

NELSON MANDELA UNIVERSITY



THE STATE OF ENVIRONMENTAL HEALTH DEVELOPMENT IN SOUTH AFRICA GIVEN THE FOURTH INDUSTRIAL REVOLUTION

WORLD ENVIRONMENTAL HEALTH DAY AND THE NATIONAL ENVIRONMENTAL HEALTH
INDABA (28-30 September 2021)

DR SHAUN RAMROOP



“The state of environmental health development in SA given the fourth industrial revolution”



Structure

- ✓ Part one: 4IR
- ✓ Part two: scope of practice: environmental health
- ✓ Part three: technology benefits for environmental health



■ Introduction

- ✓ 4IR – fundamentally change

- ✓ Holistic approach

- ✓ Compelled to change



▪ Fourth industrial revolution

- ✓ Abundance of research
- ✓ Technologies improve environmental health
- ✓ January 2016, World Economic Forum founder and executive Chairman, Klaus Schwab



▪ 4IR Technologies

- ✓ Artificial intelligence (AI)
- ✓ Robotics
- ✓ Internet of Things (IoT)
- ✓ 3D printing
- ✓ Genetic engineering
- ✓ Quantum computing

Technologies (cont...

- ✓ GPS systems
- ✓ Apple's Siri
- ✓ Amazon
- ✓ Netflix recommendation
- ✓ Airbnb
- ✓ Facebook and tagging



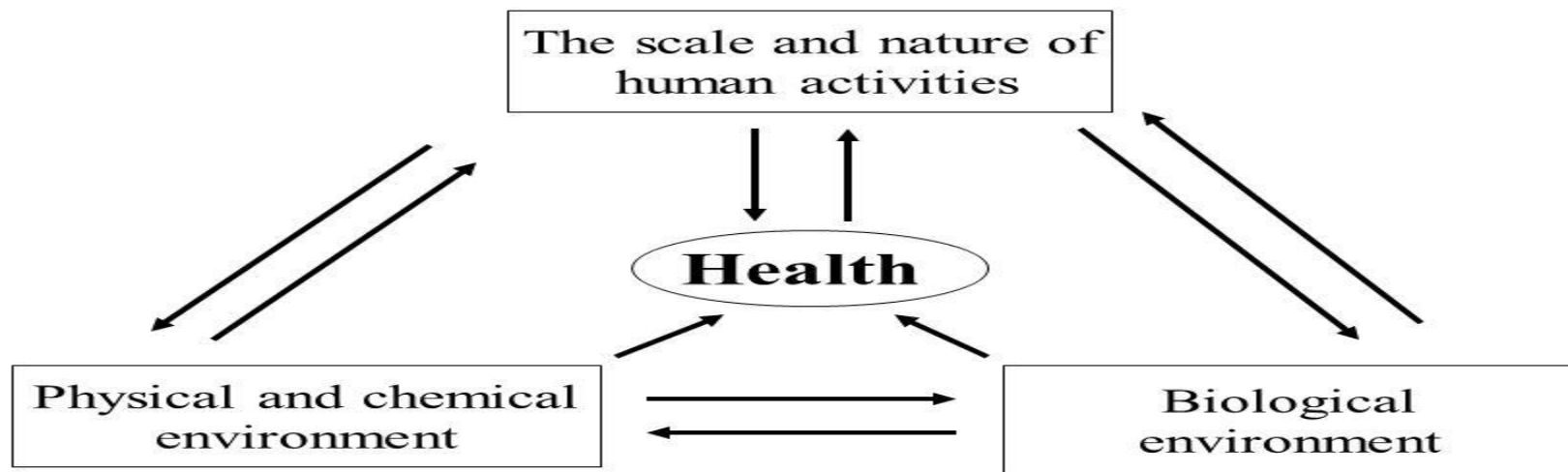
- Environmental health

“WHO defines EH as those aspects of human health, including quality of life, that are determined by physical, biological, social, and psycho-social factors in the environment.”



▪ Environmental health (Cont..)

INTERACTIONS BETWEEN HUMAN ACTIVITIES, HEALTH AND ENVIRONMENT



Health Professions Council of South Africa

Scope of practice: environmental health

Waste management & general hygiene monitoring	Port health
Health surveillance of premises	Malaria control
Surveillance and prevention of communicable diseases, excluding immunisations	Control and monitoring of hazardous substances
Vector control monitoring	General environmental health nuisances and control
Environmental pollution control	Health education, promotion & community development
Disposal of the dead	Information for decision making
Chemical safety	Supervision
Noise control	Radiation (ionising & non-ionising) monitoring and control



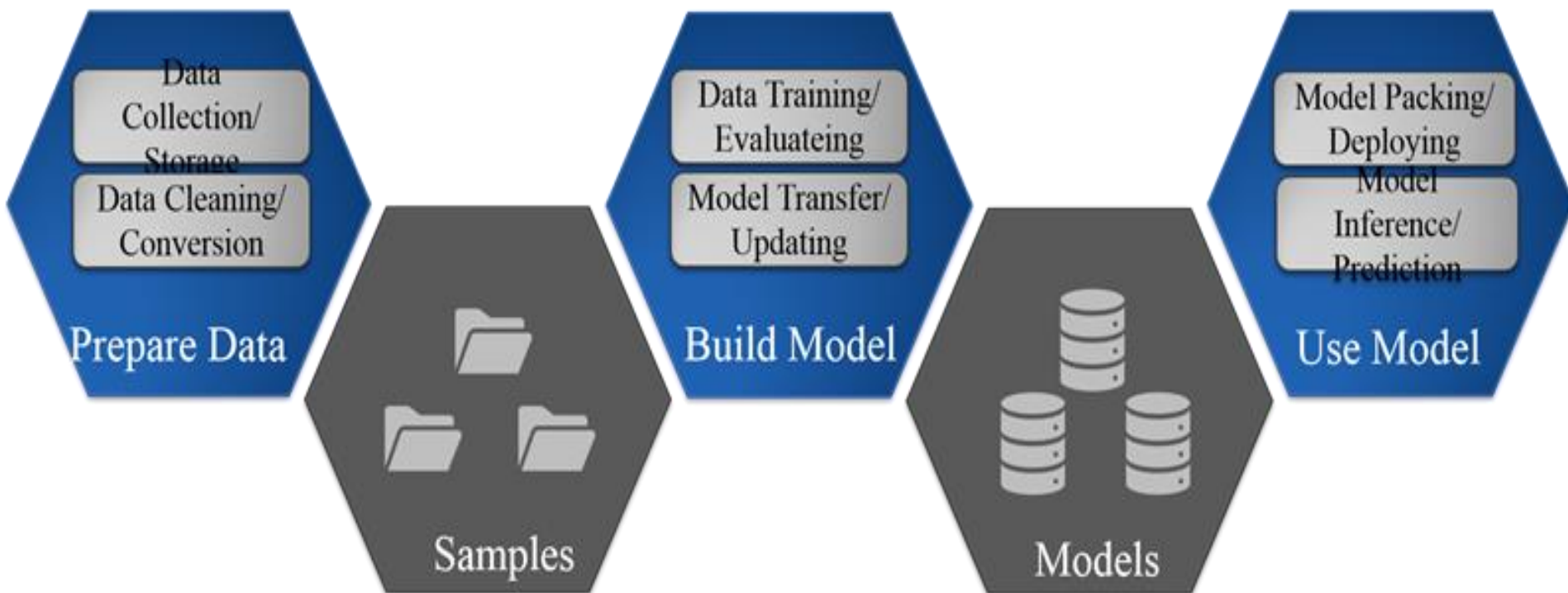
Artificial intelligence

“The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages”

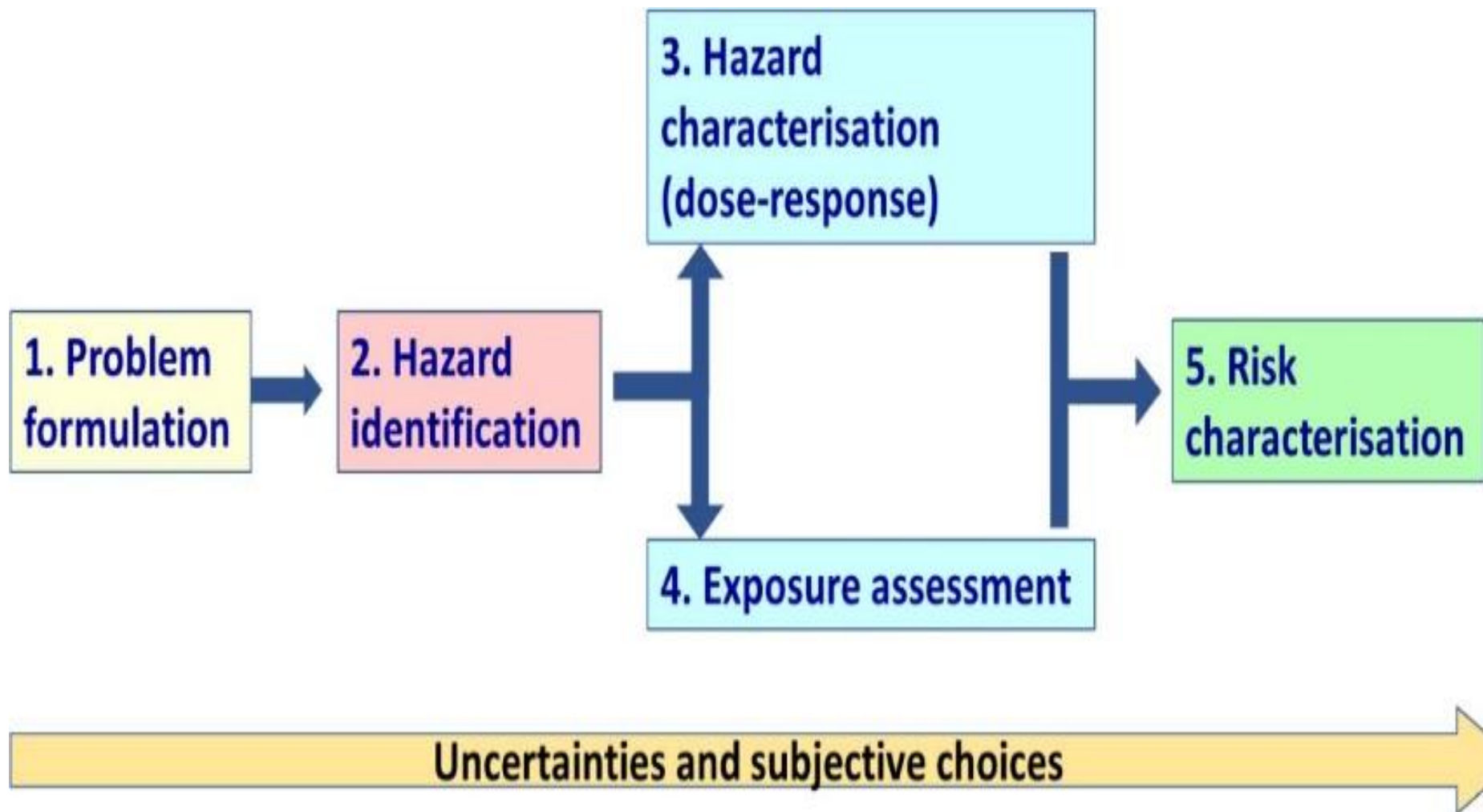
Artificial intelligence: examples

✓ Environmental epidemiology (Geospatial artificial intelligence (geoAI))

GeoAI Flow



✓ Chemical risk assessments



✓ Chemical risk assessments

Gathering evidence

Extracting relevant data
from included study
reports

Organising data

Detecting patterns in
large datasets

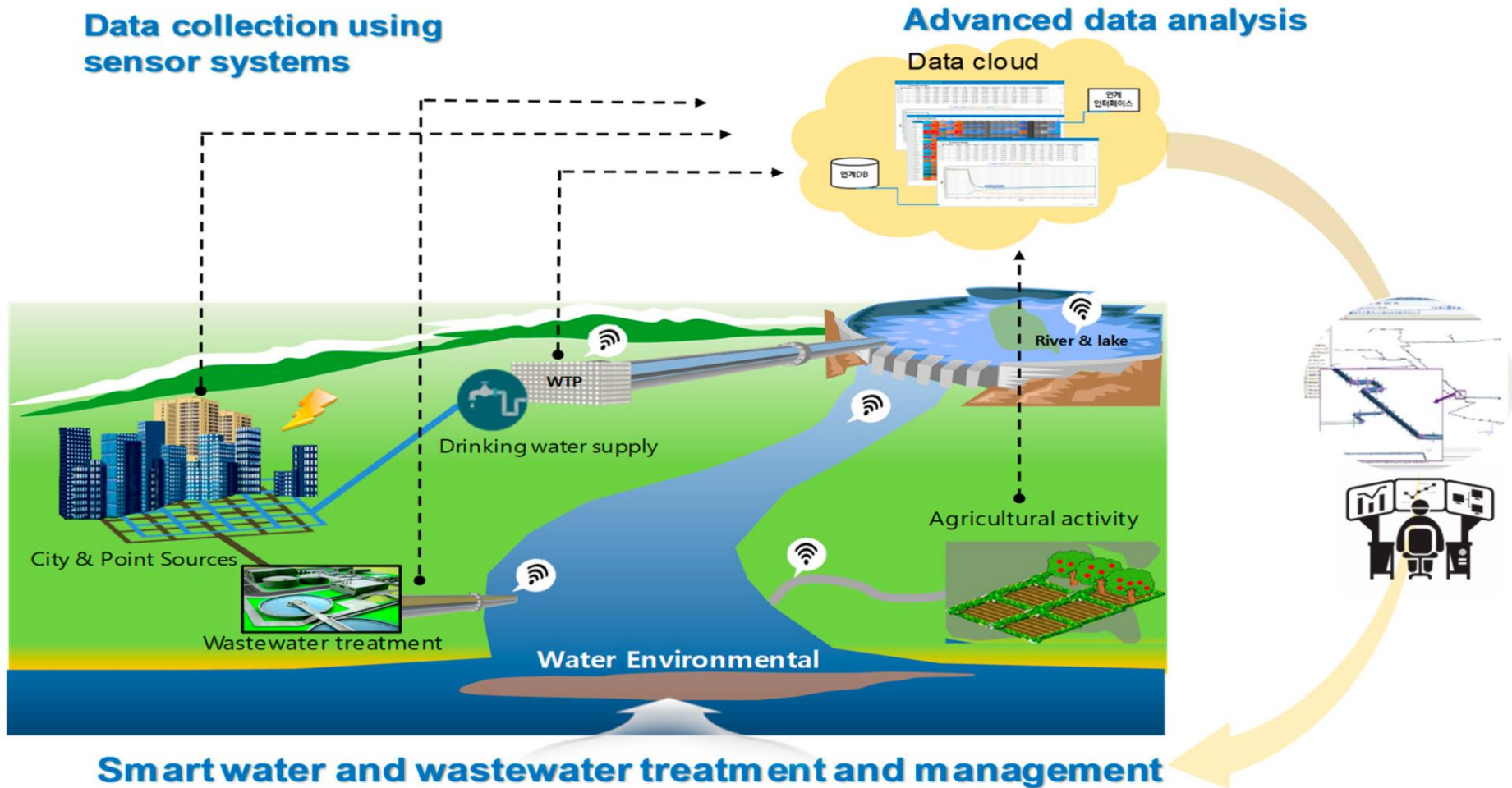
Automated search

Conversion of study reports
into human- and machine-
readable summaries

Aggregation of data into
interconnected, semantically
coded repositories

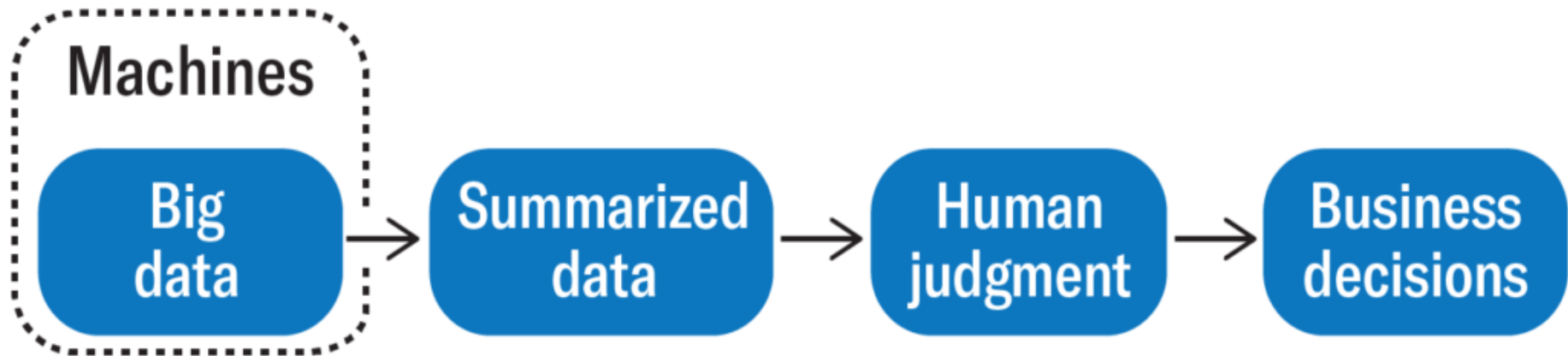
Predicting health risks based
on statistical analysis of
relations in large data sets

✓ Water pollution control



✓ Information for decision making

A Decision-Making Model That Utilizes Summarized Data



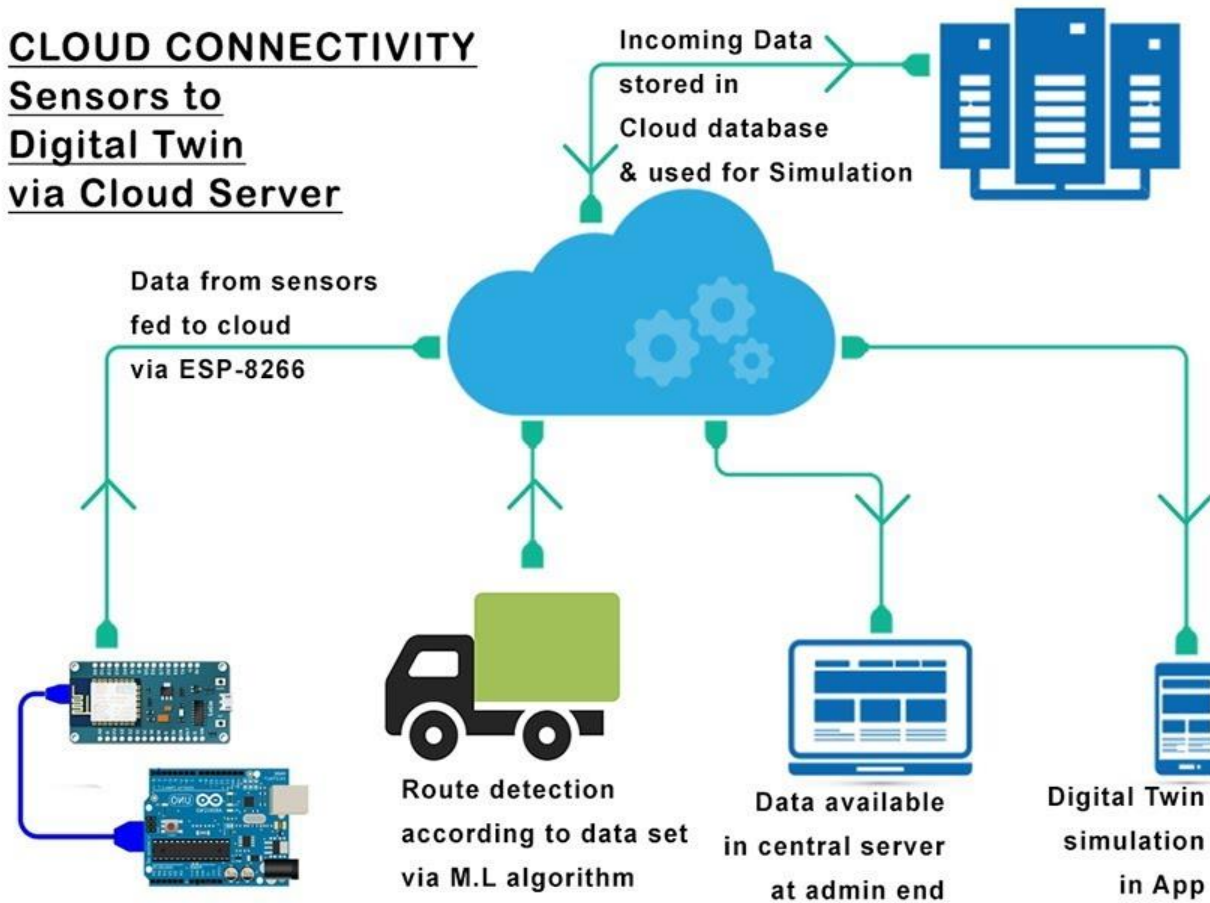
Source: Eric Colson

CLOUD CONNECTIVITY

Sensors to

Digital Twin

via Cloud Server



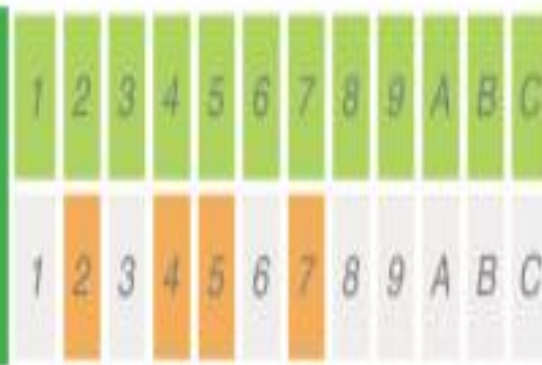
✓ Sustainable development

Environment



Enabler

Inhibitor



✓ Abattoir inspections



✓ Abattoir inspections





Robotics

“A machine resembling a human being and able to replicate certain human movements and functions automatically”

✓ Infectious disease control



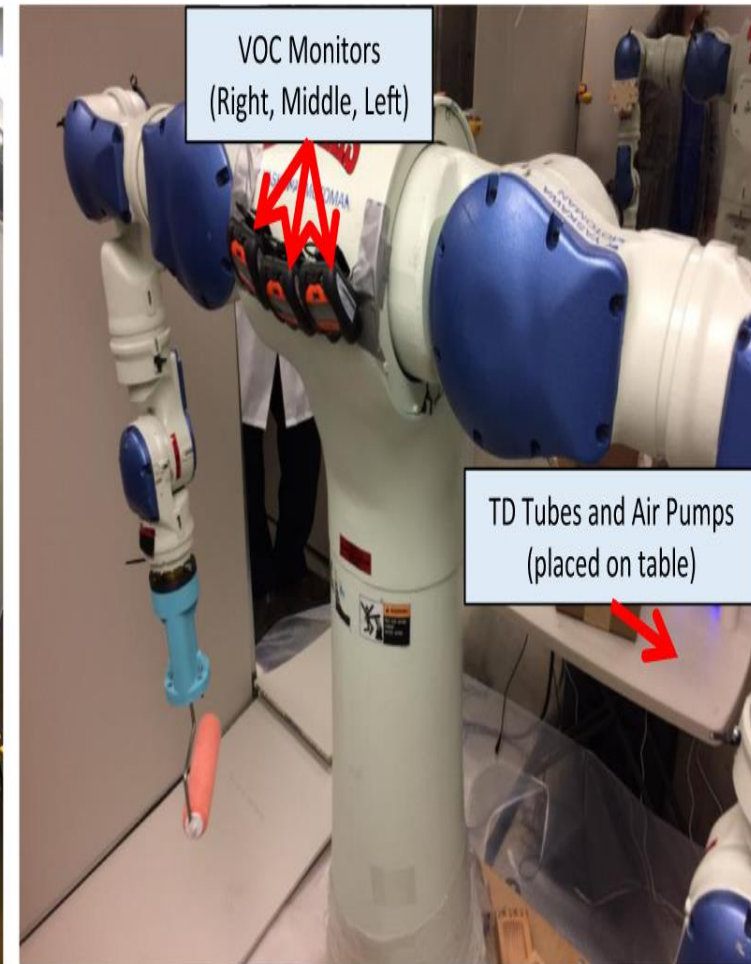
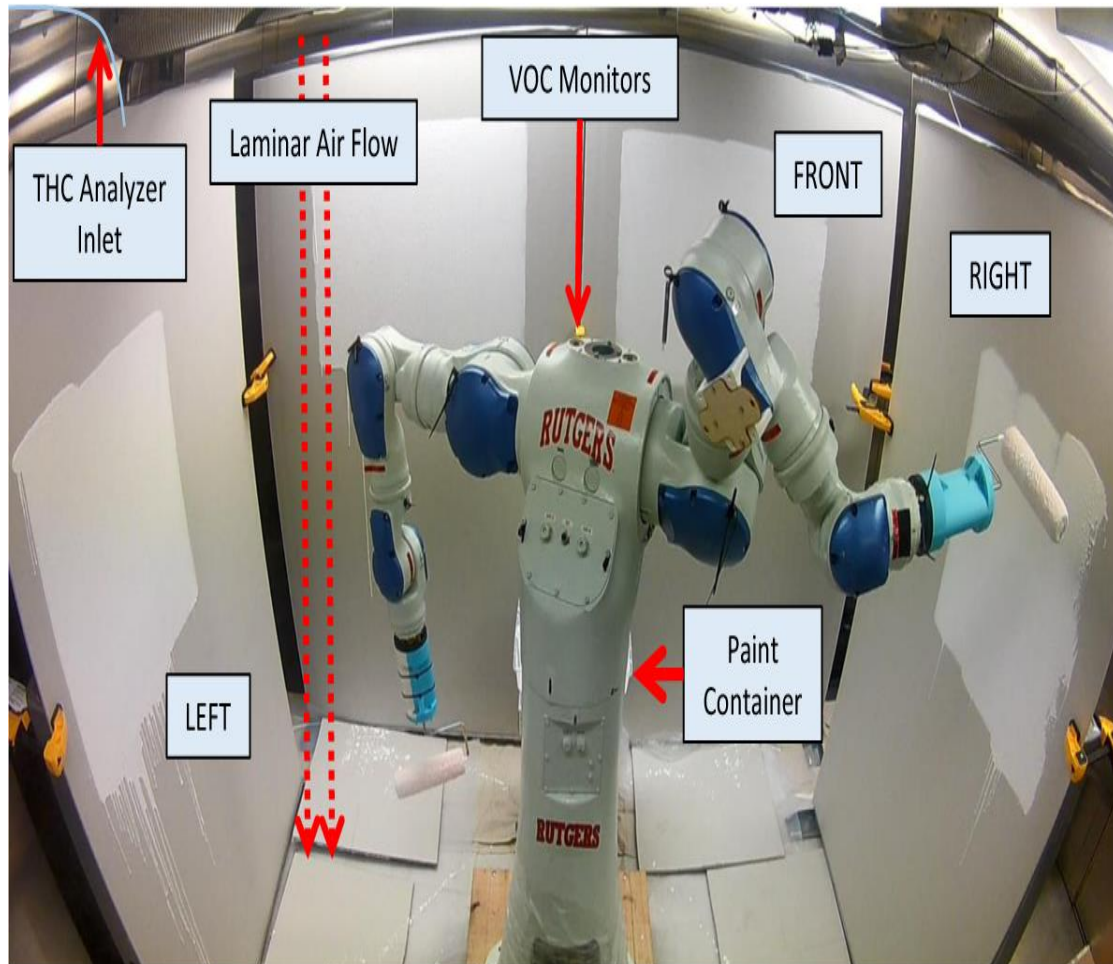
✓ Inspection of buildings



✓ Inspection of hazardous industries



✓ Chemical exposure inspections and studies



✓ Indoor air monitoring



✓ Indoor air monitoring



✓ Indoor air monitoring

anemometer



✓ Water pollution



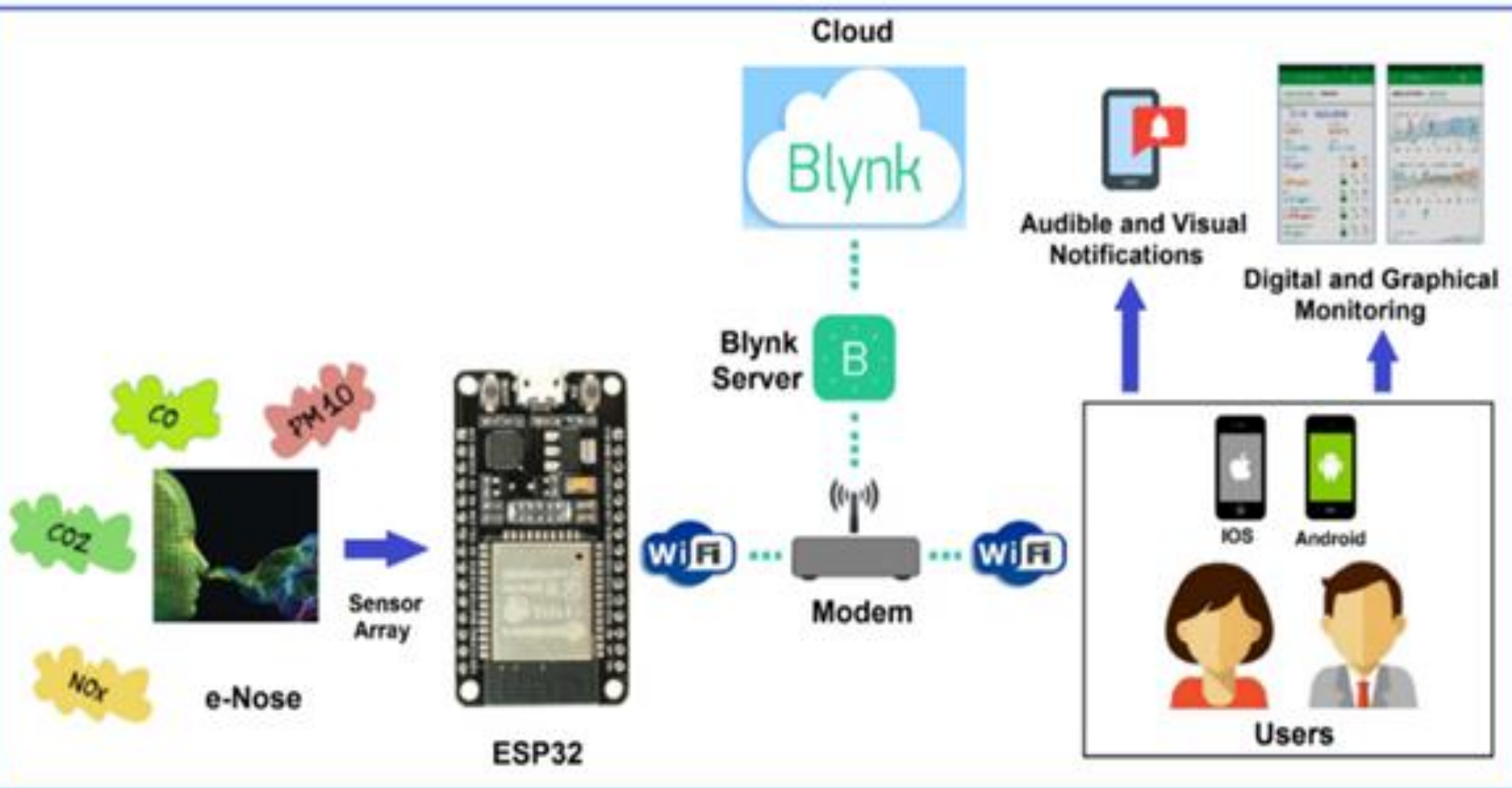
“The IOT describes physical objects, that are embedded with sensors, processing ability, software, and other technologies, that connect and exchange data with other devices and systems over the internet or other communications networks”

Internet of Things (IoT's)

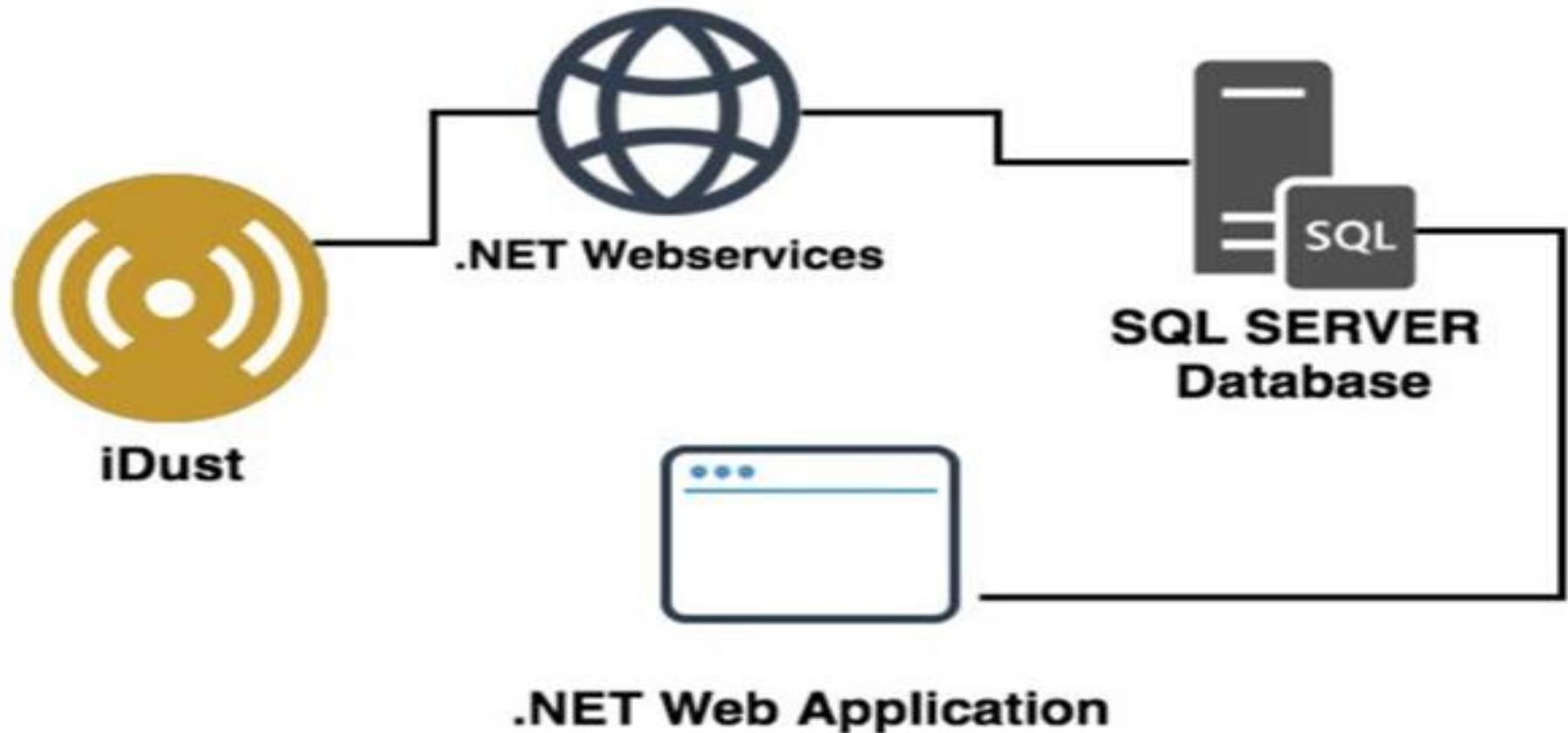
✓ Health and safety information



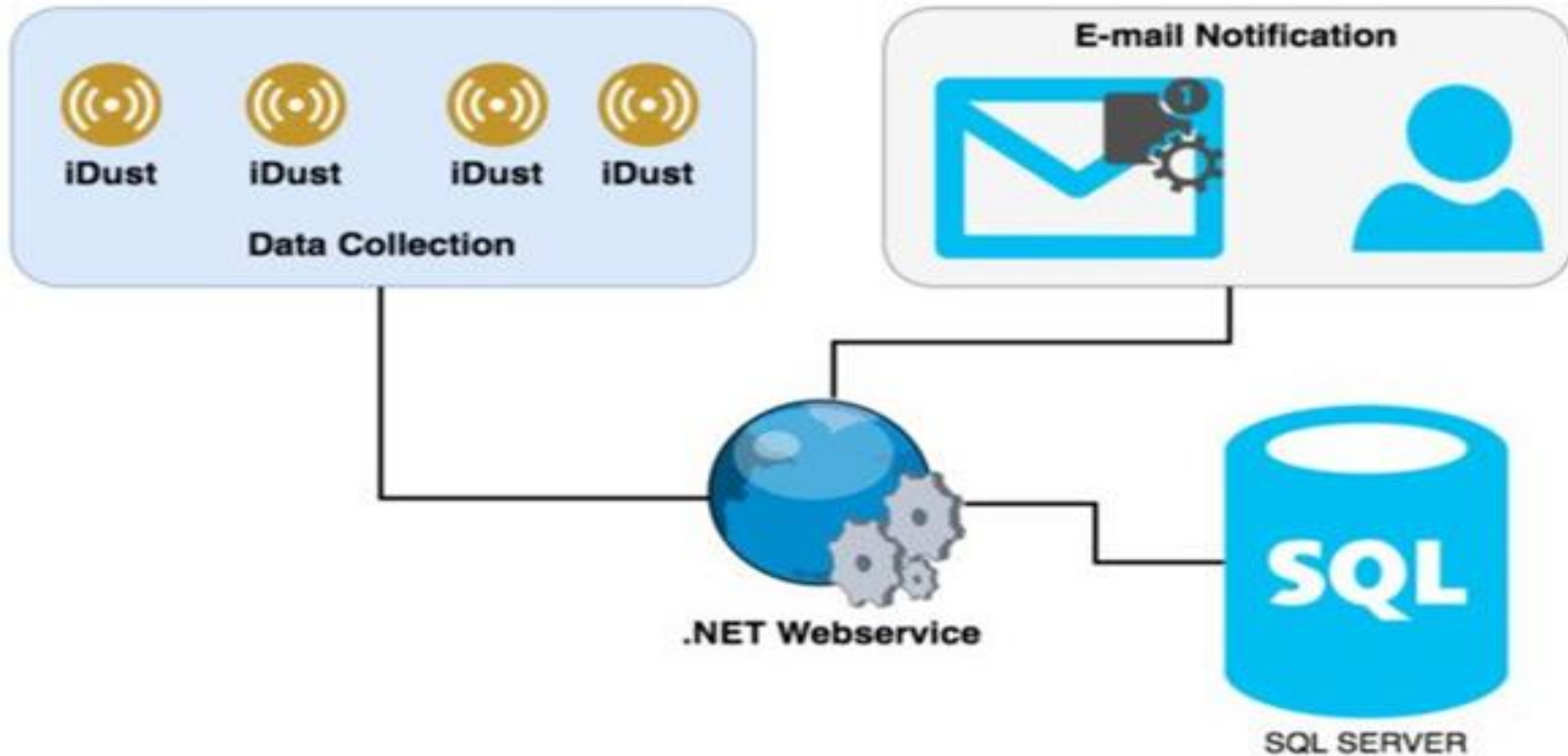
✓ Air monitoring

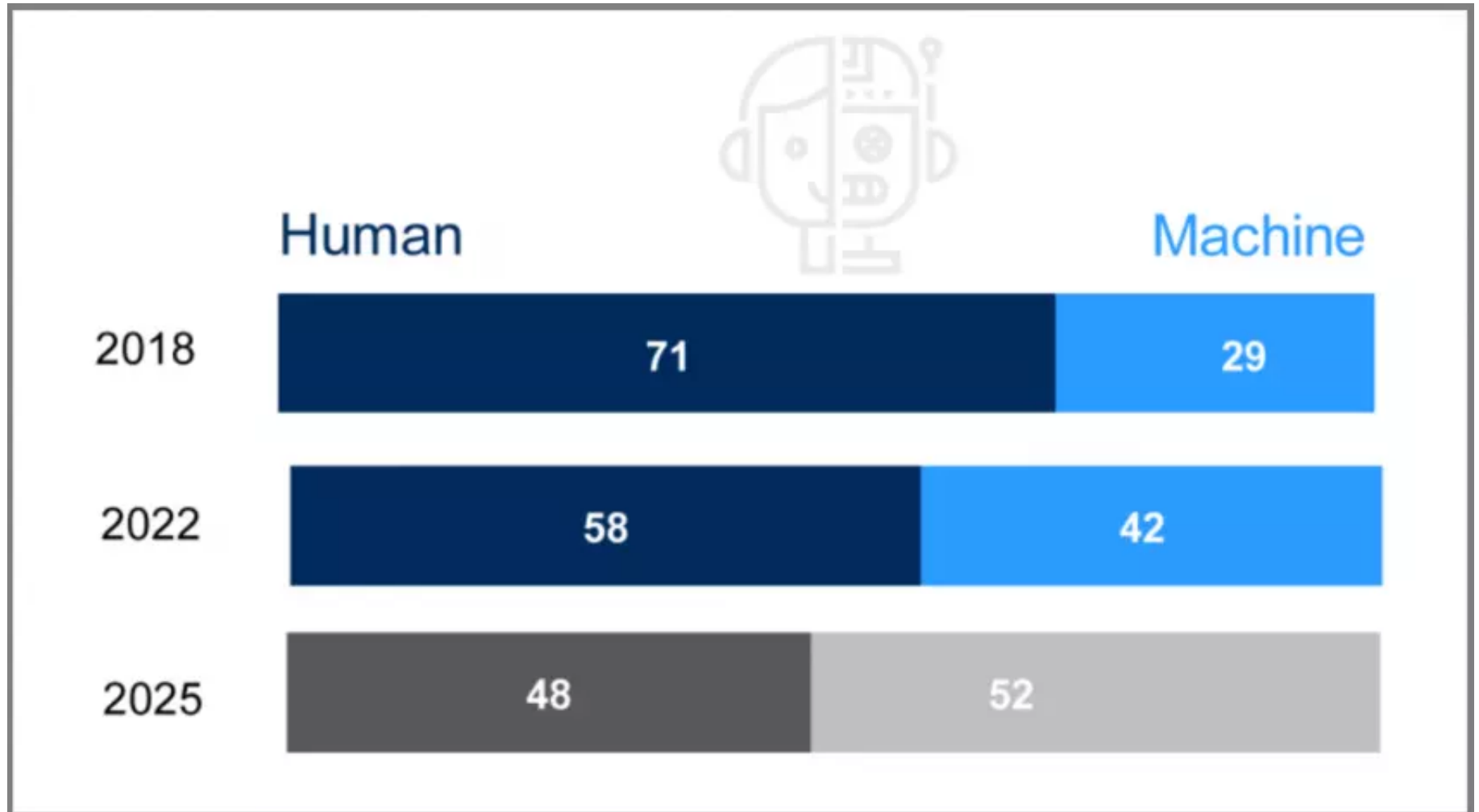


✓ Air monitoring



✓ Air monitoring





Source: World Economic Forum Future of Jobs Report 2020 ³⁶

- ✓ Environmental health inspections will change during the 4IR
- ✓ Governments, training institutions, EH departments, EHP



- Key messages: 4IR

- ✓ Must be embraced by the EH fraternity
- ✓ Change the way the EHP will work
- ✓ Increase efficiencies in the public service
- ✓ Change decision making to being data driven
- ✓ Increase productivity from automation

Change the World

mandela.ac.za