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Week 1

Introduction to AI for Good

W1 Lesson 1

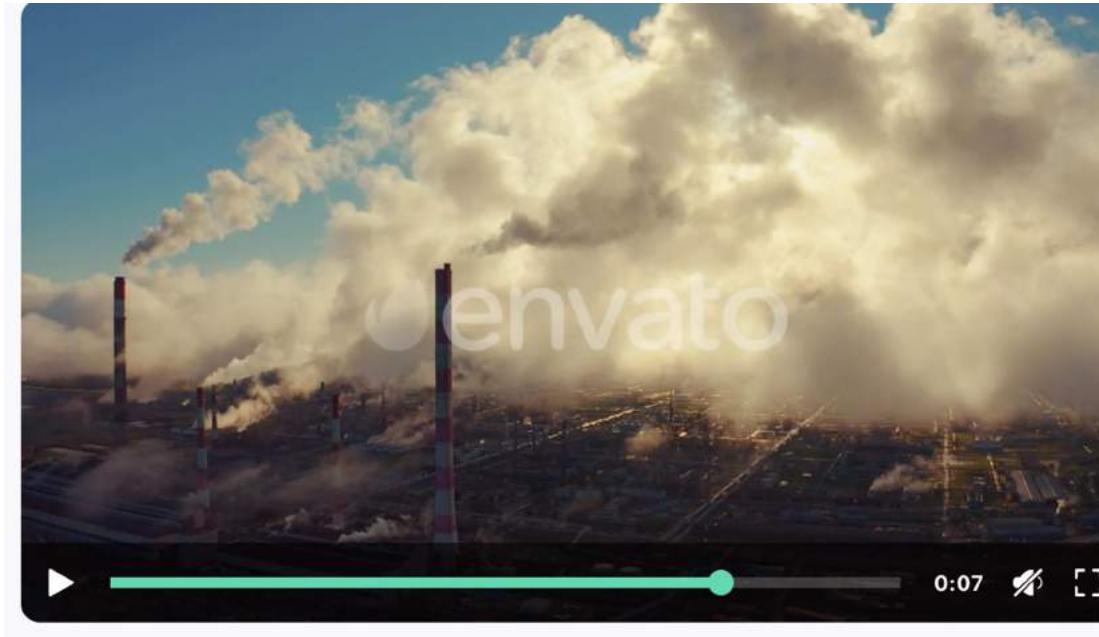
Specialization & Course Introduction



DeepLearning.AI

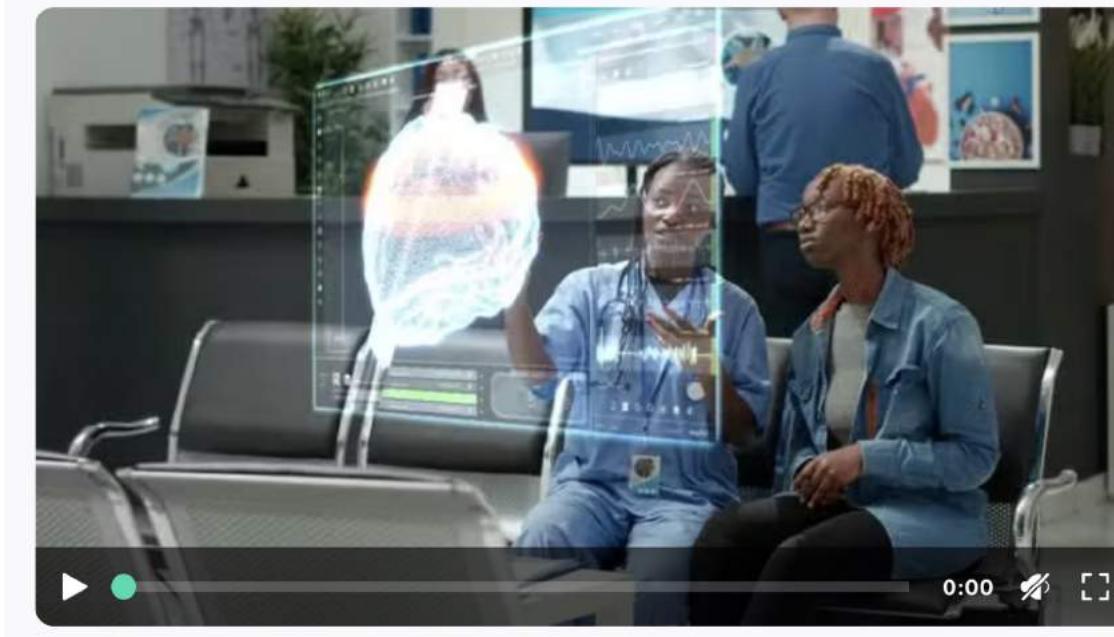
AI and Public Health

Welcome to
AI for Good



Climate change

[Climate change video](#)



Public health

Disaster management

[Disaster response video](#)



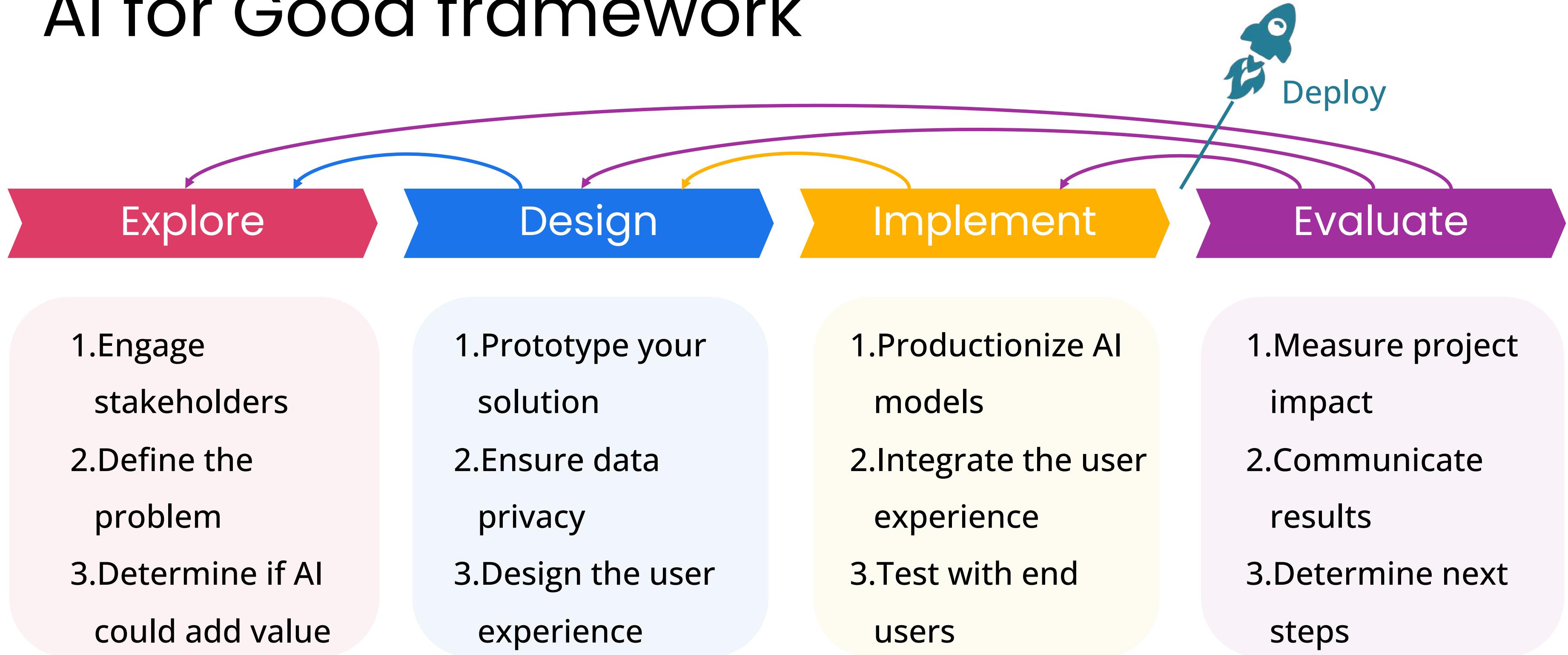


Sierra Leone, 2014. Source: WHO



Liberia, 2007. Source: UNHCR

AI for Good framework



Project spotlights



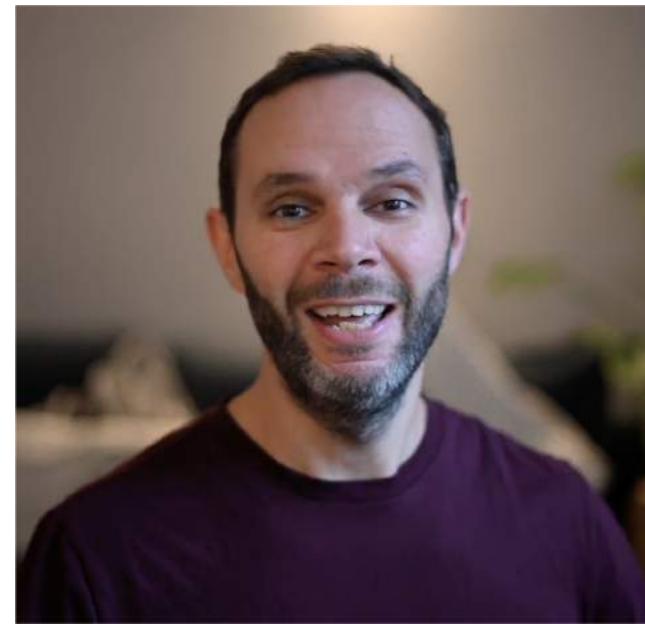
Charles Onu



Sara Beery



Iva Gumnishka



Jack Kelly



Lester Mackey



Tapiwa Chiwewe



Felipe Oviedo



Caleb Robinson



Priya Donti



Shahrzad Gholami

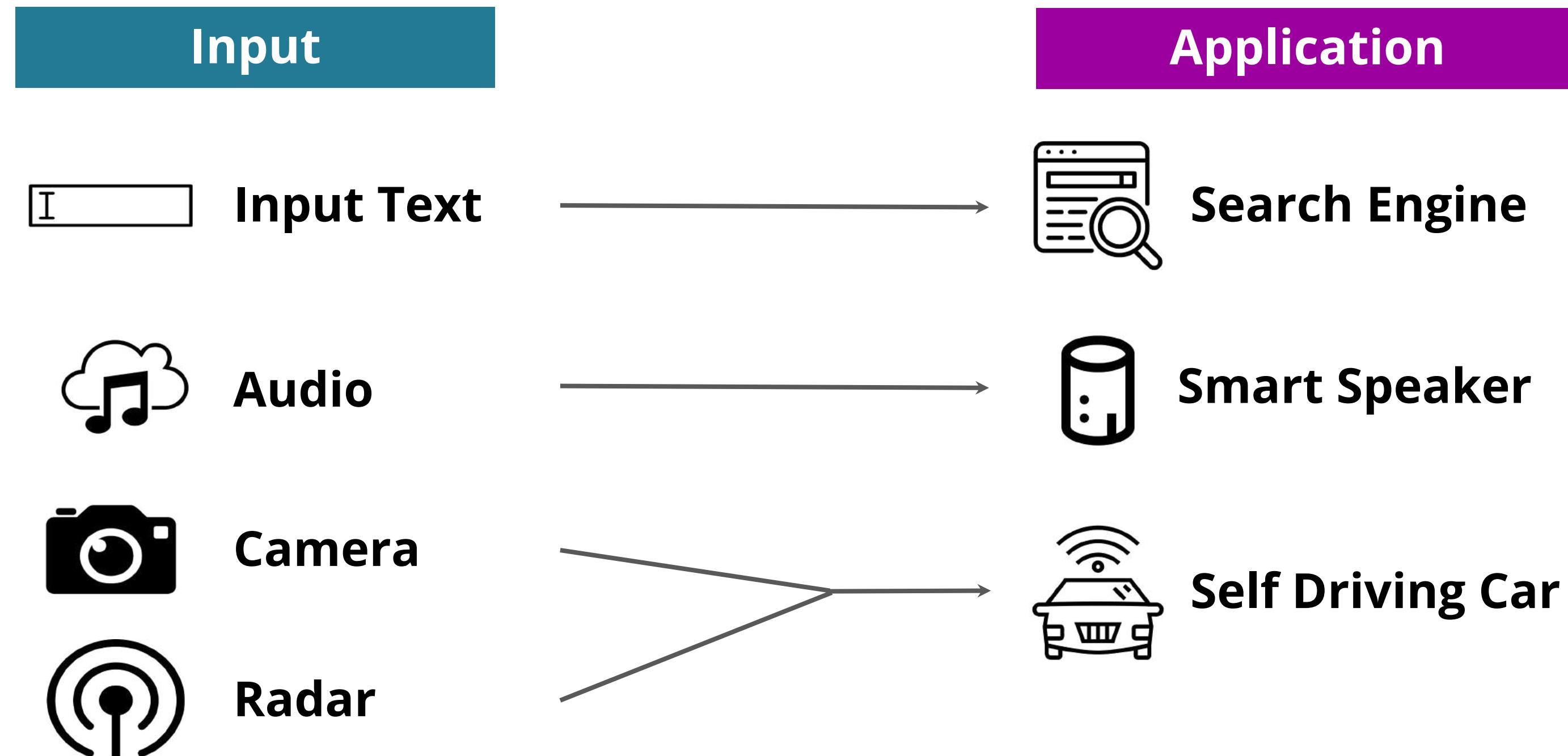


DeepLearning.AI

AI and Public Health

**What is
“AI for Good”?**

AI applications make decisions based on data





Environment



Health



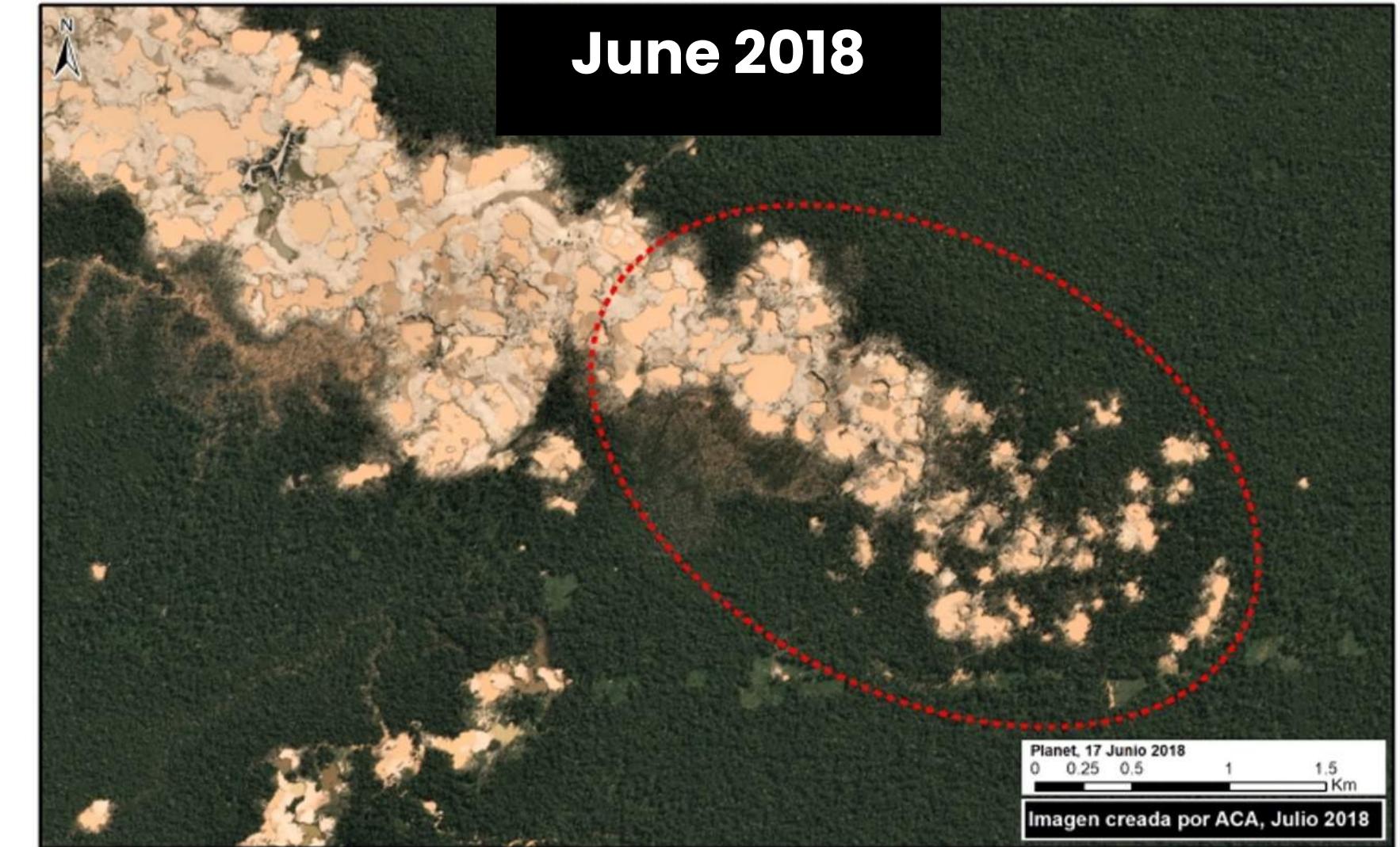
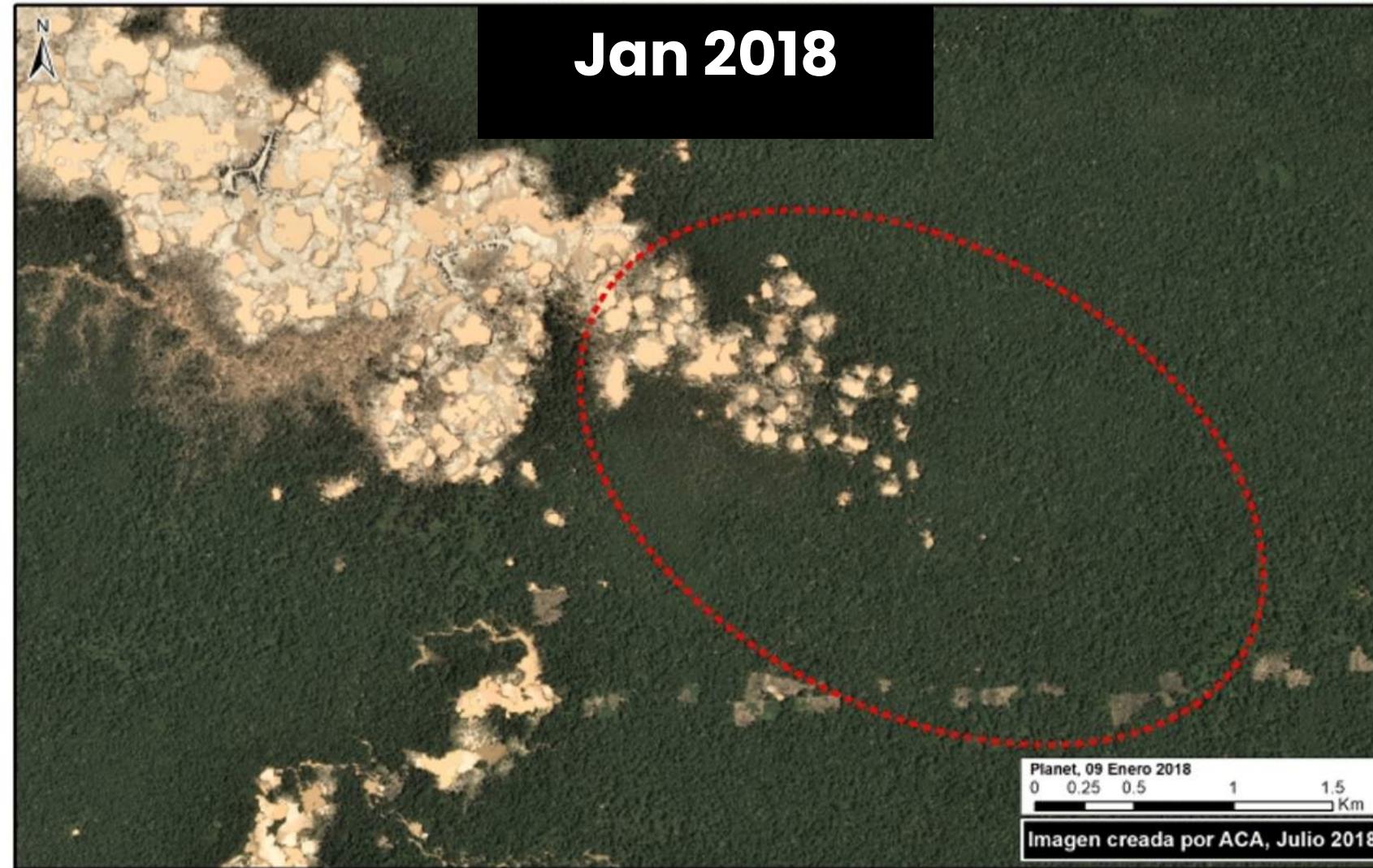
Justice



**Humanitarian
action**

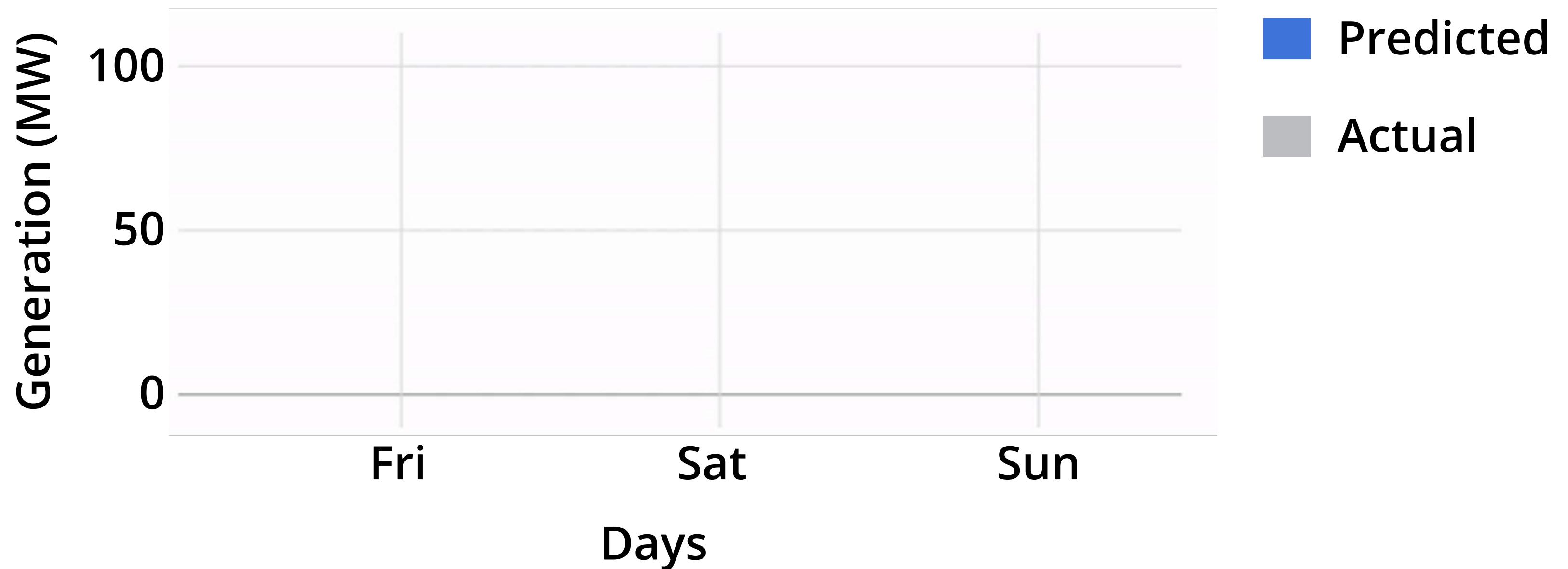
The use of AI to **prevent**, **mitigate**, or
resolve problems affecting human life or
the environment.

Illegal mining detection



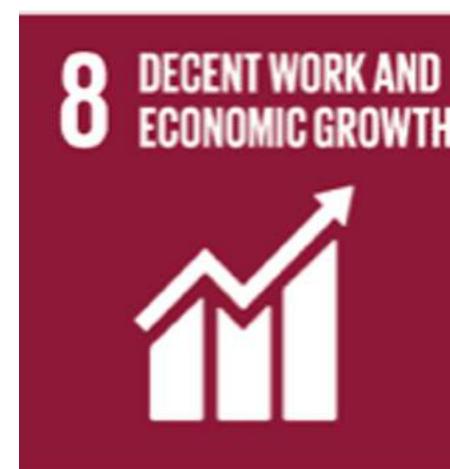
"Illegal gold mining in La Pampa and Tambopata National Reserve, Peru". @Max Stoesser on Environmental Justice Atlas.

The DeepMind system predicts wind power output 36 hours ahead



"Machine learning can boost the value of wind energy", @Google DeepMind on deepmind.com/blog

UN Sustainable Development Goals



“Do no harm”

**Everyone impacted by a project is
left improved or unchanged.**

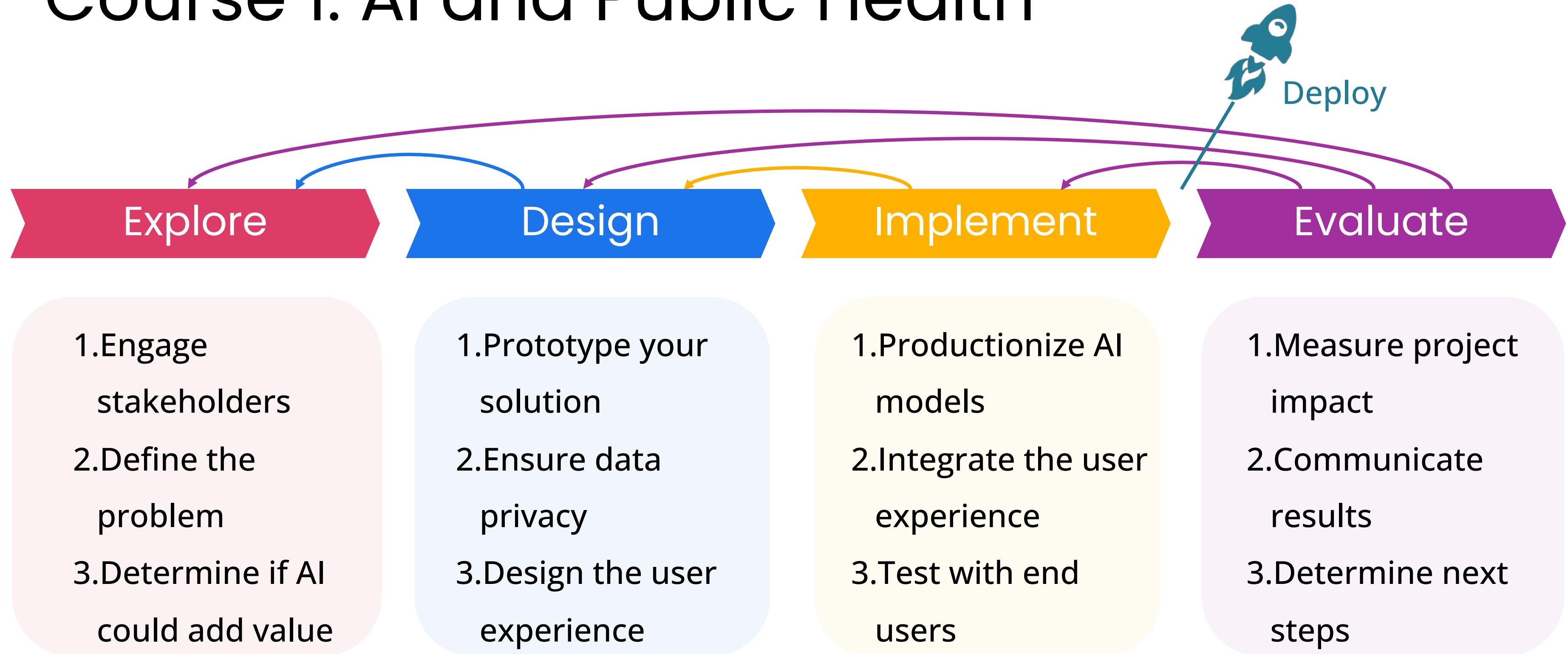


DeepLearning.AI

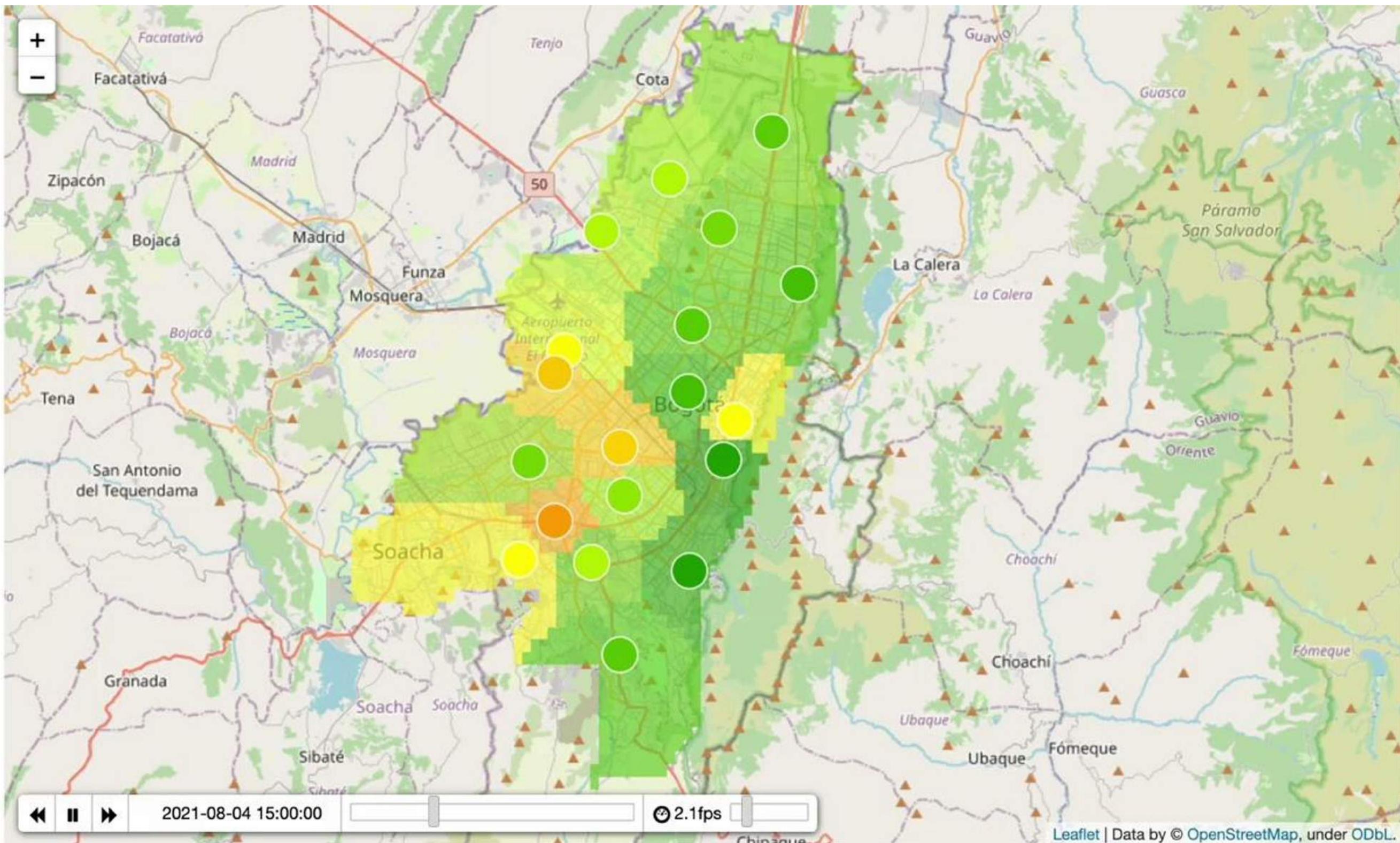
AI and Public Health

The Courses in this
Specialization

Course 1: AI and Public Health

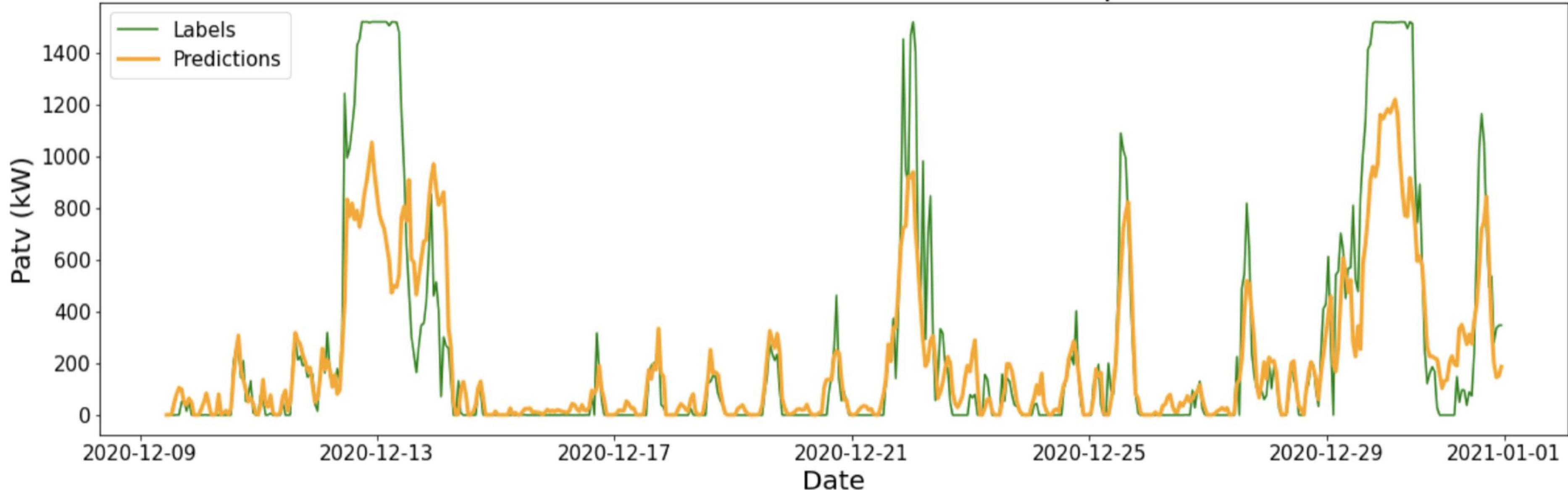


Course 1: AI and Public Health



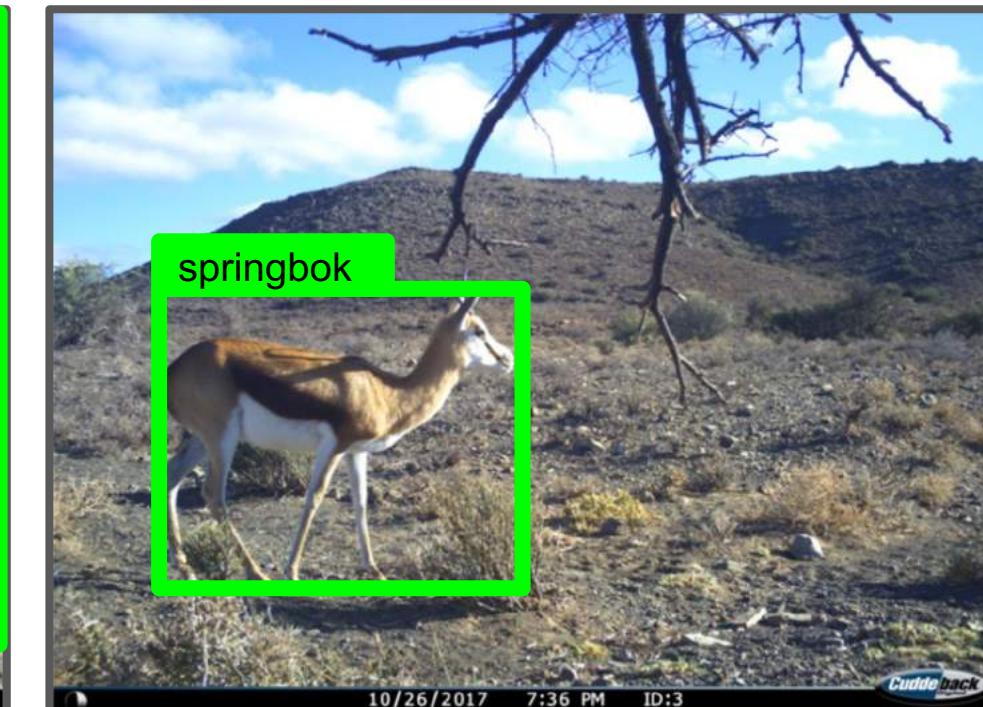
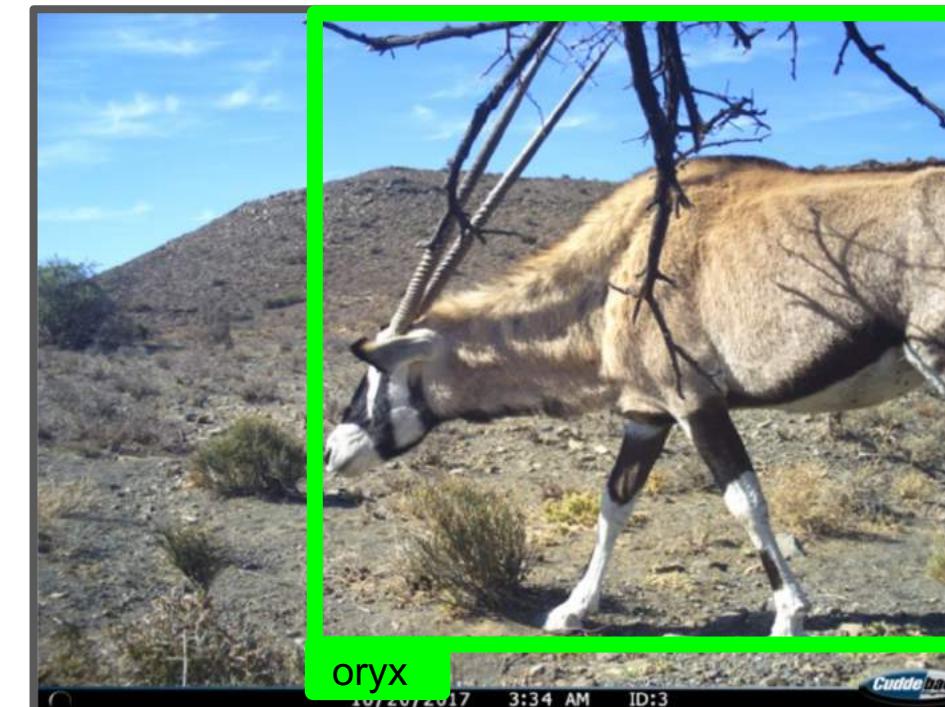
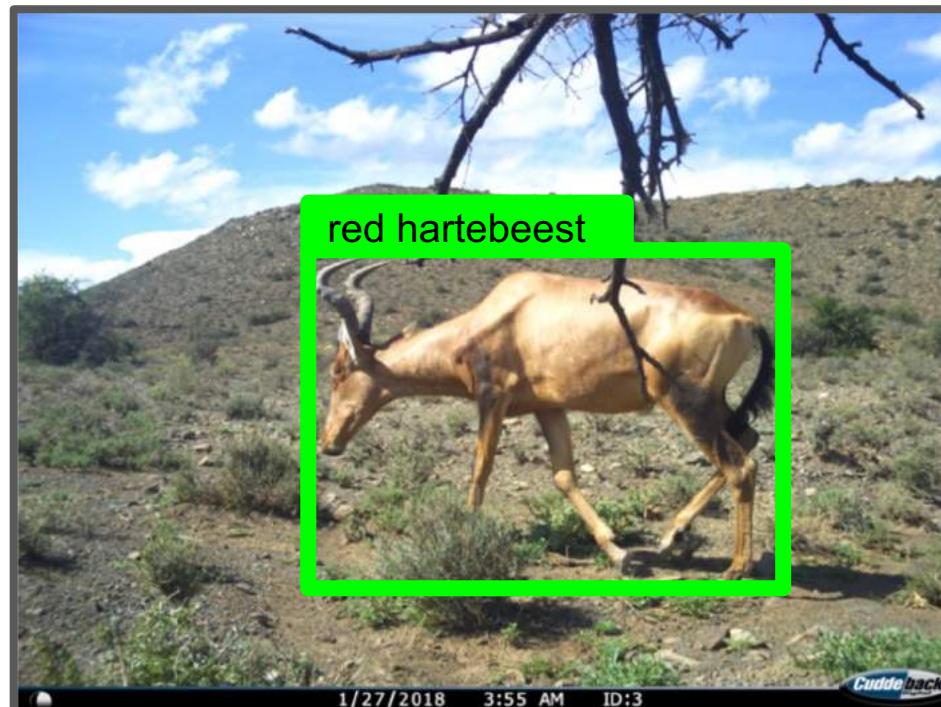
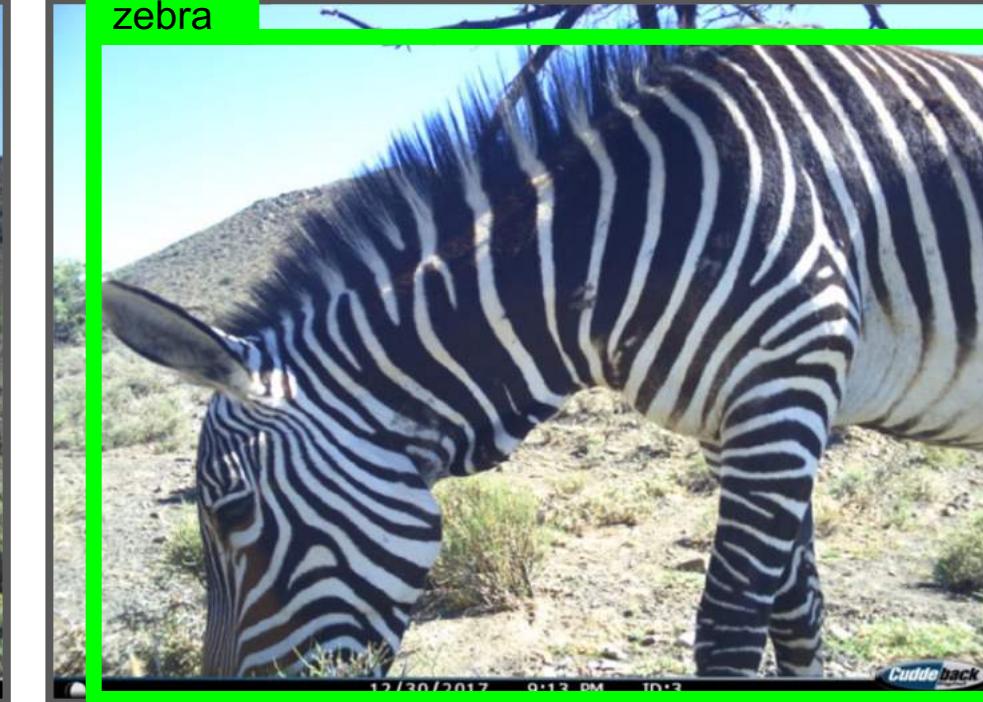
Course 2: AI and Climate Change

Predictions vs Real Values for Test Split



Course 2: AI and Climate Change

AI in biodiversity monitoring



Course 3: AI and Disaster Management



Haiti, 2010.

Moun kwense
nan Sakre Kè
nan Pòtoprens

Haitian
Kreyol

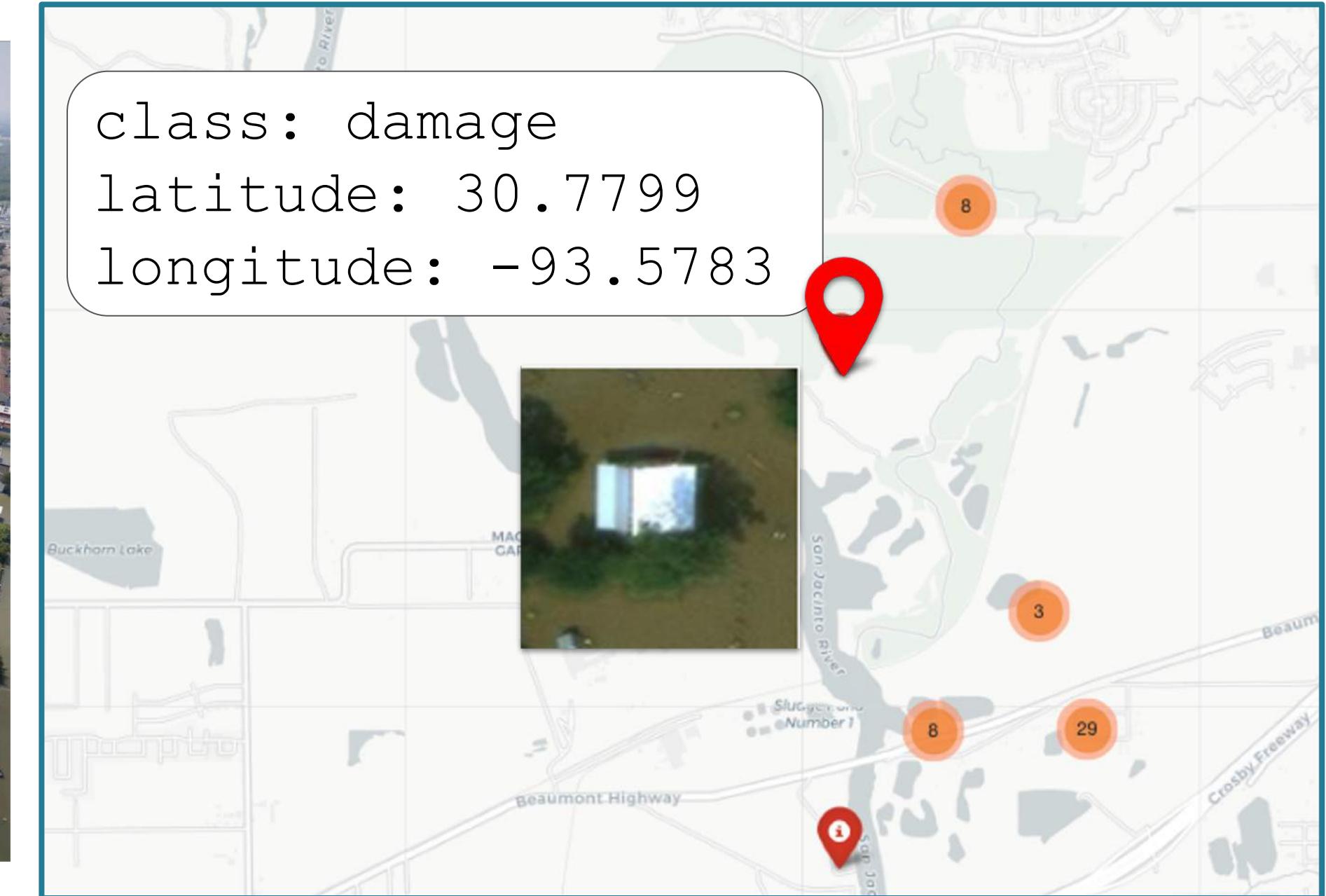
People trapped
in Sacred Heart
Church, PauP

English
Translation

Course 3: AI and Disaster Management



Hurricane Harvey, 2017





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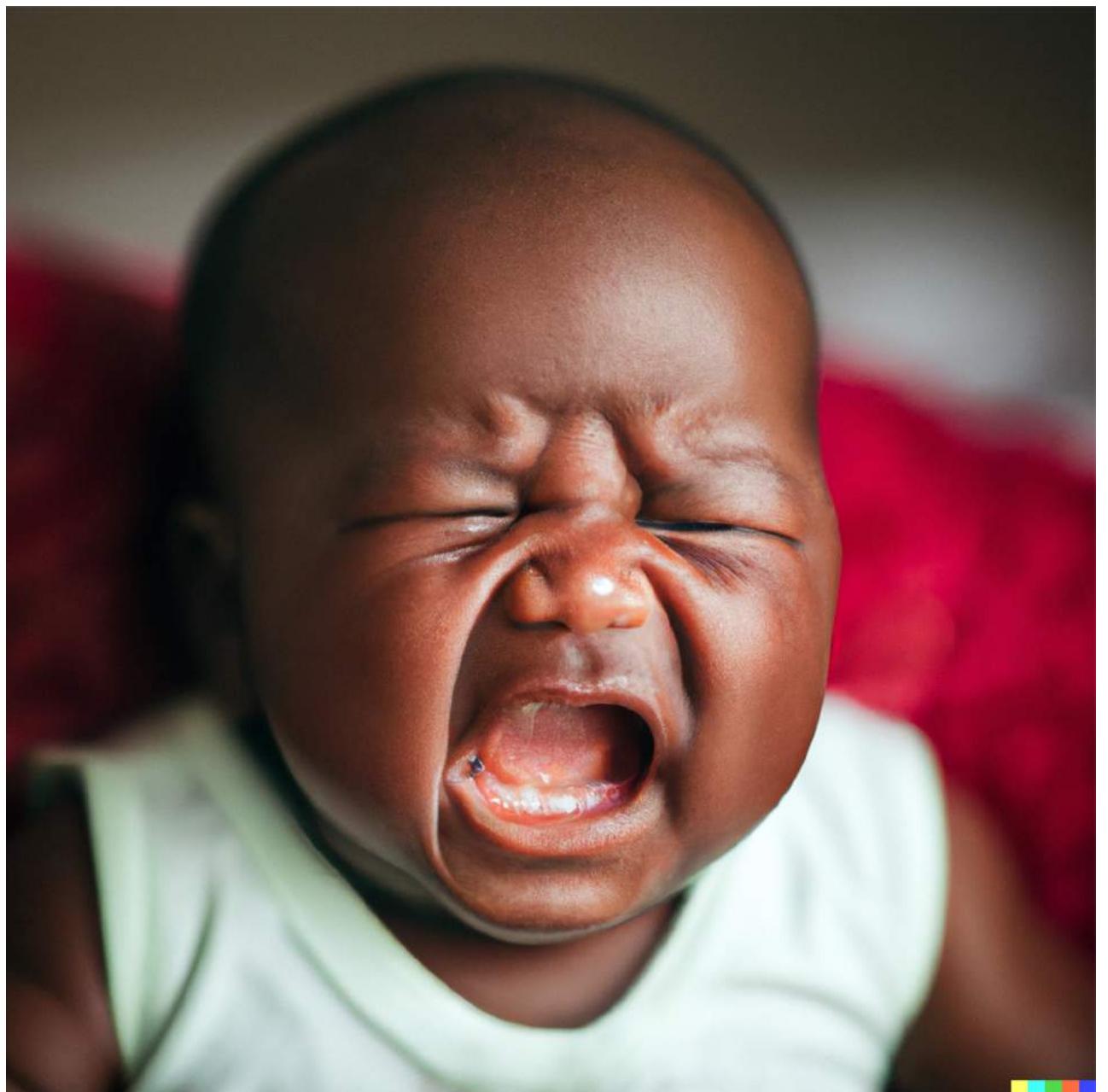
AI and Public Health

Project Spotlight:
Ubenwa Health
- Charles Onu

Neonatal asphyxia

- Top causes of **sudden death and disabilities**
- Newborn is unable to sustain spontaneous breathing
- Brain cells do not get enough oxygen
- Could result in **irreversible brain damage**

Neonatal asphyxia: Yearly casualties



> 1 million
babies die

> 1.2 million babies
develop medical
conditions

Image generated with DALL-E

Ubenwa solution

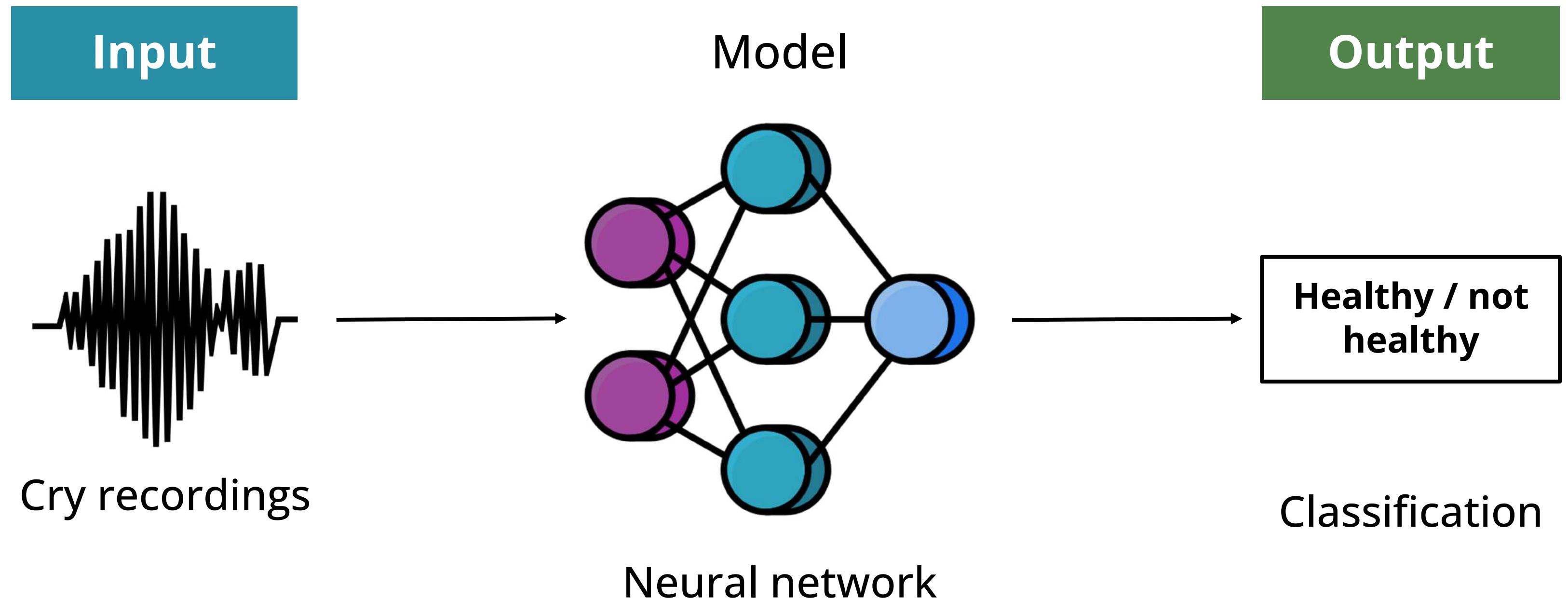


Detect early signs of neurological anomalies
using a recording of the babies cry

Key advantages

- Fast
- Cost-effective
- Non-invasive

Use of machine learning



W1 Lesson 2

Introduction to Artificial Intelligence and Machine Learning



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AI and Public Health

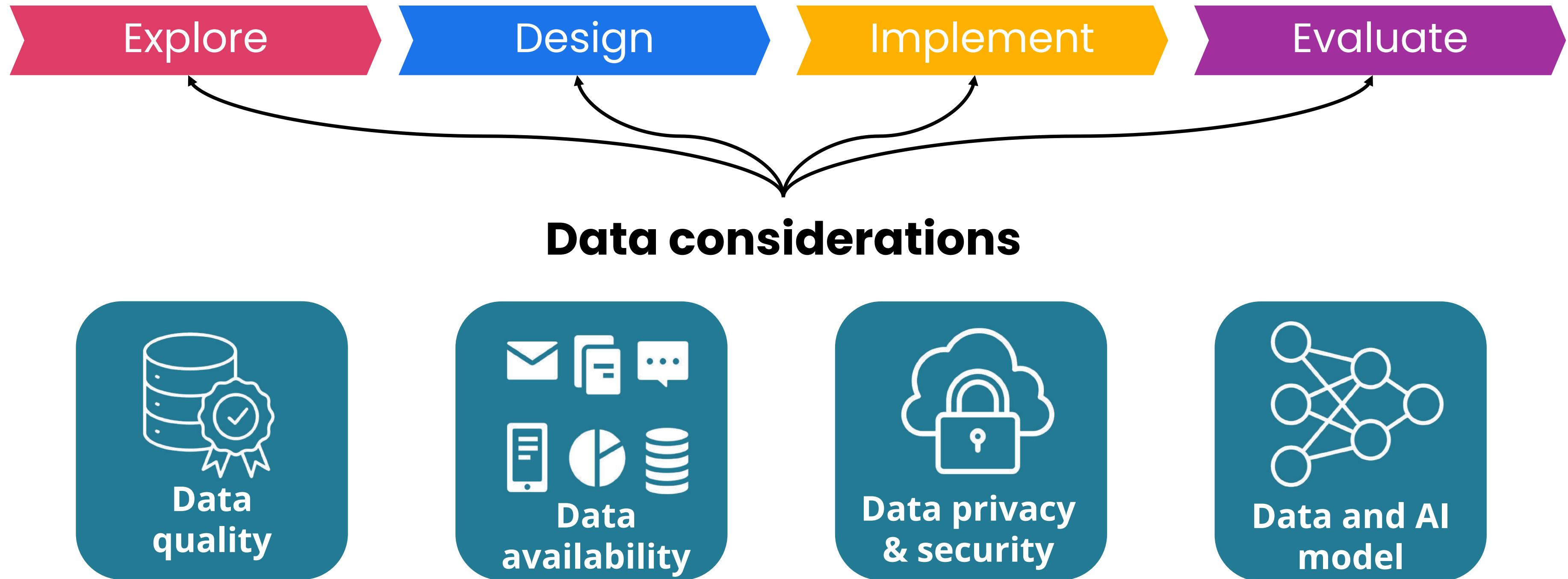
**What is Artificial
Intelligence?**

What is AI?

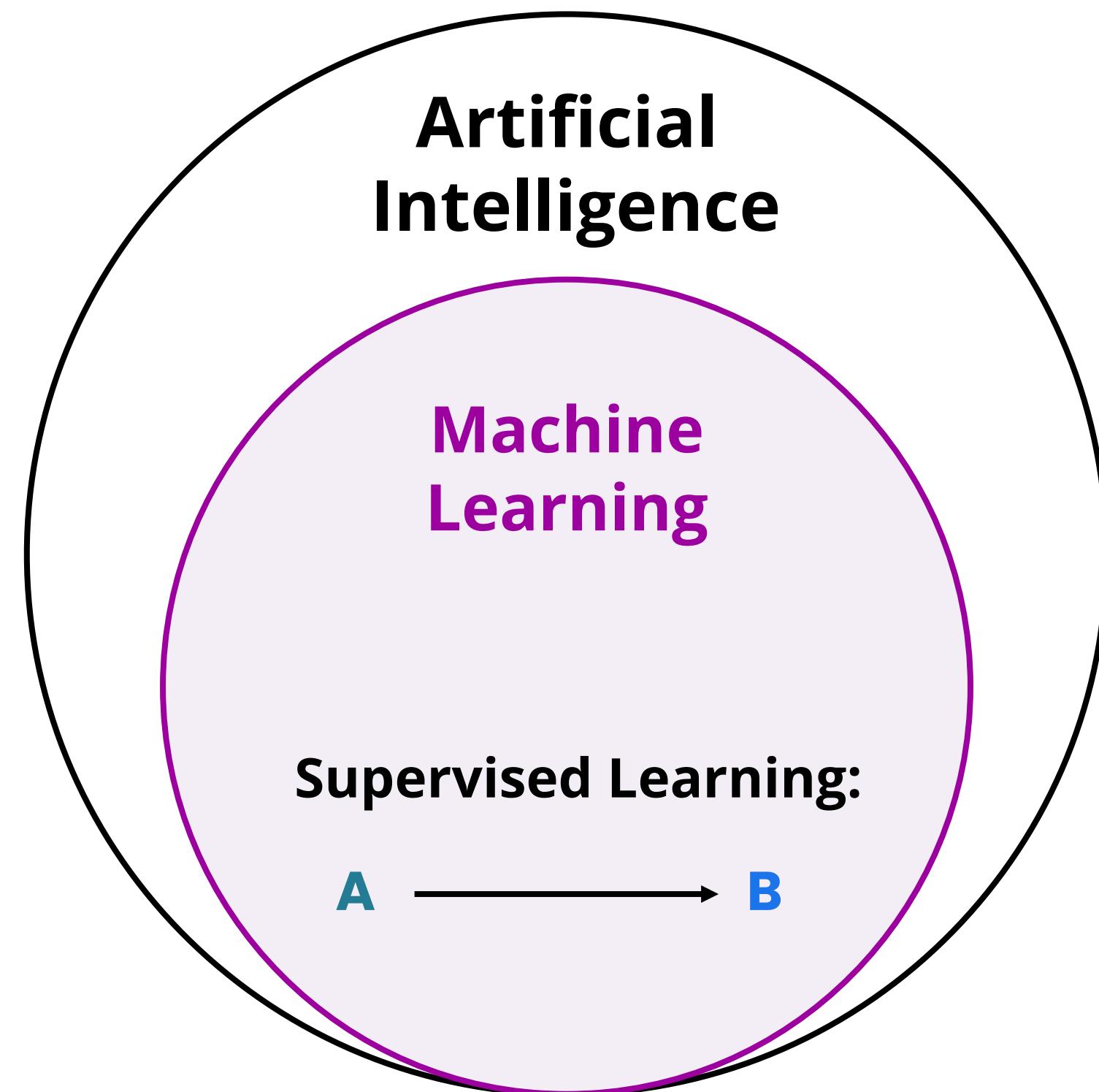
Artificial Intelligence

A computer program making
decisions based on patterns in data

AI for Good framework



Artificial Intelligence terminology

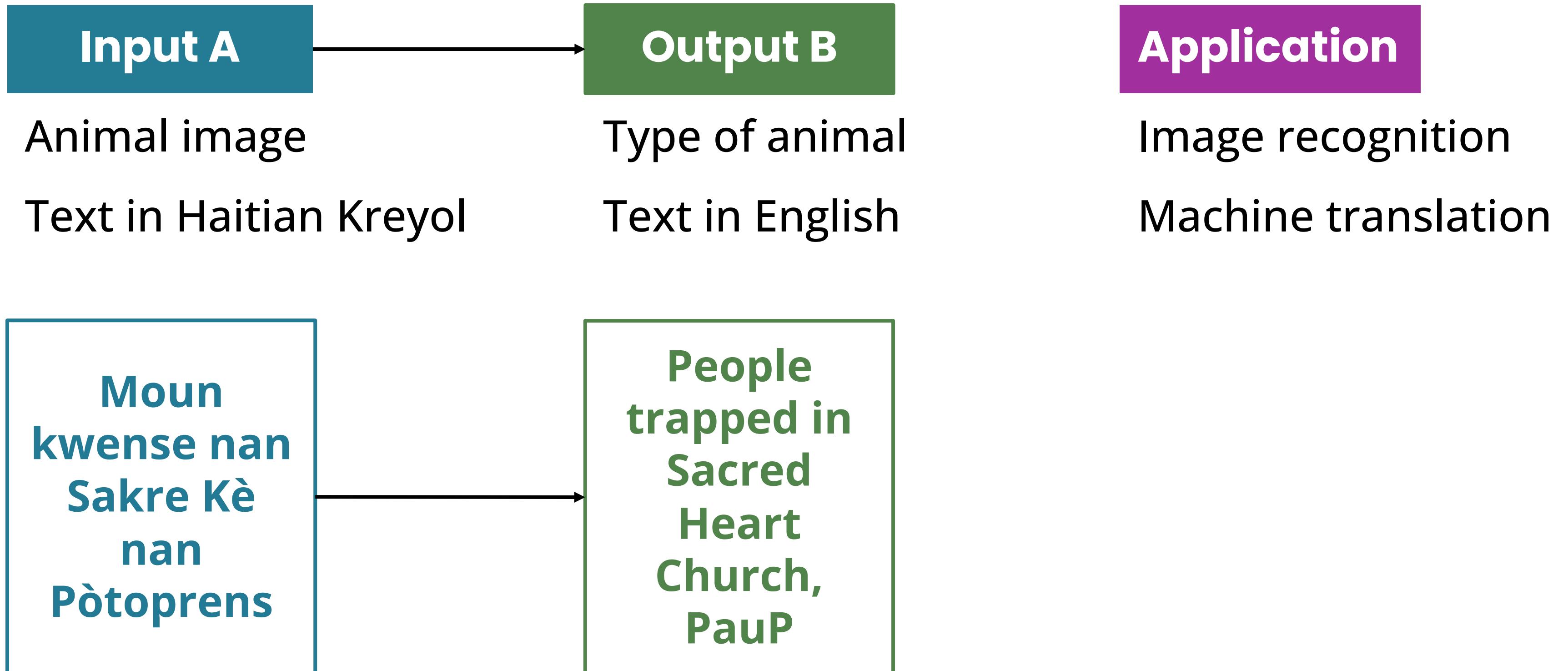


Supervised learning

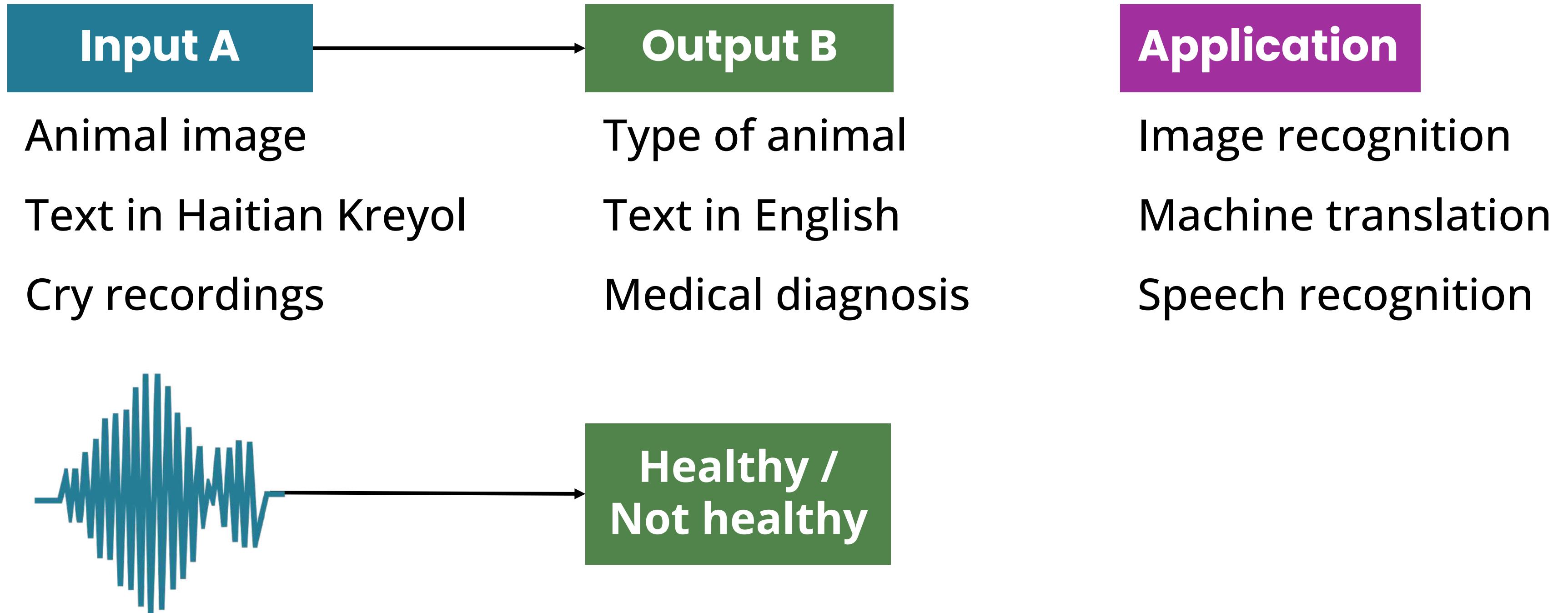


Gemsbok

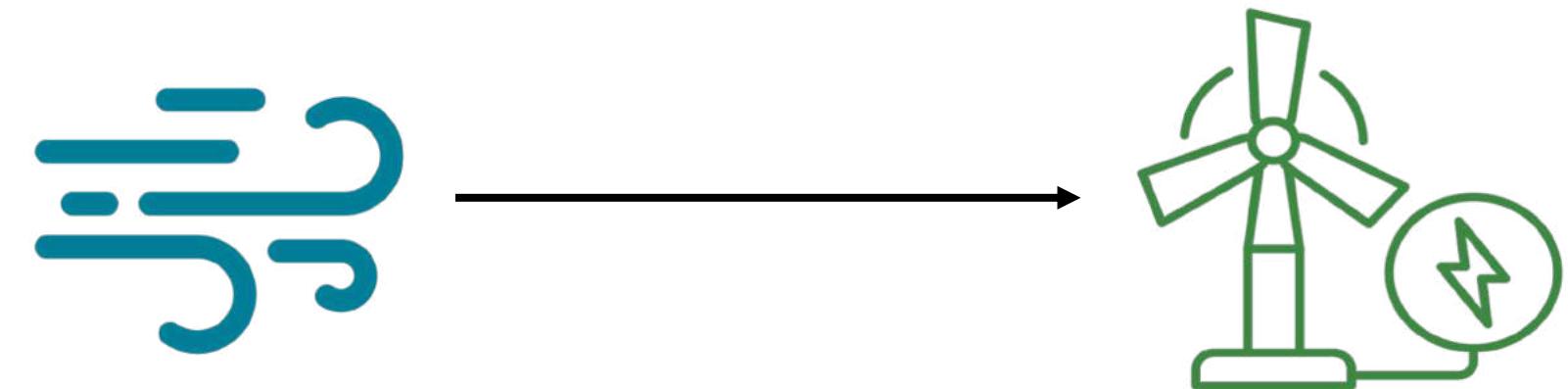
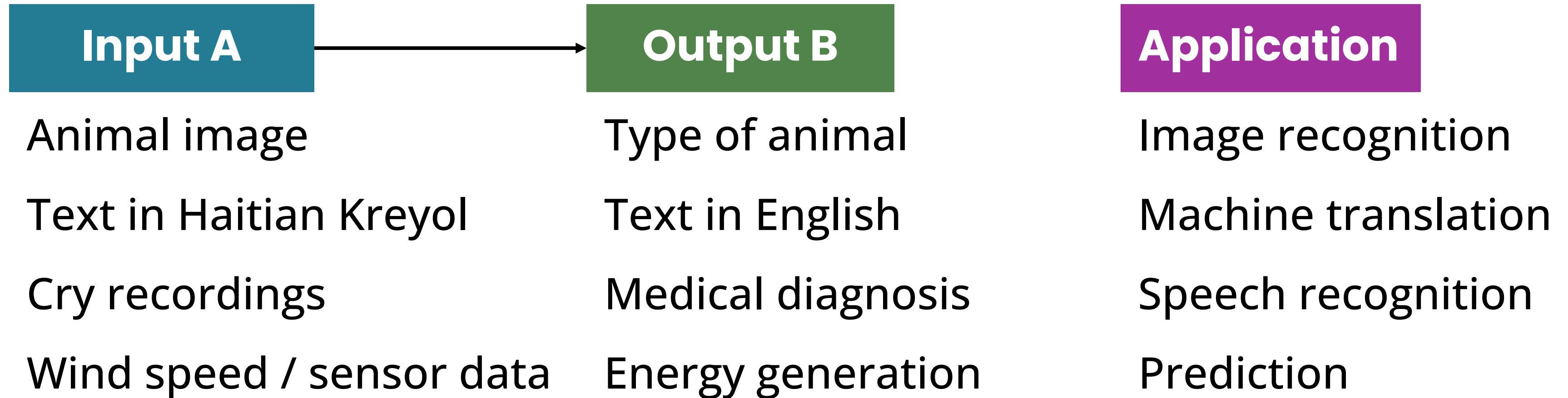
Supervised learning



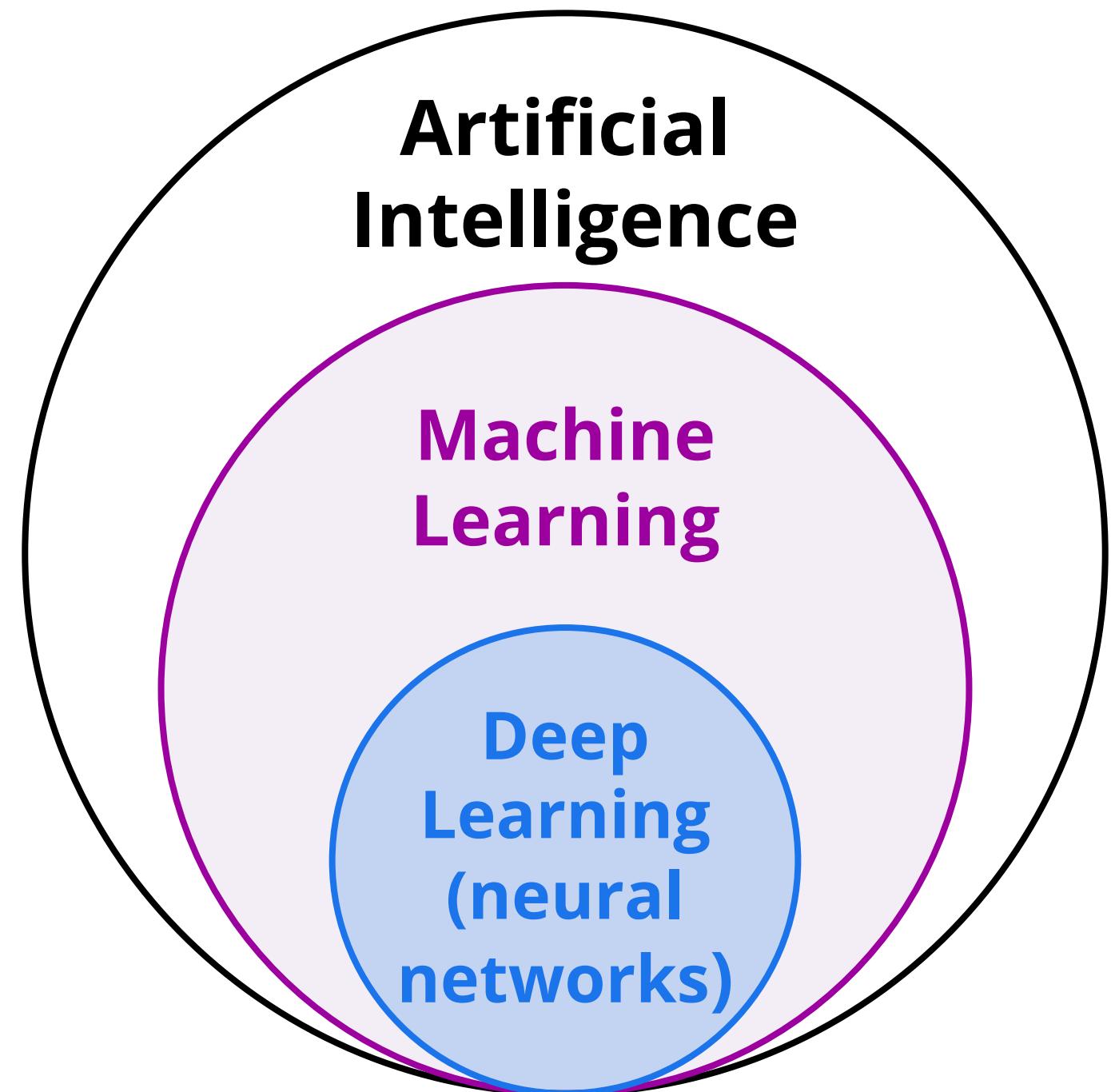
Supervised learning



Supervised learning



Artificial Intelligence terminology





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AI and Public Health

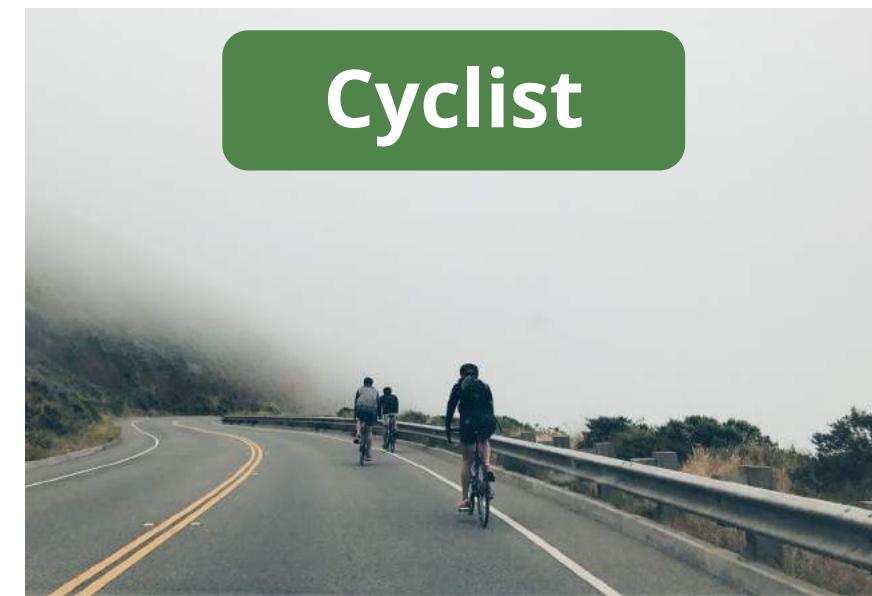
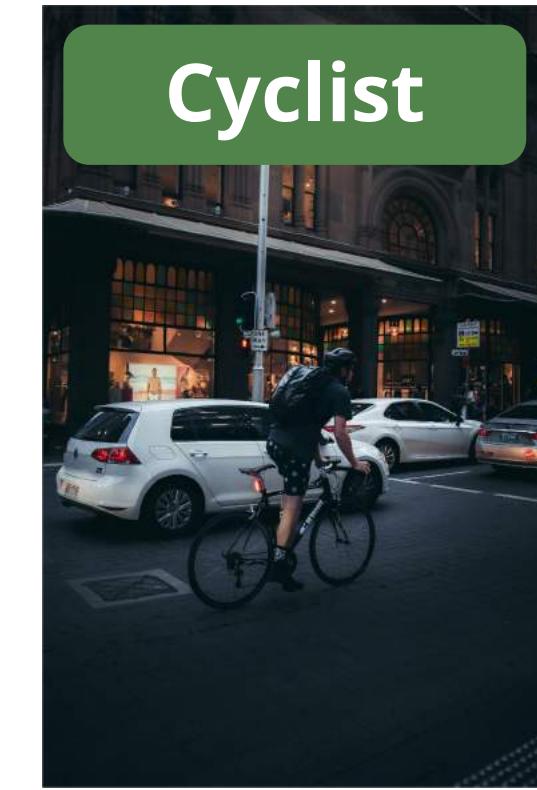
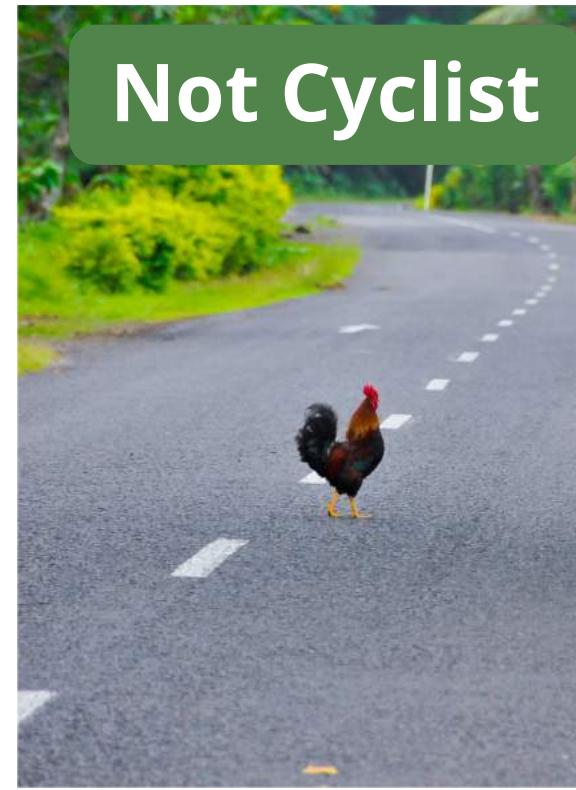
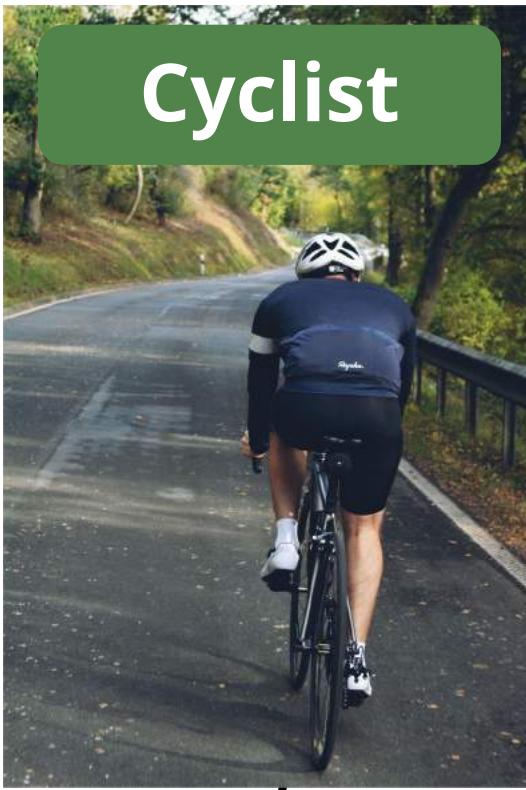
How Supervised Learning Works

Object detection

Cyclist



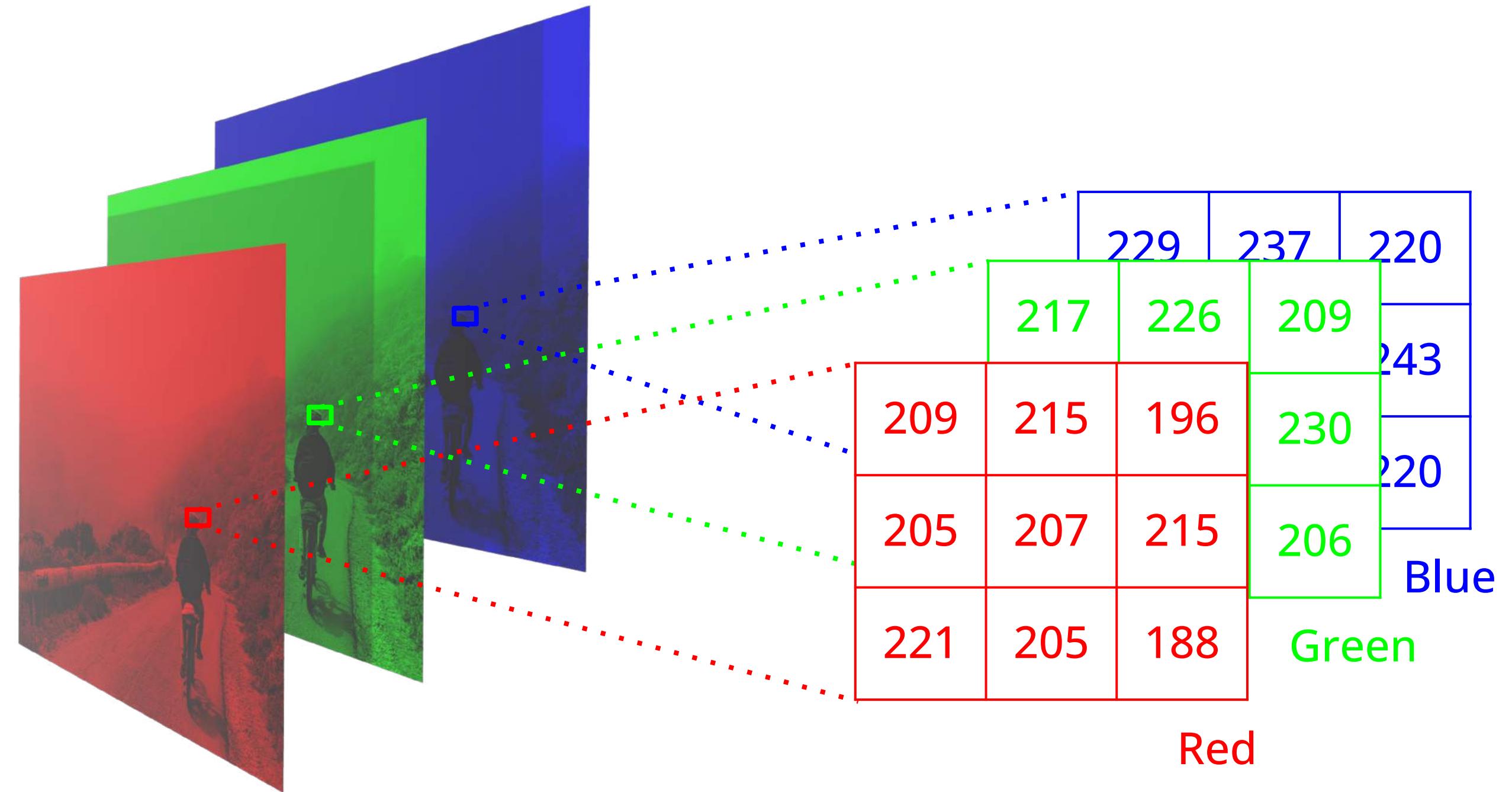
Image classification





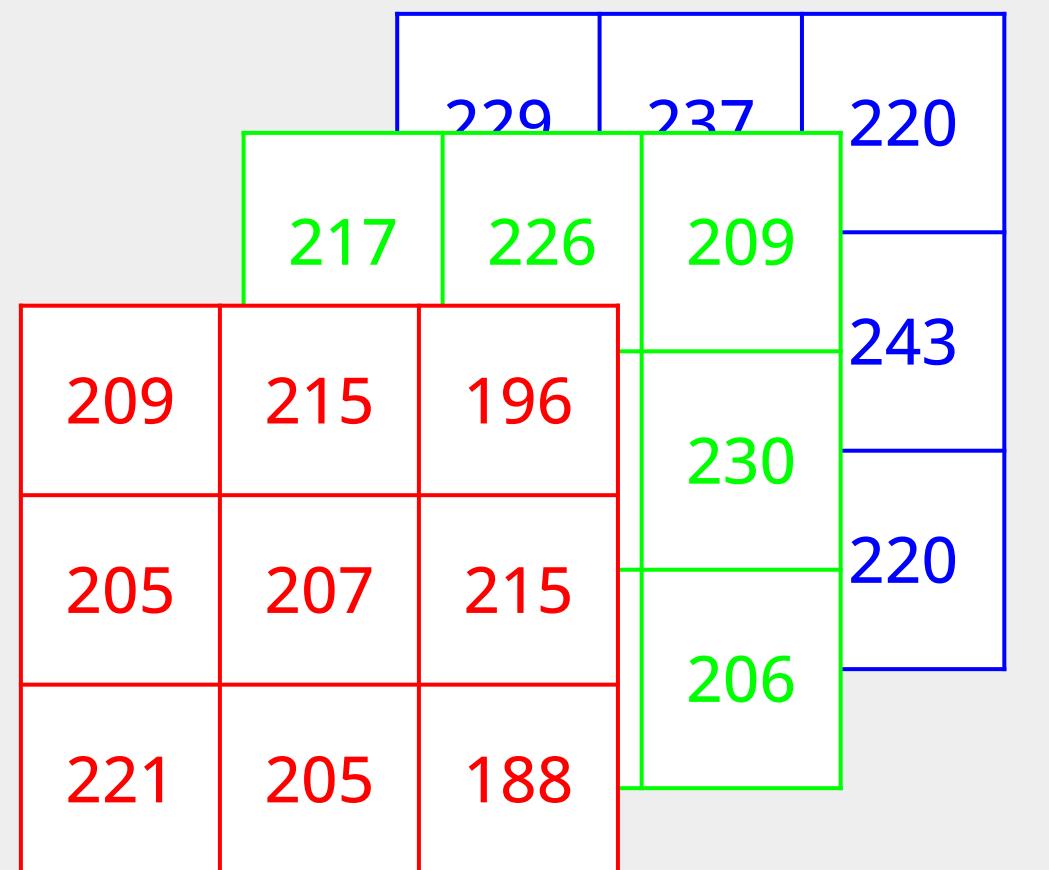
Cyclist

How supervised learning works



Input A

Image

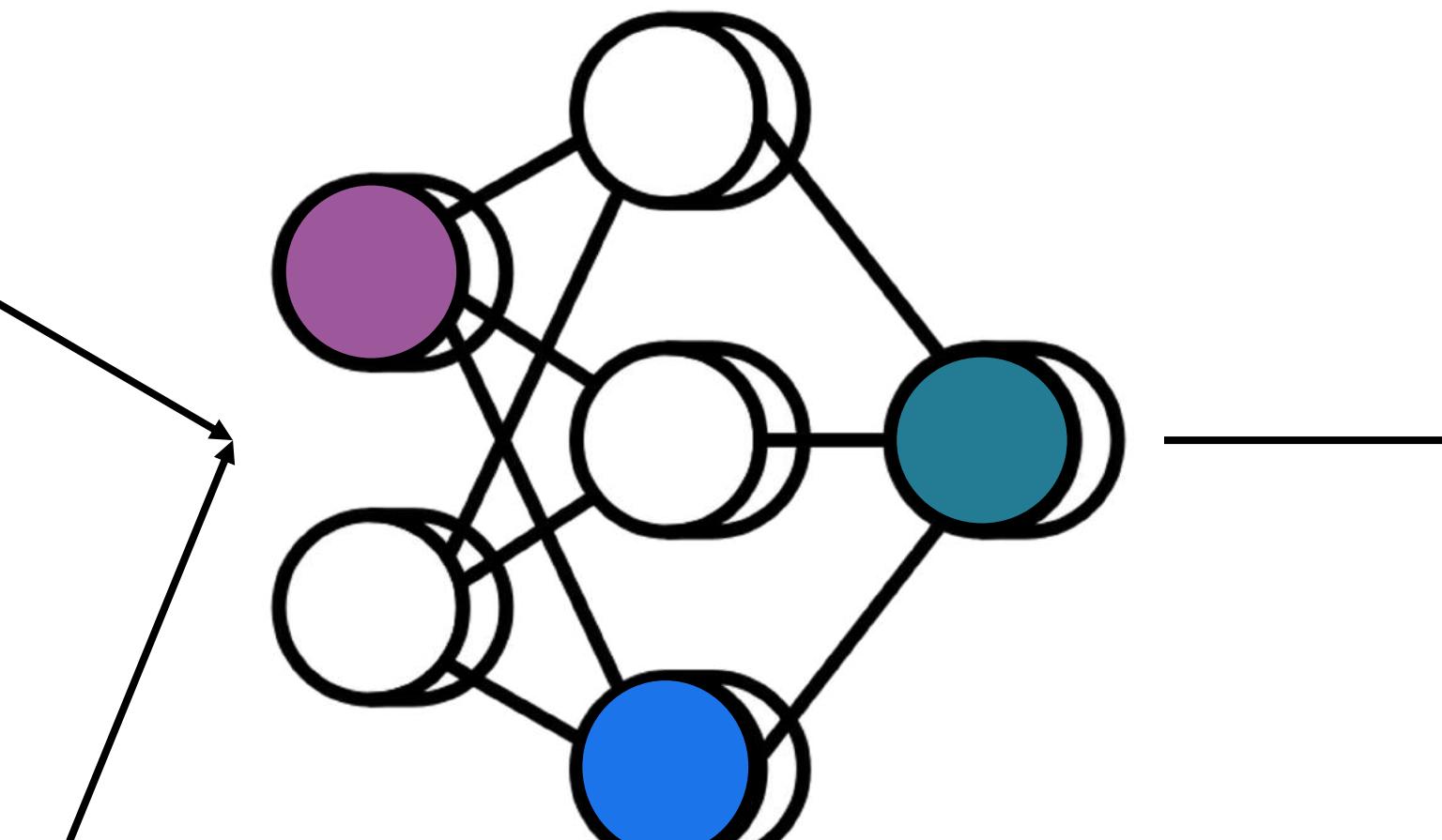


Label

Cyclist

Output B

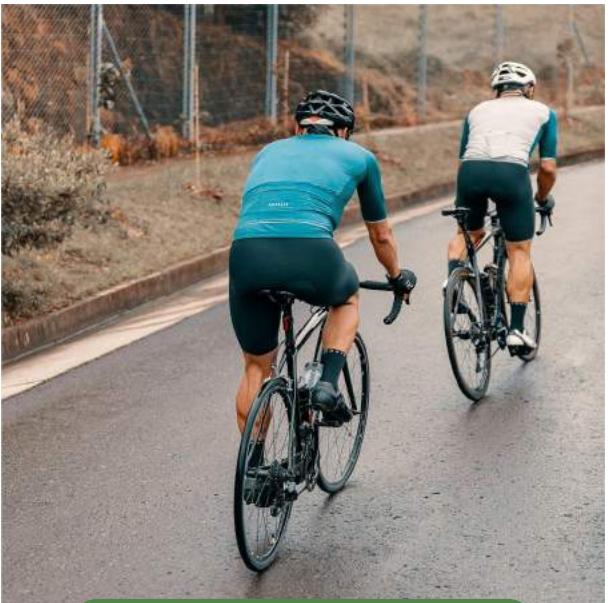
**Cyclist
or
Not cyclist**



How supervised learning works



Cyclist



Cyclist



Cyclist



Cyclist



Not Cyclist



Not Cyclist



Not Cyclist

How supervised learning works



Pedestrian



Pedestrian



Road Sign



Road Sign



Lane Marking



Lane Marking

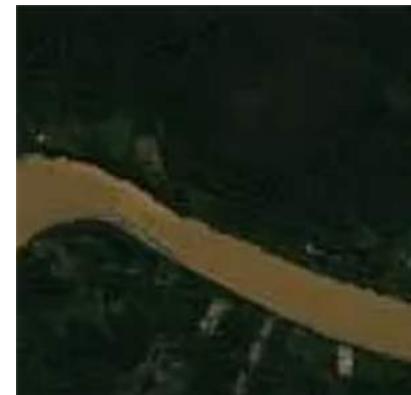
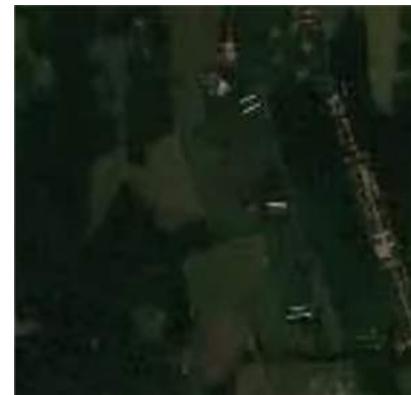


Car



Car

Illegal mining detection



No illegal
mining

No illegal
mining

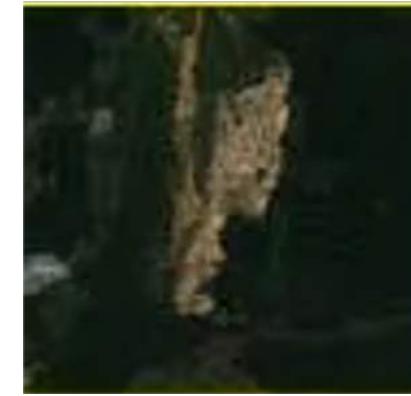
No illegal
mining



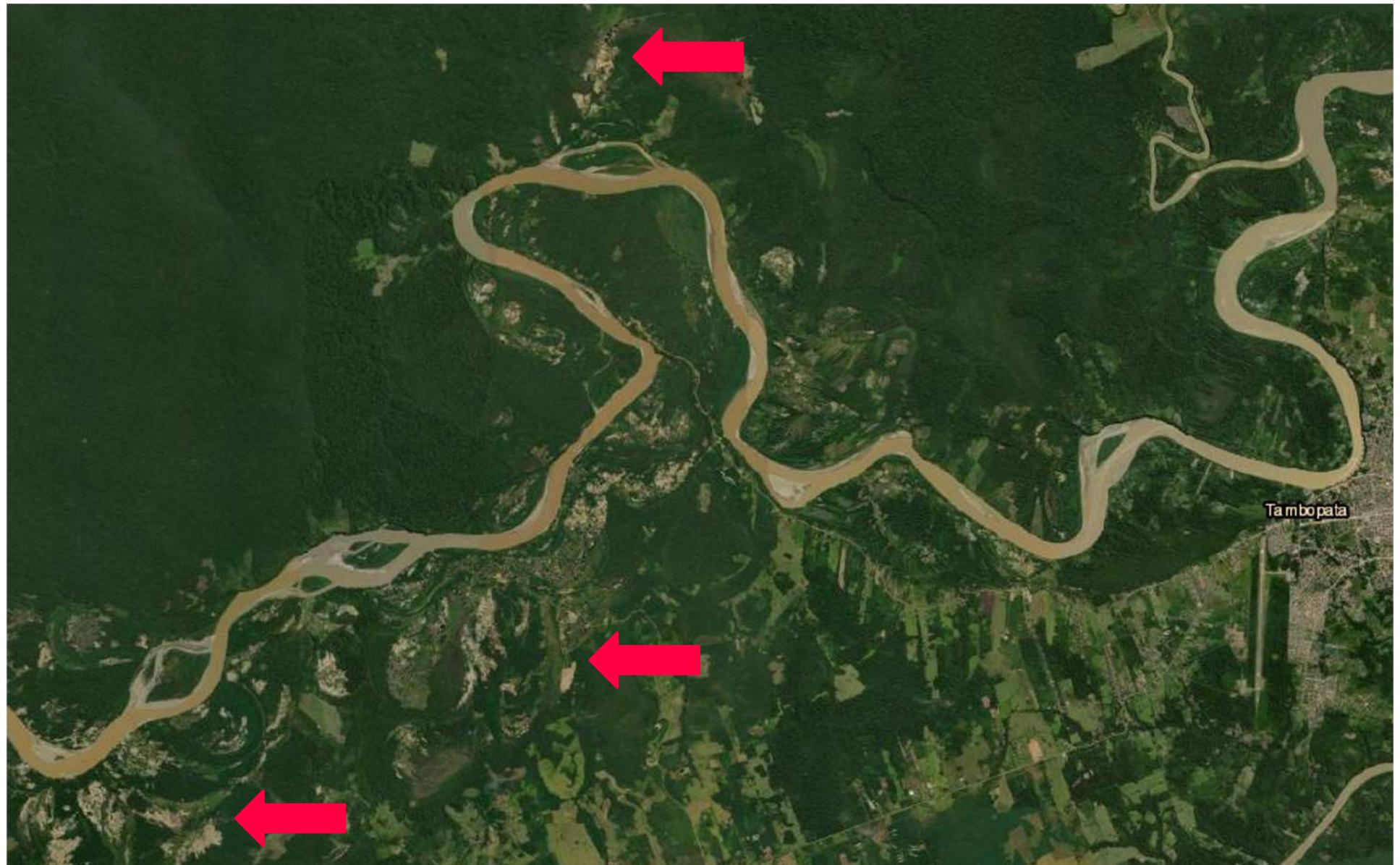
Illegal
mining



Illegal
mining



Illegal
mining



Possible illegal gold mining. Puerto Maldonado, Peru.

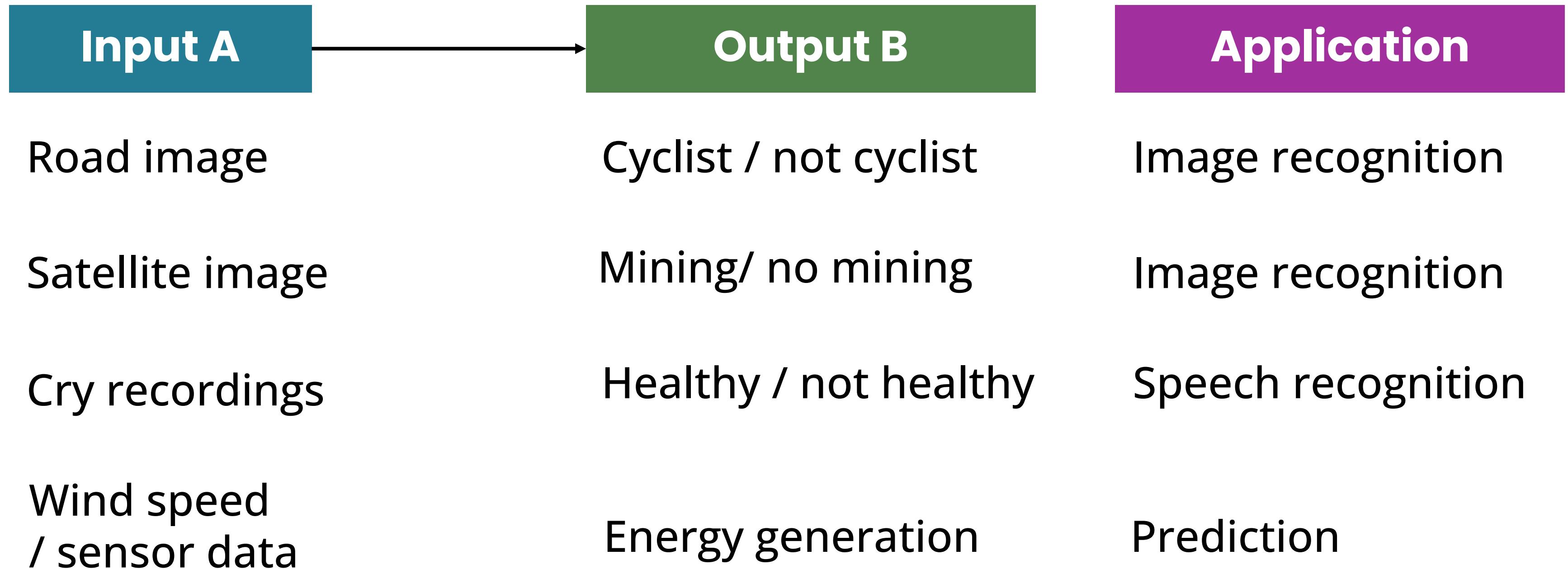
"How to track illegal mining with open data", @Techjournalist on medium.com

Medical diagnosis



Images generated with DALL-E

Supervised learning summary





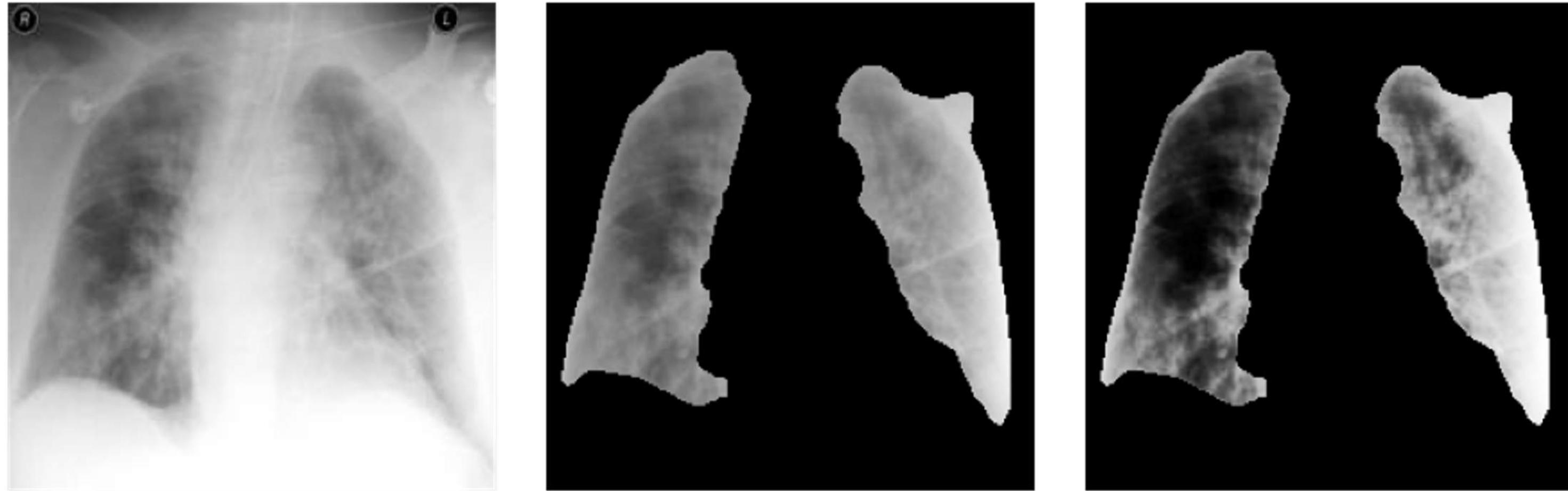
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AI and Public Health

Considering the
Impact of Your AI for
Good Project

AI and public health

X Ray feature disentanglement

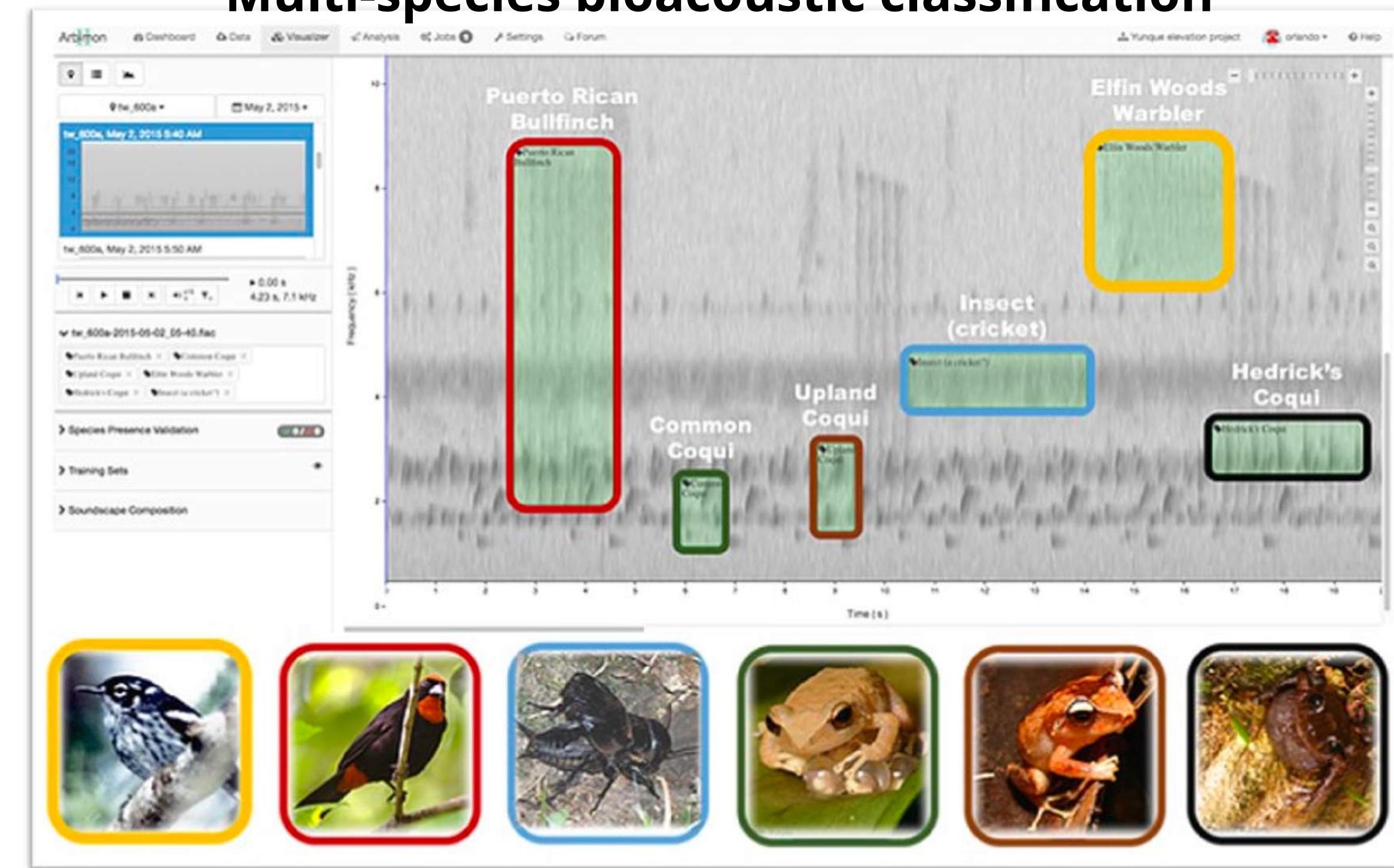


Deep learning models for COVID-19 chest x-ray classification: Preventing shortcut learning using feature disentanglement

"X Ray feature disentanglement", @Microsoft AI For Good Lab on [github.com](#)

AI and climate change

Multi-species bioacoustic classification



"Multi-species bioacoustic classification", @Microsoft, AI For Good Lab on github.com

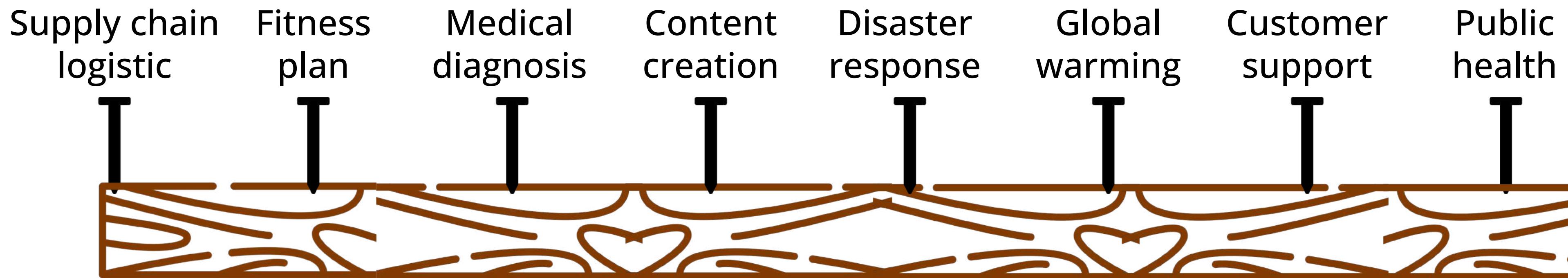
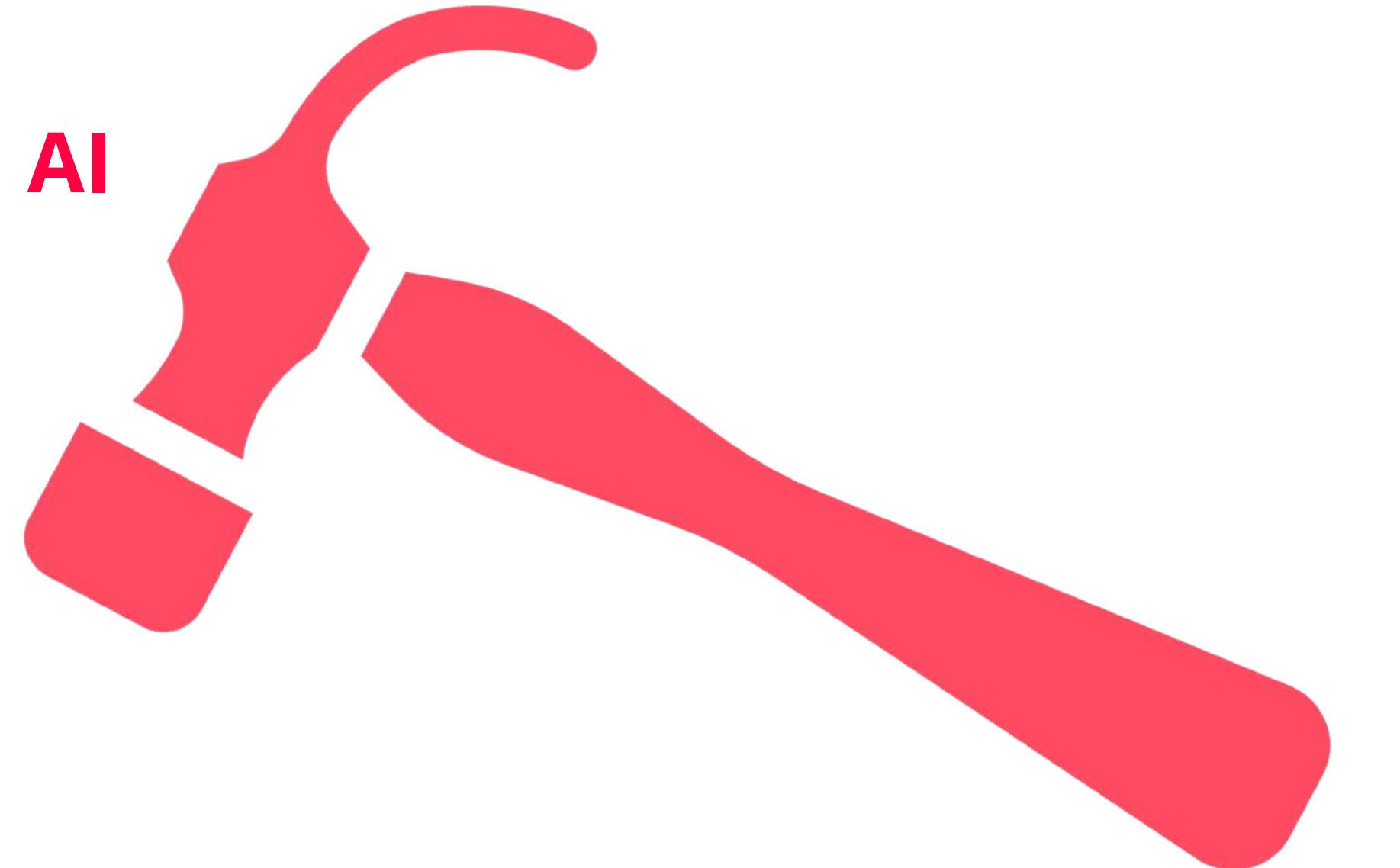
AI and disaster management

Damage Assessment Visualizer

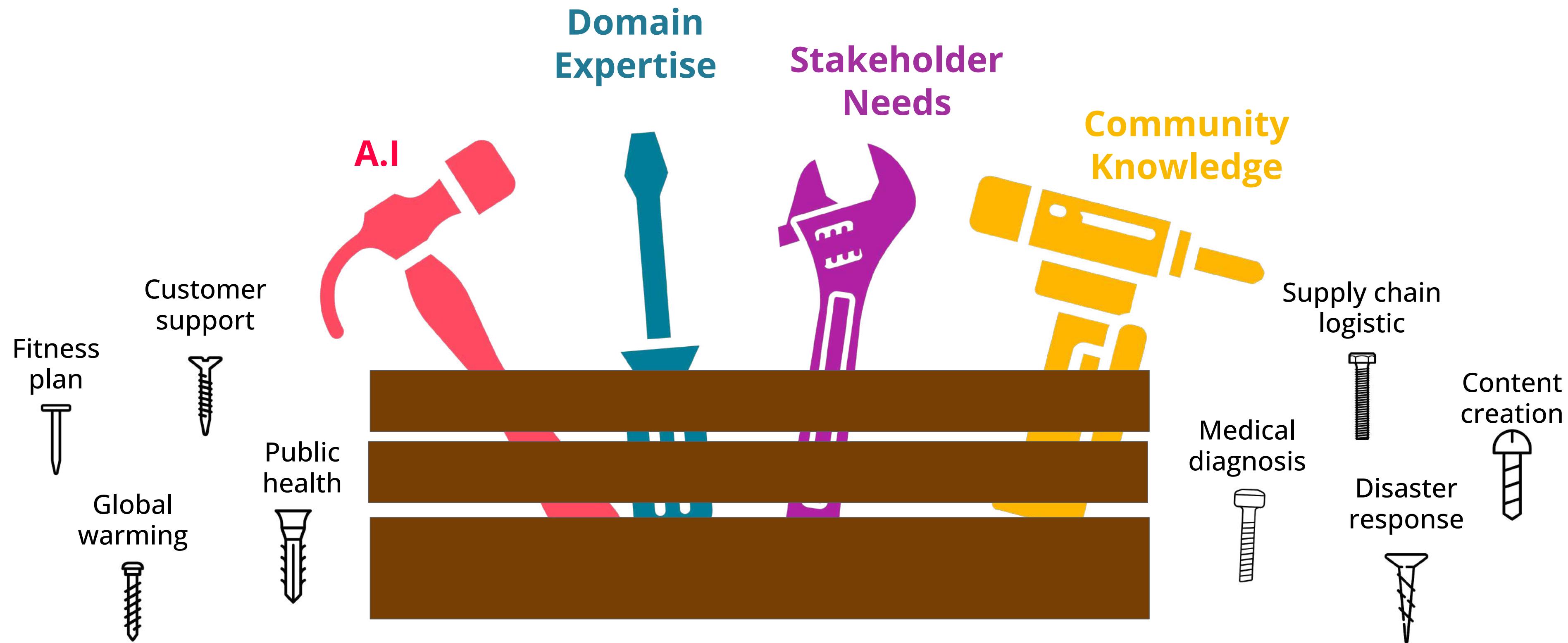


"Damage Assessment Visualizer", @Microsoft, AI For Good Lab on [github.com](#)

AI first mindset



AI is only one part of any potential solution



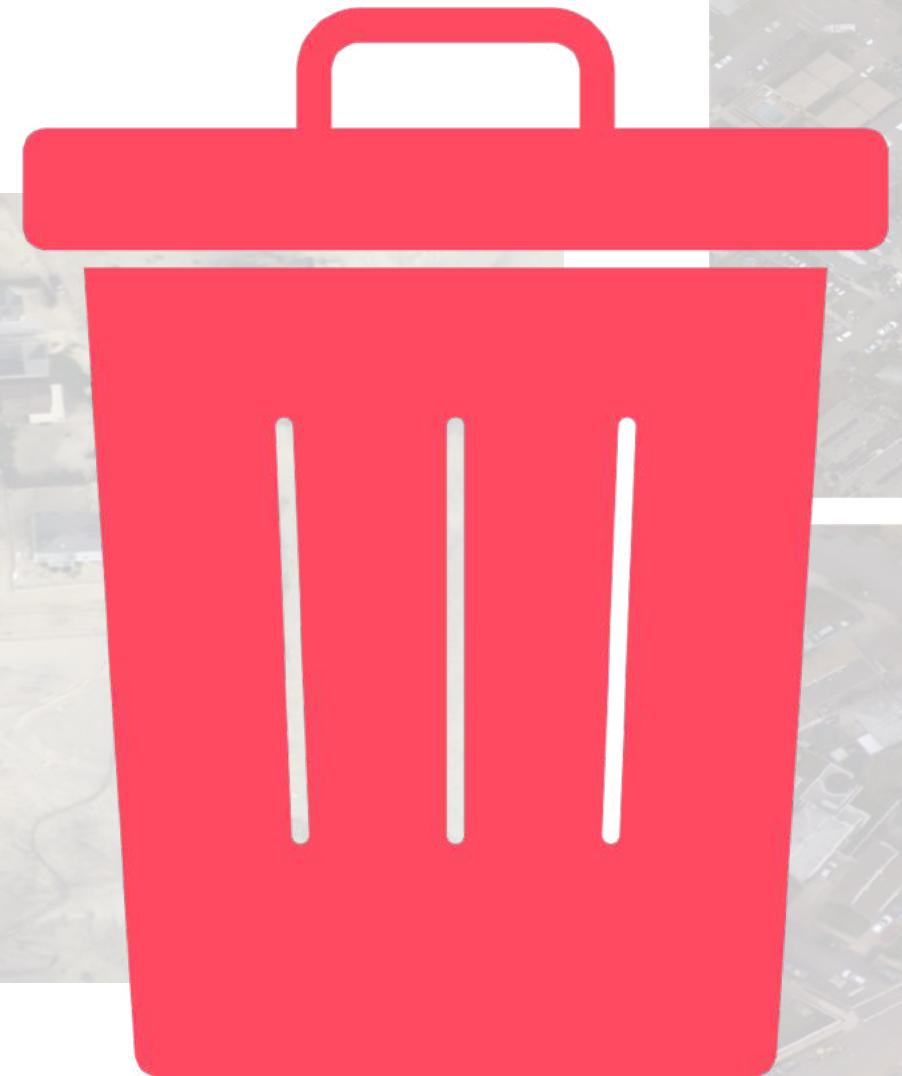
AI for Good framework



1. Engage stakeholders
2. Define the problem
3. Determine if AI could add value



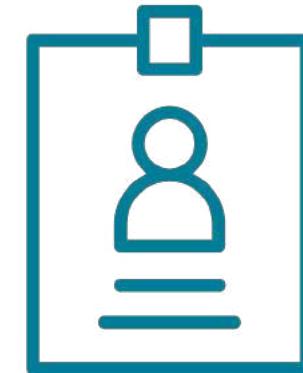
Post-hurricane Sandy



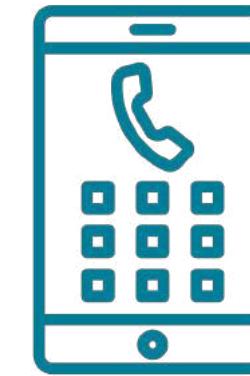
Images by NOAA storm @ archive [nhc.noaa.gov/data/](http://archive.nhc.noaa.gov/data/)

Personally identifiable information (PII)

any piece of information that can be used to identify an individual



Name



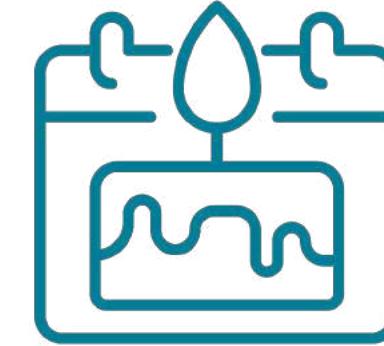
Phone
Number



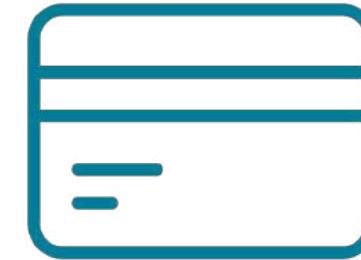
Address



Biometric
Identifiers



Birth date



Credit Card
Number



Secure PII data to avoid
information being leaked or stolen

False positive

Tell someone they have cancer when they don't.

False negative

Tell someone they don't have cancer when they actually do.

“Do no harm”

**Everyone impacted by a project is
left improved or unchanged.**



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AI and Public Health

**Week 1
Summary**

The use of AI to **prevent**,
mitigate, or **resolve** problems
affecting human life or the
environment.

UN Sustainable Development Goals



Supervised learning



Animal image

Text in Haitian Kreyol

Cry recordings

Wind speed / sensor data

Type of animal

Text in English

Medical diagnosis

Energy generation

Application

Image recognition

Machine translation

Speech recognition

Prediction

Personally identifiable information (PII)

any piece of information that can be used to identify an individual



Name



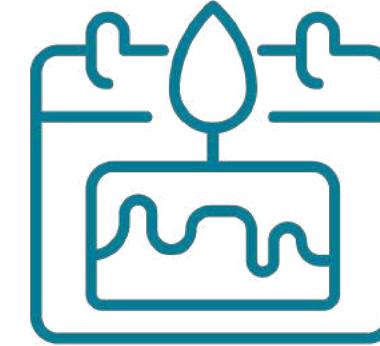
Phone
Number



Address



Biometric
Identifiers



Birth date



Credit Card
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