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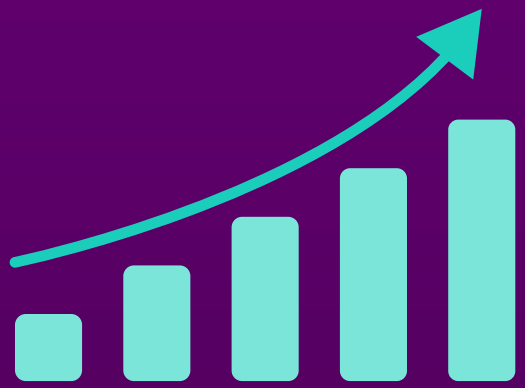
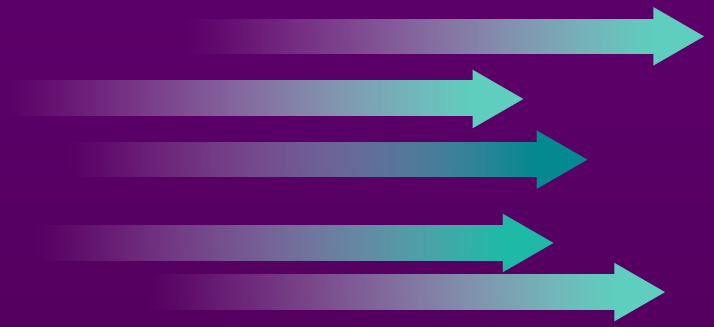
WHAT ARE BIG DATA

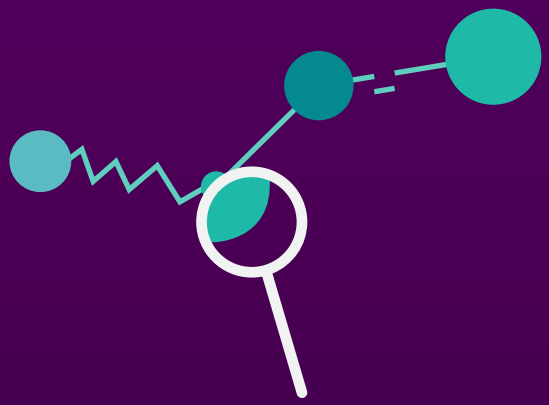


VOLUME
Large quantities of data.



VELOCITY
High-frequency of incoming real-time data.

VARIETY
Complex heterogeneous data originating from many different data types and sources.



VERACITY
The reliability and quality of data feeding into big data applications need to be evaluated and maintained.

VALUE
The ability to transform large volumes of high variety, high velocity data into valuable, actionable information for end-users.

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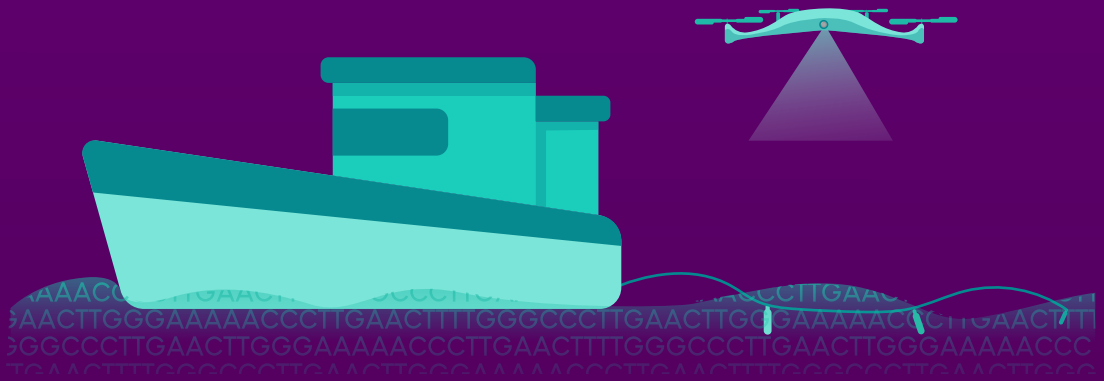
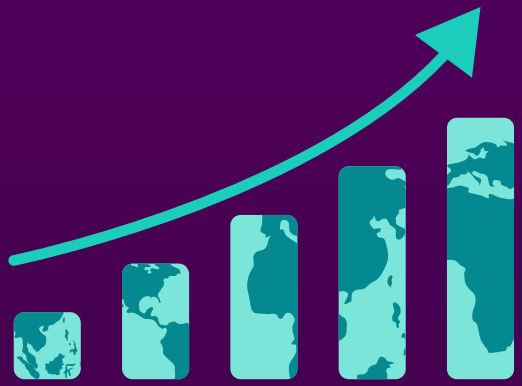
MARINE BIOLOGICAL OBSERVATIONS

We need a globally connected network of long-term biological observations to improve understanding of marine biodiversity under global change.



New biological data sources such as genetic sequences, imagery and hydro-acoustic data will be used more frequently in the big data era. These rapidly generate enormous volumes of data and can be combined and analyzed using artificial intelligence.

CLIMATE AND MARINE BIOGEOCHEMISTRY



Marine biogeochemical observational data have evolved in volume and diversity through advances in monitoring platforms and are increasing from regional to global scales.

In some parts of the ocean climate and marine biogeochemical data are difficult to collect. Machine learning can fill in these gaps and predict where new observations are needed, as well as analyze outputs from complex climate models.

Data collection and analysis need to be integrated and connected in an interdisciplinary manner to create data products that can be used in global climate negotiations and other societal applications.

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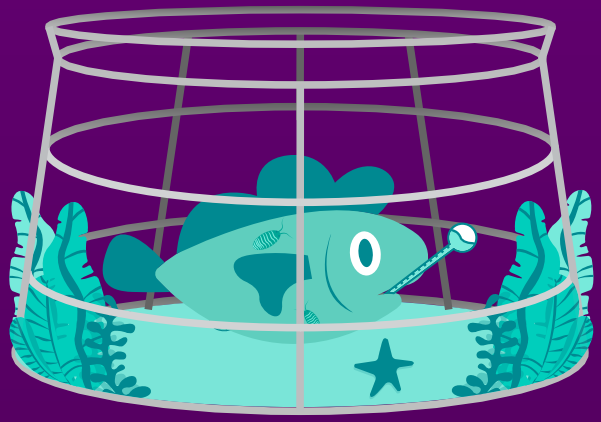
AQUACULTURE



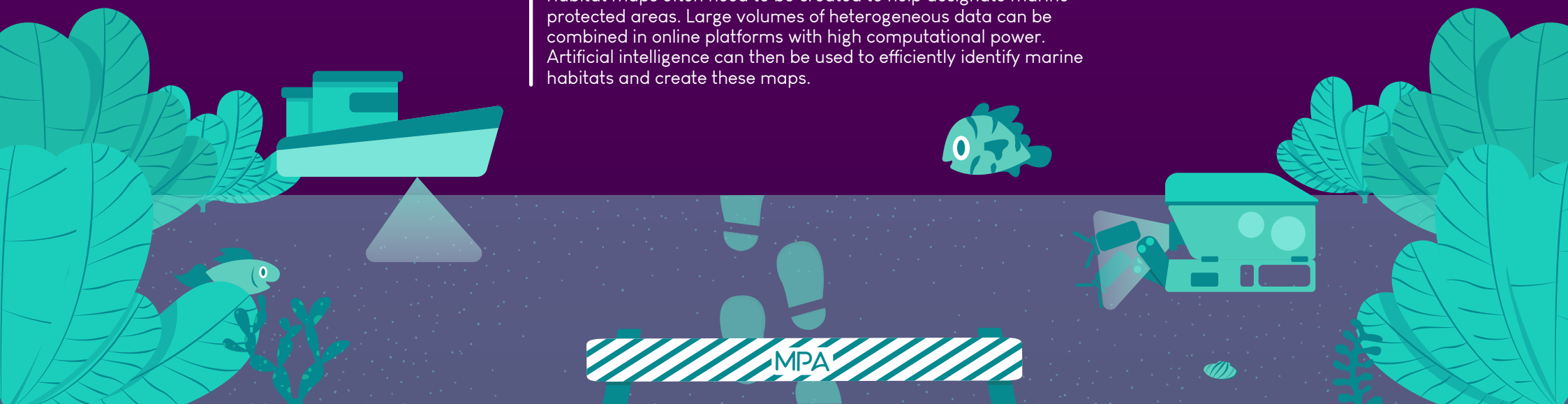
Using shared data from aquaculture farms, artificial intelligence can be used to predict the location and timing of sea-lice outbreaks so they can be treated.

Artificial intelligence can be used to develop facial recognition for fish.

Automated surveillance systems in rivers could be used to sort wild salmon and escaped, farmed salmon using facial recognition.

MARINE CONSERVATION

Habitat maps often need to be created to help designate marine protected areas. Large volumes of heterogeneous data can be combined in online platforms with high computational power. Artificial intelligence can then be used to efficiently identify marine habitats and create these maps.



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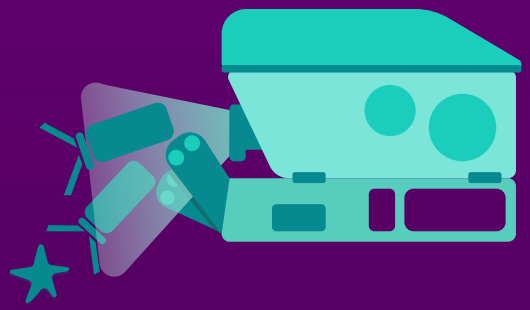
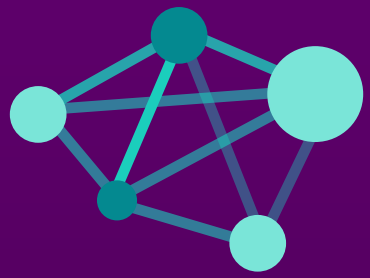
RECOMMENDATIONS

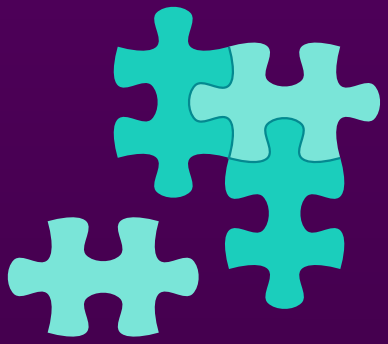


DATA ACQUISITION
Continue development of 'smart sensors' for automated sampling and data processing, as well as more efficient data transfer so more ocean data can be collected by machines.

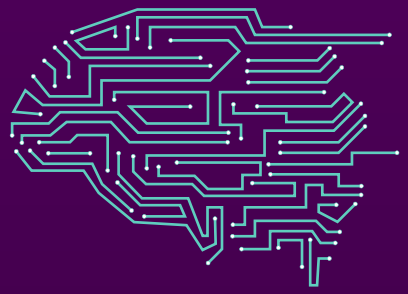
DATA HANDLING AND MANAGEMENT
Develop and use community standards and well-designed data management plans to ensure data are Findable, Accessible, Interoperable and Reusable (FAIR).



COMPUTING INFRASTRUCTURE AND INTEROPERABILITY
Increase the interoperability of marine data management infrastructures and incorporate cloud-computing, cloud-storage and big data analytical tools.



DATA SHARING
Make data open and incentivize data sharing between scientists, industry and governments.



BIG DATA ANALYTICS AND DATA VALIDATION
Develop standardized algorithms and community maintained data sets that can be used to train and calibrate models.

TRAINING AND COLLABORATION
Develop specialized training for marine scientists to adopt the use of artificial intelligence.

Develop collaborations between marine scientists and computer scientists.