



Food and Agriculture  
Organization of the  
United Nations

# ARTIFICIAL INTELLIGENCE FOR A DIGITAL BLUE PLANET FORUM AGENDA

28TH, 29TH & 30TH OF JUNE 2021

## Artificial Intelligence for a Digital Blue Planet Forum agenda overview

Thank you for registering for the Artificial Intelligence for a Digital Blue Planet forum. We hope you will find it an engaging experience where we can all discover novel approaches to share and empower others with emerging artificial intelligence (AI) technologies.

The forum takes place virtually on Zoom over three days, starting on the 28th of June over three days until the 30th of June, 2021.

Each day consists of a morning and an afternoon session in order to accommodate for the range of presenters and attendees from different time zones.

Morning presentation sessions will begin at 9 a.m. until around 11 a.m. **Central European Summer Time (CEST)**, and afternoon sessions will begin at 3 p.m. CEST and finish at around 5.30 p.m..

Sessions will begin with a recap of progress and a live Q&A with the presenter will follow each presentation.

Each session will conclude with an open discussion and Q&A to explore opportunities for future development, to explore knowledge gaps and discover how collaboration can empower equal access to digital resources for all across a digital blue planet.





### 28TH JUNE

#### 9.00 A.M. TO 11.00 A.M. CEST

- 9.00 a.m.      **FAO Fisheries welcome address by Deputy director Dr Vera Agostini**
- 9.15 a.m.      **FishID - a smart monitoring tool for aquatic ecosystem monitoring**
- 9.30 a.m.      **AI for the marine environment, biodiversity conservation & social good**
- 9.45 a.m.      **Digitization of catch origin landing declaration in tuna fisheries**
- 10.00 a.m.     **FishNet: species classification and size regression using deep learning and a labelled dataset of one million fish**
- 10.15 a.m.     **Data integration for actionable knowledge using machine learning**
- 10.30 a.m.     **RiverEye APP; Incorporating AI with Biodiversity Conservation for Environmental Governance**
- 10.45 a.m.                      **Q&A**
- 11.00 a.m.      **Close of forum session**

#### 3.00 P.M. TO 4.45 P.M. CEST

- 3.00 p.m.      **FISHIAL.AI species recognition for citizen science**
- 3.15 p.m.      **Using AI for recognising otoliths: a preliminary prototype**
- 3.30 p.m.      **A codeless deep learning interface to segment and count objects**
- 3.45 p.m.      **Integrated AI systems for sustainable tuna fisheries**
- 4.00 p.m.      **An Open Science approach to AI for Blue Growth, culture, habitats, ecological niche modelling and fish identification**
- 4.15 p.m.      **Mapping disease and distribution of fish using AI**
- 4.30 p.m.      **Q & A**
- 4.45 p.m.      **Close of forum session**

### 29TH JUNE

#### 9.00 A.M. TO 11.00 A.M. CEST

- 9.00 a.m.      **Machine learning in the Hawaii longline fisheries**
- 9.15 a.m.      **Automated eyes for better fisheries management**
- 9.30 a.m.      **The CatchID programme**
- 9.45 a.m.      **Using computer vision to evaluate size & weight of bycatch to enhance fully documented fisheries**
- 10.00 a.m.     **AI for species identification in large scale fishery electronic monitoring (EM) systems**
- 10.15 a.m.     **An automated system for species, size and sex data collection of crustacea**
- 10.30 a.m.     **Low cost monitoring for small-scale aquaculture systems**
- 10.45 a.m.                      **Q&A**
- 11.00 a.m.      **Close of forum session**

#### 3.00 P.M. TO 5.00 P.M. CEST

- 3.00 p.m.      **Using AI for food narratives in small scale aquaculture systems**
- 3.15 p.m.      **The role of AI in Post 2020 biodiversity targets & effective management**
- 3.30 p.m.      **An accessible Open Source AI platform for marine science**
- 3.45 p.m.      **AI for data deficient aquatic species identification**
- 4.00 p.m.      **Using machine learning to differentiate species and count fish in trawl nets**
- 4.15 p.m.      **Identification of individual marine species using AI**
- 4.30 p.m.      **Sustainable fish farming using AI in Tunisia**
- 4.45 p.m.      **Q & A**
- 5.00 p.m.      **Close of forum session**

### 30TH JUNE

#### 9.00 A.M. TO 11.00 A.M. CEST

- 9.00 a.m.      **Integrating AI in electronic monitoring (EM) systems for accurate verifiable data**
- 9.15 a.m.      **The development of a mobile fish phenotyping device**
- 9.30 a.m.      **TUNASCOPE – An AI solution for tuna quality inspection**
- 9.45 a.m.      **AI for catch assessment in Zambia - counting fish from forests**
- 10.00 a.m.     **Mobile AI for species ID and enhanced aquaculture stakeholder knowledge**
- 10.15 a.m.     **Integrating EM and reporting technology for fisheries management and compliance**
- 10.30 a.m.     **Big data Indonesia style - connecting communities across the oceans.**
- 10.45 a.m.                      **Q&A**
- 11.00 a.m.      **Close of forum session**

#### 3.00 P.M. TO 5.15 P.M. CEST

- 3.00 p.m.      **Electronic visual monitoring challenges and developments with AI**
- 3.15 p.m.      **Advancing ocean governance through increased transparency of human activity at sea**
- 3.30 p.m.      **Advancing AI in support of NOAA's mission**
- 3.45 p.m.      **Environmental Defence Fund - SmartPass framework**
- 4.00 p.m.      **AI for Species Identification in recreational fisheries management**
- 4.15 p.m.      **A Revolution in access to marine data in the Eastern Caribbean**
- 4.30 p.m.      **Q & A - FAO round-up**
- 5.00 p.m.      **Open discussion exploring future opportunities for collaboration and knowledge sharing**
- 5.15 p.m.      **Closing remarks**



# ARTIFICIAL INTELLIGENCE FOR A DIGITAL BLUE PLANET FORUM AGENDA

28TH JUNE - 9.00 A.M. TO 11.00 A.M. CEST



9.00 a.m.

**FAO Fisheries welcome address with deputy director Dr Vera Agostini**



9.15 a.m.

**FishID - a smart monitoring tool for aquatic ecosystem monitoring**

Sebastian Lopez (Griffith University) presents an overview of FishID, a smart monitoring tool to support the aims of the Global Wetlands Project, to measure wetland health, improve conservation action and engage stakeholders and managers authentically.

9.30 a.m.

**AI for the marine environment, biodiversity conservation & social good**

Fish counter AI & biomass detection solutions aim to provide sustainable social, economic, and environmental benefits through the effective conservation, management, promotion, and development of fisheries and marine resources.



9.45 a.m.

**Digitization of catch origin landing declaration in tuna fisheries**

TrACE.AI is a mobile app which takes pictures of the caught tuna, giving estimated length, weight & geolocation. TrACE.AI integrates a smart management platform where the information is uploaded and sent to brokers/buyers and exporters, presented by Cherry Murillon-Cubacub CEO of CawilAI.co.

10.00 a.m.

**FishNet: species classification & size regression using deep learning & a labelled dataset of one million fish**

Using a massive dataset of photographs taken by Indonesian fishers from over 500 vessels and annotated by a team of biologists, we are training an artificial intelligence system to assist with fish stock estimation. Presented by Peter Sadowski, Assistant Professor of Computer Science, University of Hawaii Manoa.



10.15 a.m.

**Data integration for actionable knowledge using machine learning**

A guide to the use of artificial intelligence for optimising video surveys including sorting juvenile fish to provide early life-history information for particular species, with Dr Michael Bradley from James Cook University, Marine Data Tech Research Group.

10.30 a.m.

**RiverEye APP; Incorporating AI with biodiversity conservation via bottom-up environmental governance**

China Biodiversity Conservation and Green Development Foundation's Anti Electrofishing Network has pledged to safeguard freshwater ecosystems by using an App. Technical assistance and connection between volunteers and government were made easy thanks AI innovation technology.



10.45 a.m. - Q & A

11.00 a.m. - Close of forum session





# ARTIFICIAL INTELLIGENCE FOR A DIGITAL BLUE PLANET FORUM AGENDA

28TH JUNE - 3.00 P.M. TO 4.45 P.M. CEST

3.00 p.m.

## FISHIAL.AI citizen science fish species labeled datasets for species recognition

The FISIAL.AI team present a citizen science-based approach to aggregating worldwide images of fish species into a centralized open-sourced labeled dataset for machine learning. The project also provides free access to researchers to label their fish species images.



3.15 p.m.

## Using AI for recognising otoliths: a preliminary prototype

An introduction to the prototype model for visual recognition of otoliths from fish species, presented by Dr Giuseppe Amato of AIMH lab, CNR (Consiglio Nazionale delle Ricerche).

3.30 p.m.

## A codeless deep learning interface to segment and count objects

Monitoring of progress for the SDGs at a global scale using an agile platform which enables users to codelessly train deep learning models to count visible objects harnessing an ecosystem of innovation applicable for the identification and counting of fish species. Presented by the Picterra Team.



3.45 p.m.

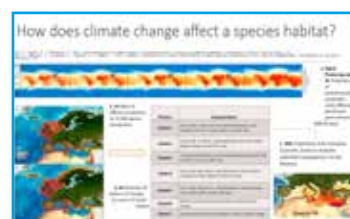
## Integrating AI in electronic monitoring systems

Marine Instruments and the Basque Research Institute AZTI present how AI enhances visual recognition of marine species in electronic monitoring systems for compliance, control and fully documented fisheries.

4.00 p.m.

## An Open Science approach to AI for Blue Growth, culture, habitats, ecological niche modelling & fish identification

Dr Gianpaolo Coro of FAO/EU/Consiglio Nazionale delle Ricerche presents examples of how Open Science and Machine Learning can benefit EU Blue Growth strategy in line with the Sustainable Development Goals.



4.15 p.m.

## Mapping disease and distribution of fish using AI

Developing a computer vision (AI) system that can detect and classify disease based on visible symptoms in still images of fish, which enables mapping of the distribution of wild fish whilst simultaneously mapping their disease status.

4.30 p.m. - Q & A

4.45 p.m. - Close of forum session





# ARTIFICIAL INTELLIGENCE FOR A DIGITAL BLUE PLANET FORUM AGENDA

29TH JUNE - 9.00 A.M. TO 11.00 A.M. CEST

9.00 a.m.

## Machine learning in the Hawaii longline fisheries

The Pacific Islands Fisheries Science Center (PIFSC) EM (electronic monitoring) systems collect data on the 20 volunteer Hawaii longline vessels carrying EM systems. The team is developing an image library to train AI algorithms to detect fish and protected species to improve the efficiency of reviewing EM footage.



9.15 a.m.

## Automated eyes for better fisheries management

Alongside EM systems such as WANDA®, CSIRO's Marine Visual Technologies group are developing automated solutions to help manage large-scale fishery sustainably, and support seafood producers to manage the supply of their product from boat-to-plate.

9.30 a.m.

## The CatchID programme

Developing a fully integrated documentation system using third party technology to automatically register all marine resources harvested in real time and with limited or no need for human interaction. Presentation by Ole Høstmark, programme coordinator of the Norwegian Directorate of Fisheries.



9.45 a.m.

## Using computer vision to evaluate size & weight of bycatch to enhance fully documented fisheries

How can computer vision and machine learning be used to identify species, measure size and also reduce the time live discards are out of the water; a European Maritime and Fisheries (EMFF) funded project with Wageningen University to develop methods for addressing the need for fully documented fisheries.

10.00 a.m.

## AI for species identification in large scale fishery electronic monitoring (EM) systems

Satlink present their machine learning systems integrated in electronic monitoring (EM) for large scale fishing fleet management, and explore the challenges presented with identifying species from video data.



10.15 a.m.

## An automated system for species, size and sex data collection of crustacea

Dr Natalie Hold of Bangor University presents the development of a camera system which harnesses machine learning to automatically capture species, sex and size data from crustacean potting boats and presents novel approaches to video data collection methods to further develop this body of work.

10.30 a.m.

## Low cost monitoring for small-scale precision aquaculture systems

Deepen Modi demonstrates how the SAJAL Technologies (PL) social enterprise project develops low cost technology solutions to enhance small-scale precision aquaculture systems for marginal fishers and empowers low income households to reduce risks and improve productivity.



10.45 a.m. - Q & A

11.00 a.m. - Close of forum session





# ARTIFICIAL INTELLIGENCE FOR A DIGITAL BLUE PLANET FORUM AGENDA

29TH JUNE - 3.00 P.M. TO 5.00 P.M. CEST



3.00 p.m.

## Using AI for food narratives in small-scale aquaculture systems

Scott Nuzum of DAILY CATCH presents an integrated platform for producers and a range of tools, including intelligent capture and computer vision, to enable producers to share their stories with the world and ultimately derive greater value from their openness.



3.15 p.m.

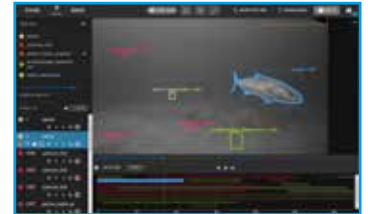
## The role of AI in post 2020 biodiversity targets & effective management

Millie Chapman and Carl Boettiger, University of California, Berkeley, demonstrate the capacity to effectively translate imperfect information about environmental systems into effective management decisions to address post2020 biodiversity targets.

3.30 p.m.

## An accessible Open Source AI platform for marine science

Kitware present Video and Imagery Analytics for the Marine Environment (VIAME) toolkit, an open-source software platform to assist marine and environmental scientists with cutting edge AI algorithms that they can customize without any knowledge of programming or how AI works.



3.45 a.m.

## AI for data deficient aquatic species identification

The VIMS project presented by Paul J. Clerkin explores combining traditional taxonomy with genetics and AI to better understand shark species. Sharks are important to overall ocean health yet remain largely data deficient largely due to issues in shark identification and the limitations of outdated taxonomic descriptions.

4.00 p.m.

## Using machine learning to differentiate species and count fish in trawl nets

The Conservation Engineering group at the Alaska Fisheries Science Center (NOAA) present a computer vision and machine learning system to automate the review of videos collected in experimental trawl gear used in Alaska's pollock fishery.



4.15 a.m.

## Identification of individual marine species using AI

Development of operational systems for the use of AI in photo identification and very high resolution satellites. Focussing on marine mammals rather than fish, Christin Khan presents a functional solution for using machine learning to identify individual animals of key indicator species, Right Whales.

4.30 p.m.

## Sustainable fish farming using AI in Tunisia

Amel Mzoughi of the National Institute of Science and Technology of the Sea (INSTM), Tunisia provides insight into the need for applying AI to meet the rising demand seafoods sustainably.



4.45 p.m. - Q & A

5.00 p.m. - Close of forum session





# ARTIFICIAL INTELLIGENCE FOR A DIGITAL BLUE PLANET FORUM AGENDA

30TH JUNE - 9.00 A.M. TO 11.00 A.M. CEST



9.00 a.m.

## Integrating AI in electronic monitoring (EM) systems for accurate verifiable data

Teem Fish and SnapIT present a fully integrated framework to enable and encourage data sharing between fisheries stakeholders to provide more affordable EM services to the industry incentivising the cost-savings potential of AI to address regulatory catch, discard and compliance monitoring.



9.15 p.m.

## The development of a mobile fish phenotyping device

Wageningen University present In the Horizon2020 project AqualIMPACT developing a mobile fish phenotyping device using machine vision and machine learning methods.

9.30 a.m.

## TUNASCOPE – An AI solution for tuna quality inspection

Kazuhiro Shimura, and the TUNASCOPE team present tuna quality assessment using AI to ensure delivery of delicious tuna. TUNASCOPE presents a range of new ideas, development strategy and innovation for the tuna supply chain.



9.45 a.m.

## AI for catch assessment in Zambia - “Counting Fish from Forests”

Alberto Massa of 3StartConnect introduces his work within the “Resilient River Basins - Counting Fish from Forests” FAO Multidisciplinary activities, led by Dr Rishi Sharma, to harness AI for “leapfrog strategy” to empower riparian stakeholders & fisheries managers in Zambia with an intuitive mobile app to count and measure fish.

10.00 a.m.

## Mobile AI for species ID and enhanced aquaculture stakeholder knowledge

Chona Camille Abeledo presents the CrabTECH Crabifier mobile app which aims to improve efficiency and sustainability by allowing fishers to focus their limited resources and to compare sources and growout site of crablets, so farmers can be guided as to which crablet source is best for their farms minimising high risk undertaken by fishers.



10.15 p.m.

## Integrating EM and reporting technology for fisheries management and compliance

Dr Amos Barkai presents the development of an existing logbook technology (Olrac) with electronic monitoring technology exploring the viability of deploying efficient technology independent of manual human interventions related to the monitoring and surveillance of commercial fishing operations.

10.30 a.m.

## Big Data Indonesia style - connecting communities across the oceans

Sustainable seafood traceability expert Alan Steele presents his work, including with UNDP, “a real life story; using innovative catch data to predict the future”.



10.45 a.m. - Q & A

11.00 a.m. - Close of forum session







# ARTIFICIAL INTELLIGENCE FOR A DIGITAL BLUE PLANET FORUM AGENDA

**30TH JUNE - 3.00 P.M. TO 5.15 P.M. CEST**

**3.00 p.m.**

## Electronic visual monitoring challenges and developments with AI

Dr. Jenq-Neng Hwang of the Information Processing Lab, the University of Washington presents an overview of electronic visual monitoring challenges and AI developments for fishery monitoring applications including fish species identification and length and insight into convolution neural network features.



**3.15 p.m.**

## Advancing ocean governance through increased transparency of human activity at sea

Global Fishing Watch advances ocean governance through increased transparency of human activity at sea. By creating and publicly sharing map visualisations, data and analysis tools, we enable scientific research and drive a transformation in how we manage our ocean. We're partnering with the Food and Agriculture Organization of the United Nations to map fishing activity throughout the United Nations Ocean Decade.

**3.30 p.m.**

## Advancing AI in support of NOAA's mission

Hassan Moustahfid and Greg Dusek present an overview of NOAA's mission to advance AI for effective strategic management of aquatic resources. The NOAA AI strategy harnesses the capacity of machine learning to improve the efficiency, effectiveness and AI development and usage across the agency.



**3.45 p.m.**

## Environmental Defence Fund - SmartPass framework

Sepp Haukebo & Chris Cusack of the Environmental Defence Fund present the SmartPass framework to enable others through technology to measure effort with a timely, accurate and cost effective solution.

**4.00 p.m.**

## AI for species identification in recreational fisheries management

Because recreational anglers use a variety of common names for the species they catch and have widely varying degrees of expertise in species identification, RecFish is developing machine learning models to identify and name species caught using the American Fisheries Society preferred common name.



**4.15 p.m.**

## A Revolution in access to marine data in the Eastern Caribbean

Nikola Simpson of the UNDP Barbados and the Eastern Caribbean Accelerator Lab explores how Artificial Intelligence for a Digital Blue Planet has the capacity to empower individuals and communities to inform decision making by revolutionising data sharing, knowledge exchange and access to marine data.

**4.30 p.m.**

## A reflection on forum outcomes in relation to FAO's Fisheries and Aquaculture information and knowledge management' agenda and the need for future collaborative practice.

**4.45 p.m.**

## Q&A followed by an open discussion to explore future opportunities for collaboration and knowledge sharing.

**5.15 p.m. - Closing remarks**