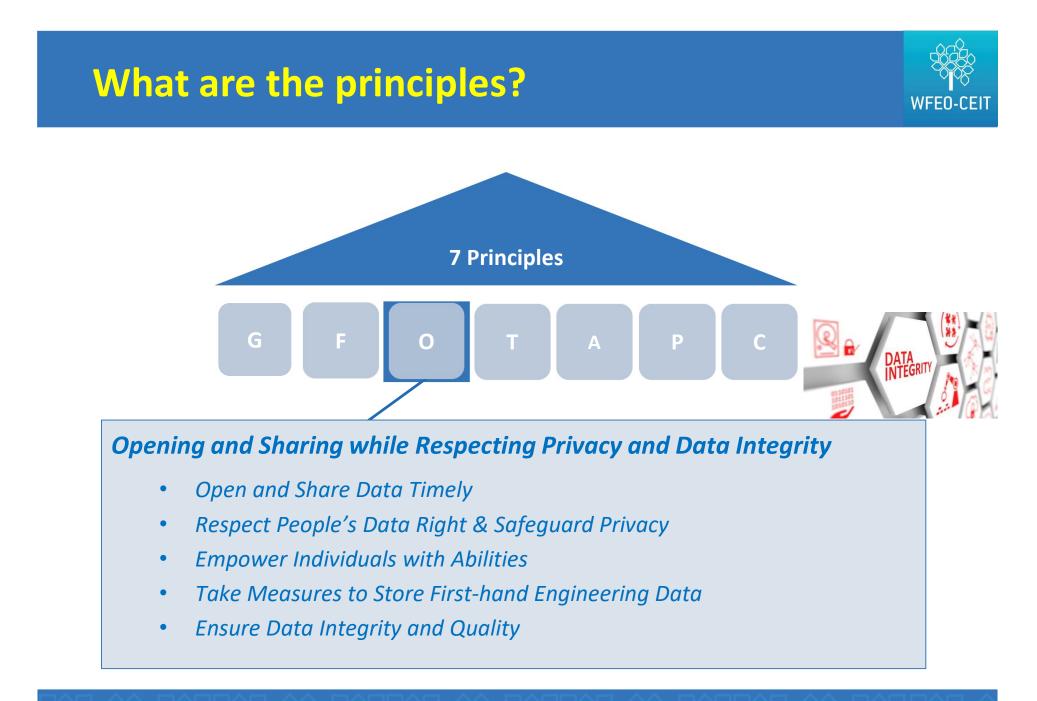




#### Inclusiveness, Fairness, Public Awareness and Empowerment

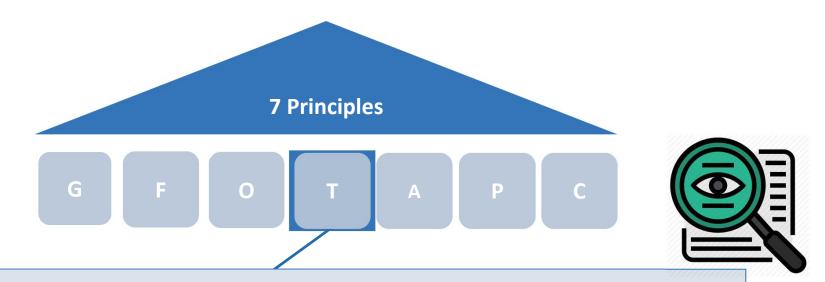
- Mitigate Bias in Datasets
- Involve and Benefit Everyone
- Improve Public Awareness
- Empower All





## What are the principles?





#### Transparency

- Maximize the Traceability of Data
- Guarantee Verifiability of I/O and Explicability of Judgments and Decisions
- Provide Understandable Information

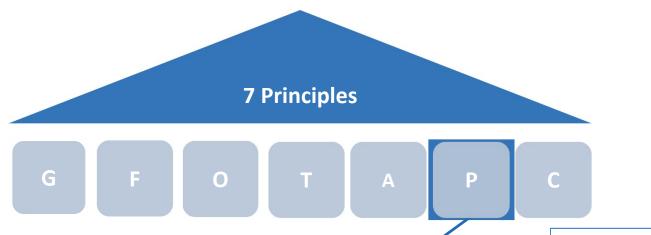






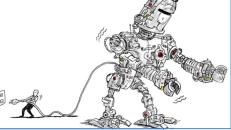
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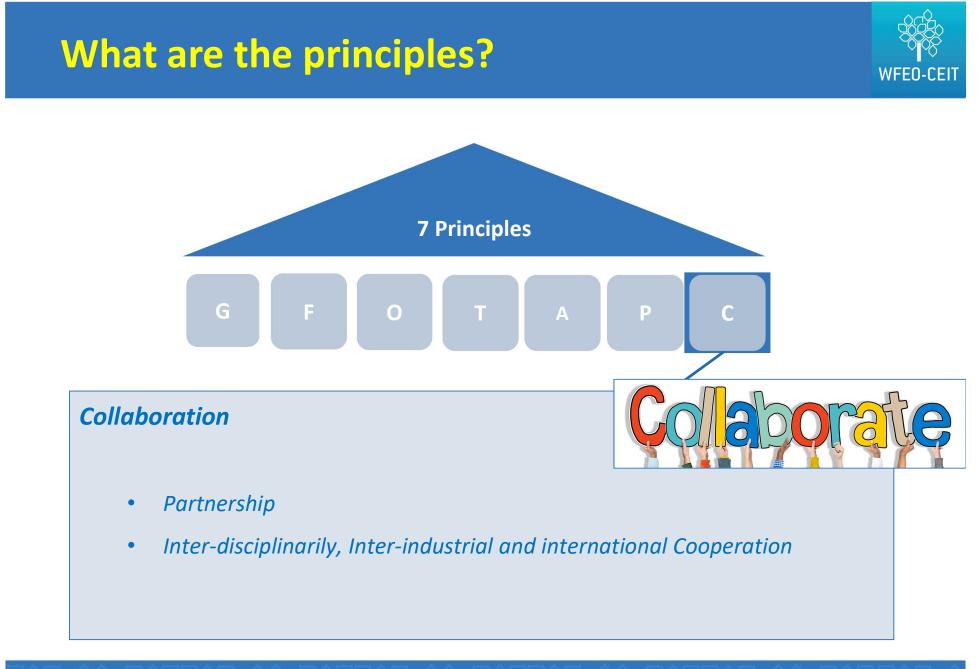




#### Peace, Safety and Security

- Maintain International Peace and Security
- No Harm to Life, Body, Property
- Thorough Testing before Release
- Improve Quality, Safety, Reliability and Security





### Acknowledgement





#### Acknowledgement to

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# Happy World Engineering Day!

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