



Smartphone app. update

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(Japan Fisheries Research and Education Agency)

Agriculture, Forestry and Fisheries Technology Catalog for the Asia-Monsoon region

Smartphone application to collect coastal fisheries and environmental information for adaptation to changes in the marine environment (FishGIS)

Production → Demonstration → Item: Fisheries → Resource management

Outline

Local fishers can quickly share information on changes in the marine environment and catches due to climate change among stakeholders through reporting of images such as catches and ocean colours, and the location where they were taken, using their smartphones.

Background/effect/note

The marine environment has considerably changed worldwide in recent years, and the species composition of catches is also changing. To adapt to changes in the marine environment and achieve sustainable fisheries, it is important to detect changes in the marine ecosystem and immediately share this information with stakeholders. Therefore, as part of the PICES/MAFF project "Building Local Warning Networks for the Detection and Human Dimension of Ciguatera Fish Poisoning in Indonesian Communities", funded by the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan through the Fisheries Agency of Japan (JFA) from the Official Development Assistance (ODA) Fund, a research team consisting of researchers from the Japan Fisheries Research and Education Agency (Japan), Canada, China, South Korea, Russia and the USA developed a smartphone application for collecting coastal fisheries and environmental information (Fig. 1). With this application, local fishers can collect fish size distribution data from catch images (Fig. 1, left) and water quality parameters from ocean colour images (Fig. 1, right), as well as share the reported results with local stakeholders (e.g., fishers' groups, government officials). Thus, this application is a useful tool to facilitate fisheries resource assessment and management in Southeast Asia.



Fig. 1. Examples of coastal fisheries and environmental information collected by FishGIS

Technical details:



Contact:
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<https://meetings.pices.int/projects/FishGIS>
<https://meetings.pices.int/projects/Ciguatera>
<https://apps.apple.com/jp/app/fishgis/id1550904014>
<https://play.google.com/store/apps/details?id=com.g.fra.fishgis>

Japan Fisheries Research and Education Agency  North Pacific Marine Science Organization 

Today's talk

1. FishGIS app modifications in the 1st half of FY2023
 - 1.1. Modification and Refinement plan
 - 1.2. Refinement of the smartphone app
 - 1.3. Modification of PC management page (Dashboard)

2. Achievements of the FishGIS app in the 1st half of FY2023
 - 2.1. Data collection status
 - 2.2. Fish body size estimation results from image analysis
 - 2.3. Fishery database

3. Publication and Outreach of FishGIS app in the 1st half of FY2023

4. Plans of FishGIS app for the 2nd half of FY2023

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1.1 Modification and Refinement plan

- We have identified needs through the PST meeting (October 2022, Busan) and the Indonesia WS (January and July 2023, Lombok).
- Also, we have presented the FishGIS app at FRA's meetings, academic conference, etc., in Japan and collected opinions from stakeholders (more than 10 times in total).
- Then, we have Identified and prioritized additional functions to be modify and refine FishGIS app based on the opinions.
- Finally, the 3-year modification and refinement plan have been formulated.

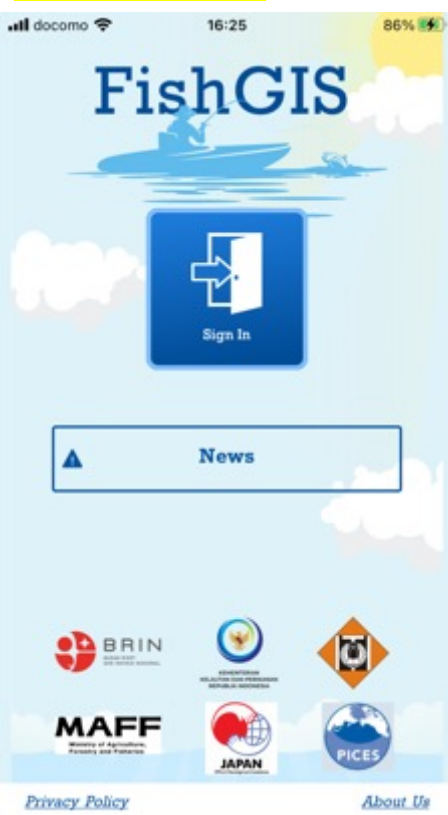
Plan	Additional functions	Feedbacks and needs from SHs
FY2023 (Year1)	Multilingualization of app	Necessary for horizontal deployment of FishGIS to PICES member states
	Reporting function for high-resolution image	Resolutions of images are sometime low. Also, the original images & movies should be stored on own smartphone.
	Reporting function for comments with images	Even if the relevant fish species is not an option, comments can be written if available.
	Account authorization function (for PC management page)	Necessary for horizontal deployment of FishGIS to PICES member states.
FY2024 (Year2)	Reporting function for new items	Some SHs want to report information on sea turtles, dolphins, seabirds, etc.
	Chat function	Interactive chat functions such like SNS app (LINE, What's up, FB etc.) would be easier to report.
	Water profile data visualization function	Some researchers want to transmit information on observation data to citizens via smartphone.
	Fish body size data visualization function	Some researchers want to transmit information on fish body size information for fishers via smartphone.
	Input/output function for water profile and fish body size data (for PC management page)	Functions required to visualize water quality and length composition data on smartphones.
FY2025 (Year3)	Function to protect information on fishing ground.	The location of fishing grounds should be secured.
	New system to store reporting data in a database* independent of PICES	ABS compliance; Data transfer to the Japanese server has been stopped. However, additional costs are incurred.

* Google Firebase

1.2. Refinement of the smartphone app

- Multilingualization of the application
 - Indonesian & English + Chinese, Korean, Japanese, Russian **NEW**
 - Penbin-san (CHINA), Moonho-san (KOREA) and Voa-san (RUSSIA).
Thank you very much for your lots of support for translations!
- New function for reporting high-resolution images
 - Users can choose between three resolutions (**LARGE**, **MEDIUM** and **SMALL**).
(The resolution of the old version of app is **SMALL**)
 - Also, the original images and videos taken is stored on the device.
- New function for reporting images with comments.

English



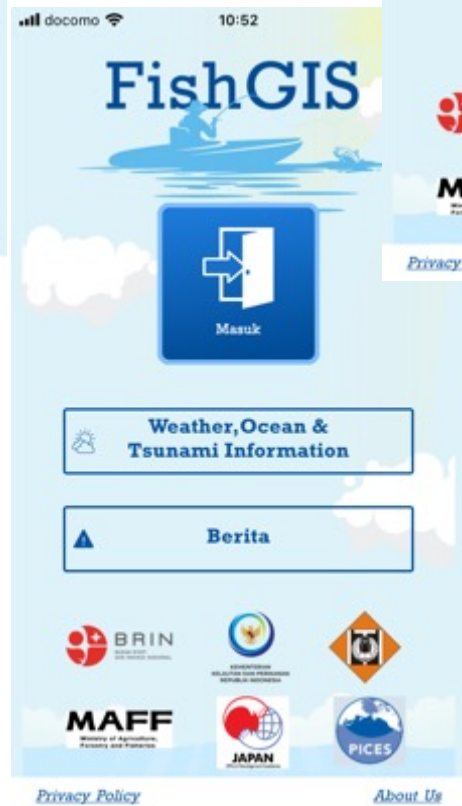
Chinese



Japanese



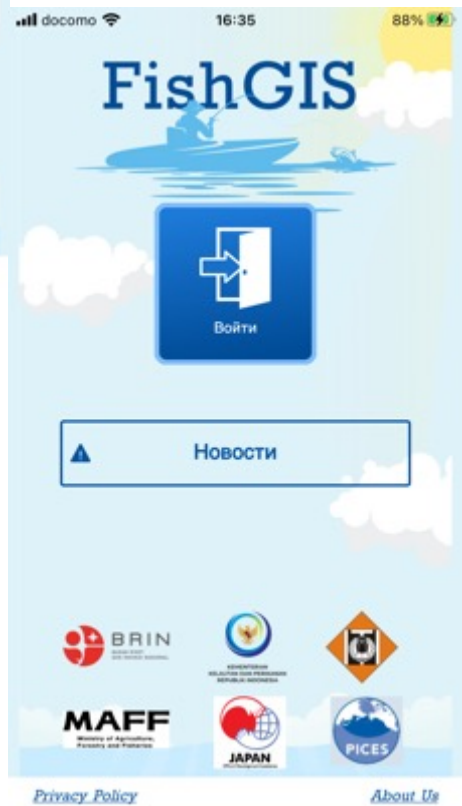
Bahasa



Korean



Russian



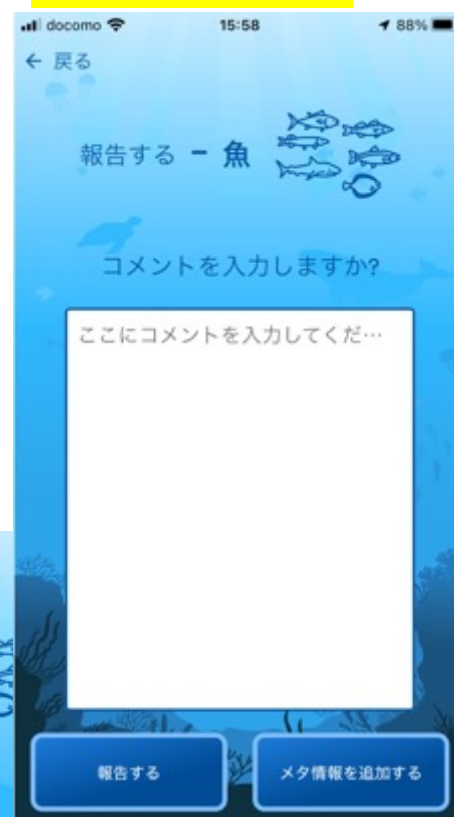
English



Chinese



Japanese



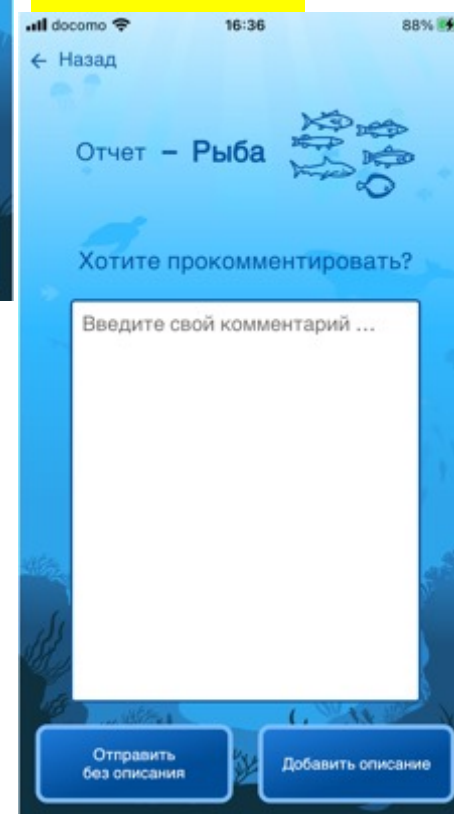
Bahasa



Korean



Russian



English

docomo 16:28 86%

← Back

Account Setting

Japan - 日本

English

Image quality setting
Medium (about 1.5MB)

Group01

Password
.....

Your Name
gftest

Save

Chinese

docomo 16:44 89%

← 后退

账户设置

Japan - 日本

Chinese - 中文

图像质量设置
中等的

Group01

密码
.....

你的名字
gftest

保存

Japanese

docomo 15:55 89%

← 戻る

アカウント設定

Japan - 日本

Japanese - 日本語

画像サイズ設定
中 (1.5MB程度)

Group01

パスワード
.....

名前
gftest

保存

Bahasa

docomo 16:43

← Kembali

Pengaturan akun

Japan - 日本

Indonesian - Bahasa Indonesia

Pengaturan kualitas gambar
sedang

Group01

Kata Sandi
.....

Nama
gftest

Menyimpan

Korean

docomo 16:35

← 이전

계정 설정

Japan - 日本

Korean - 한국어

이미지 품질 설정
미드움

Group01

비밀번호
.....

이름
gftest

저장

Russian

docomo 16:45 89%

← Назад

Настройки

Japan - 日本

Russian - Русский

Настройка качества изображения
средний

Group01

Пароль
.....

Ваше имя
gftest


Сохранить

English

 Tuna, Bonito	 Sea catfish
 Milkfish, Mackerel	 Crab, Shrimp
 Grouper	 Oyster, Scallop
 Snapper, Spinefoot, Flatfish	 Monster (unusual fish)
 other fish	no data




Next

Chinese

 金枪鱼·鲣鱼	 海鲂鱼
 鳓目鱼·鲭鱼	 蟹·虾
 石斑鱼	 牡蛎·扇贝
 鲷鱼·鲷鱼·比目鱼	 怪物 (不寻常的鱼)
 其他鱼类	no data

下一个








Japanese

 マグロ・カツオ・カジキ	 内水産(アユ・ウナギ)
 ブリ類, サワラ, サケ	 アジ・サバ・イワシ・サンマ
 タラ・ホッケ・キンメダイ	 タイ類・カレイ・ヒラメ
 エビ・カニ	 イカ・タコ
 藻類資源	 その他

次へ

Japan and Russia have modified their illustrations and reporting content to match the major fish species in their countries.

Bahasa

 Tuna, Bonito	 Lele laut
 Bandeng, Makarel	 Kepiting, Udang
 Kerapu	 Tiram, Kerang
 Kakap, Flatfish, Tulang Belakang	 Monster (ikan biasa)
 Ikan lainnya	no data

Lanjut







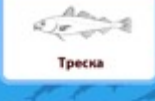
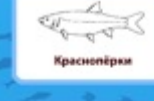


Korean

 참치, 가다랭이	 바다 메기
 밀크 피쉬, 고등어	 게, 새우
 바리류	 굴, 가리비
 도미, 가시말, 가자미	 몬스터 (특이한 물고기)
 기타(그외 물고기)	no data

다음

In other countries, it can be customized to suit the major fish species.

Russian

 Камбали	 Минтай
 Бычки	 Терпуги
 Навага	 Морские окуни
 Треска	 Краснопёрки
 Корюшки	 Сельдь

Далее

1.3. Modification of PC management page

- Until **Ciguatera project**, data managers in [Indonesia or PICES team](#) only needed to be able to view and download survey data in Indonesia.
 - In **FishPytO project**, the authorization needs to be amended to allow researchers in each [member country to view and download their own survey data](#) for [horizontal deployment to PICES member countries](#) (with limited access by researchers in other member countries).
 - Also, data managers in each PICES member country need to be authorized to [freely issue group IDs for their country](#).
- New account management functions are needed.
- Now, undergoing modification (Until end of Nov 2023).

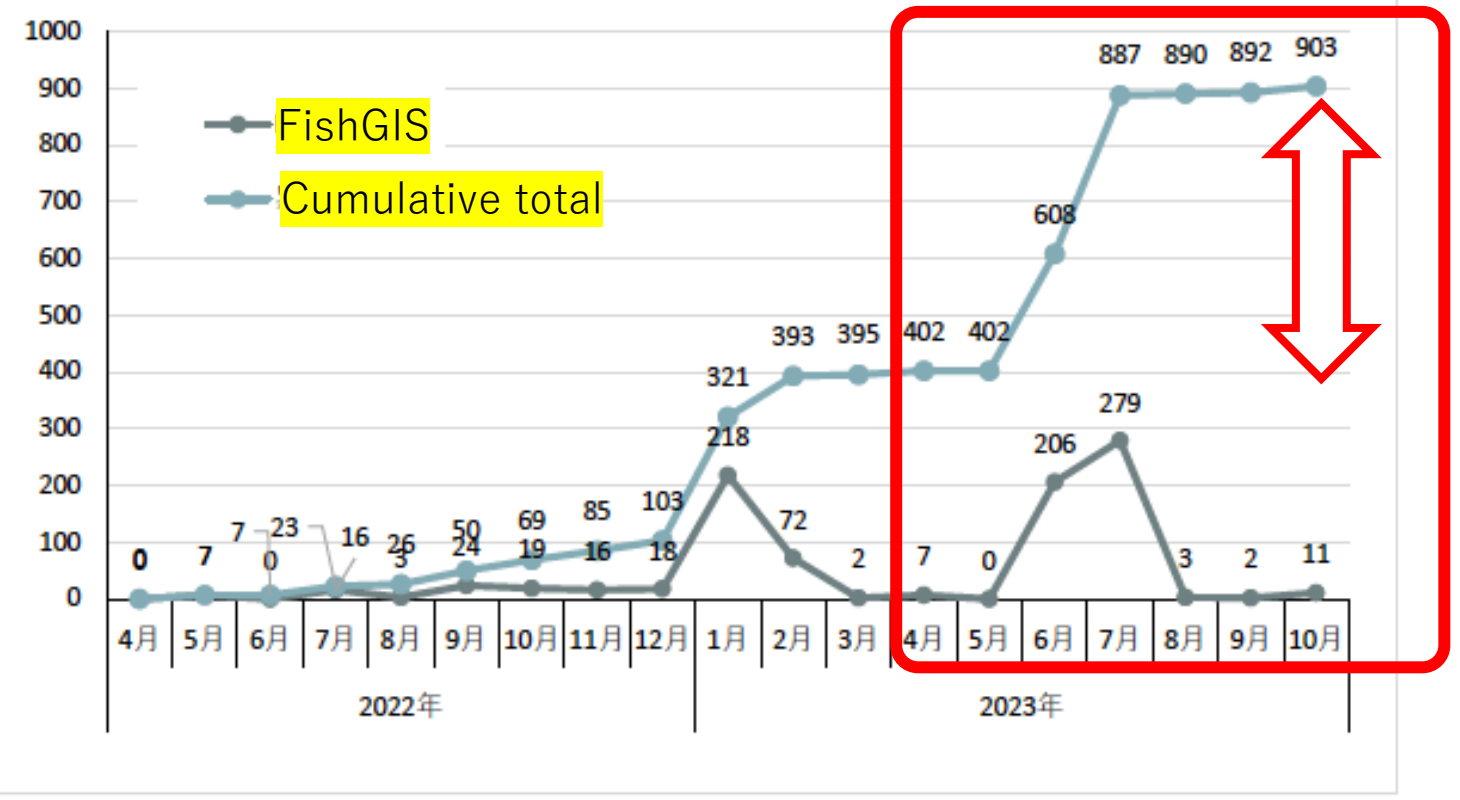
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2.1. Data collection status

Number of data reported
(until Oct 17, 2023)

FY2023



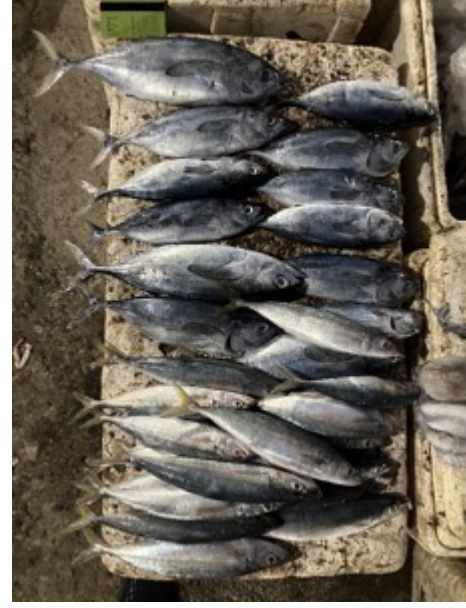
More than 500 reports in six months of FY2023.

Data collection is underway at twice the speed of FY2022 (395 reports).

Catch images (tuna)
in Lombok, Indonesia

2.2. Fish body size estimation

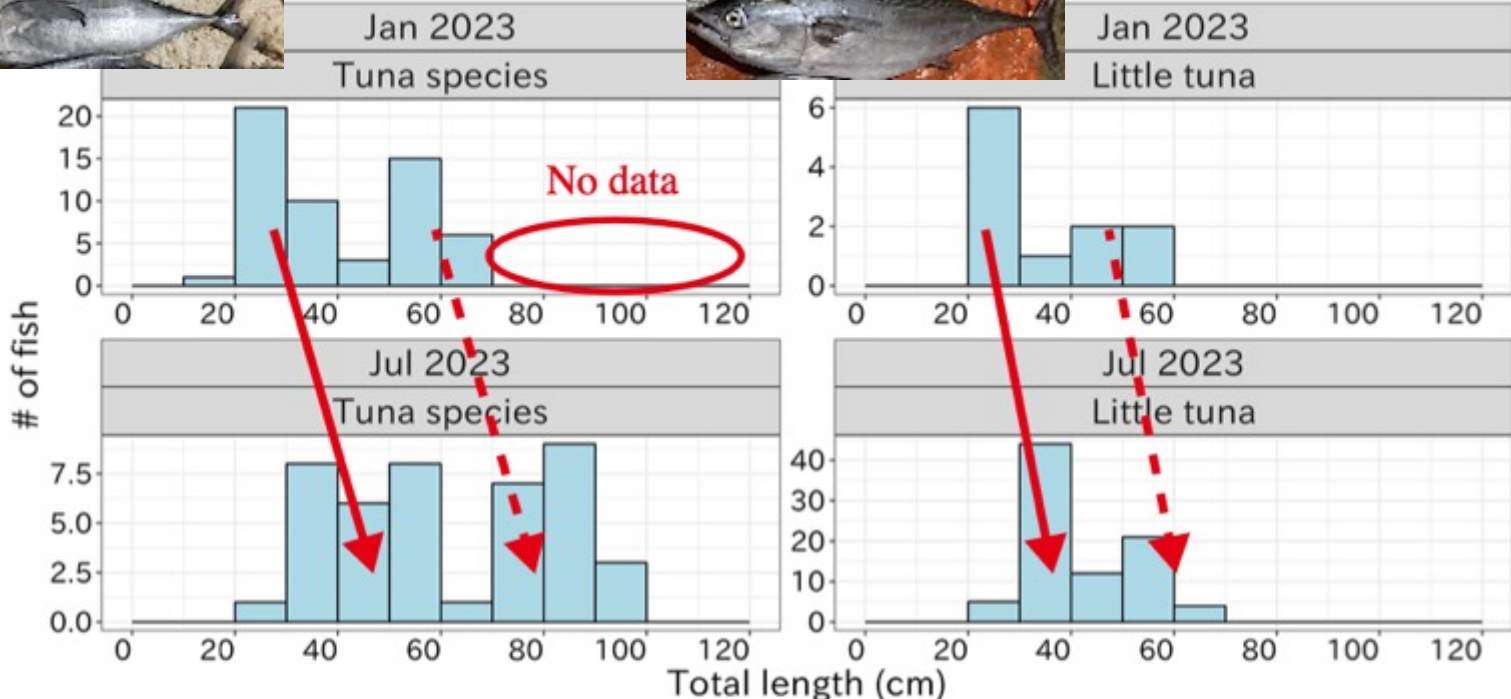
January 2023
(9 images)



July 2023
(11 images)



2.2. Fish body size estimation



	Tuna species	Little tuna
January 2023	Peaks at 20~30 cm and 50~60 cm	Peaks at 20~30 cm and 40~50 cm
July 2023	Peaks at 30~50 cm and 70~80 cm	Peaks at 30~40 cm and 50~60 cm

Human measurements have allowed to detect seasonal changes in fish body size composition of tuna species from catch images.

The more catch images accumulate, the more basic information about the fish stock becomes known.

To be presented at the poster session of PICES2023 → We wonder to write a concept paper.

2.3. Fisheries Database

Catch images

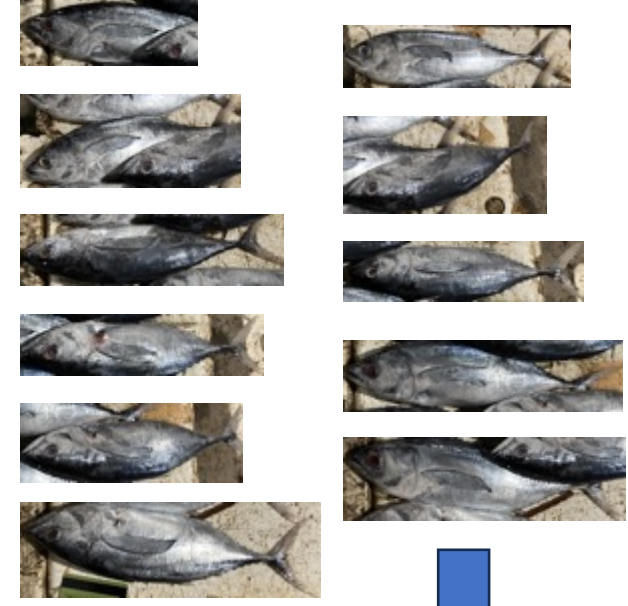
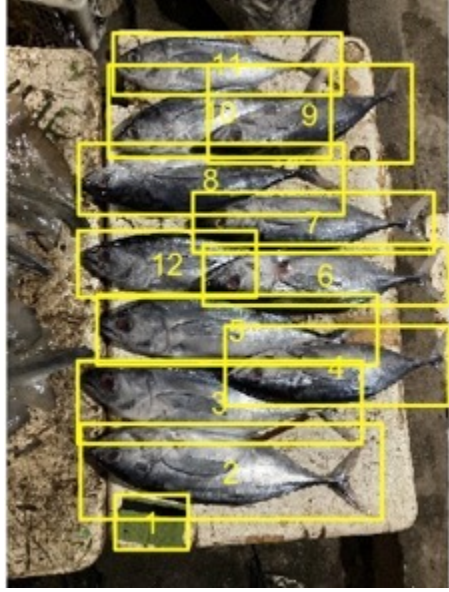
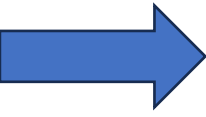
(1) Annotation

(2) Segmentation

(3) Sorting images

(4) Adding to Fisheries-Database (GitLab private repository)

Work flow



fishgjs-fisheris-database

Name	Last commit	Last update
data	ファイル名を修正 [27番] 4文字 #6 修正 shoutakamura authored 8 days ago	8 days ago
wiki	日本語の読み方を修正 #6-2 shoutakamura authored 1 week ago	1 week ago
README.md	Update README.md shoutakamura authored 1 week ago	1 week ago

fishgjs-fisheris-database

Ocean fish

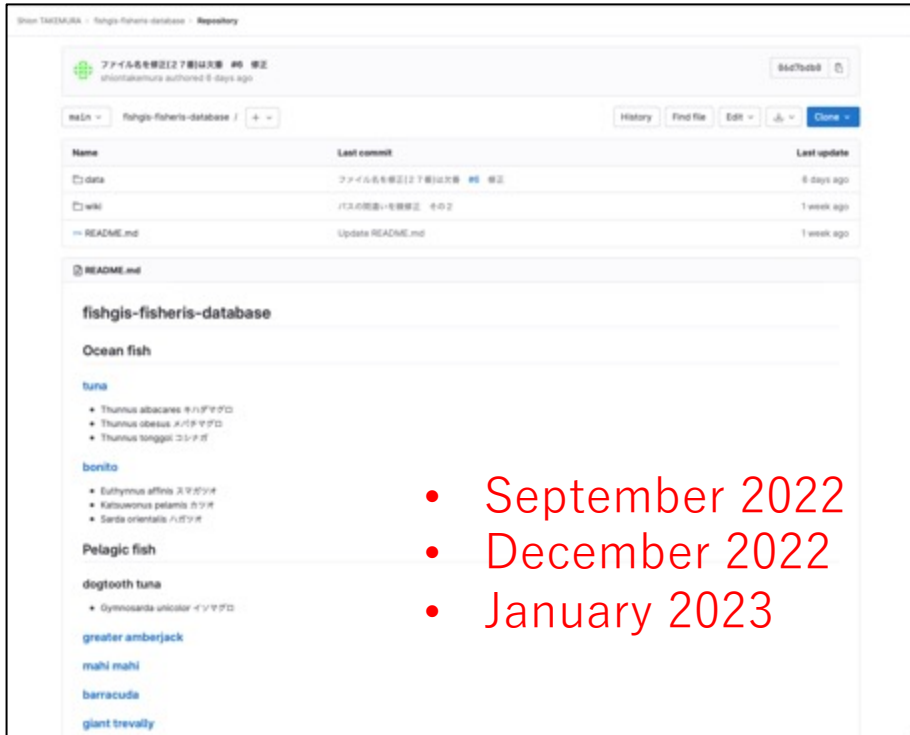
tuna

- Thunnus albacares 太平洋マアサジ
- Thunnus obesus アトランティック

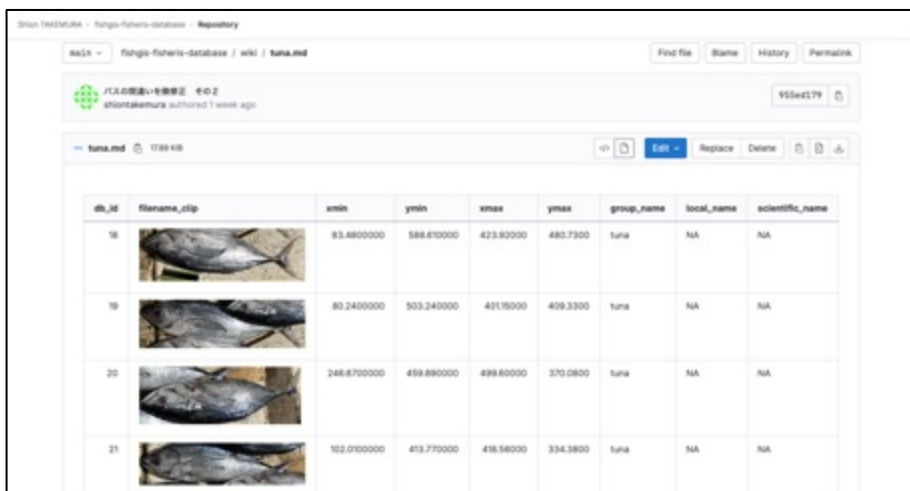
fishgjs-fisheris-database / wiki / tuna.md

id	filename_clip	xmin	ymin	xmax	ymax	group_name	local_name	scientific_name
18		83.4800000	588.610000	423.92000	480.7300	tuna	NA	NA
19		80.2400000	503.240000	401.16000	409.3300	tuna	NA	NA
20		246.6700000	459.890000	499.60000	370.0800	tuna	NA	NA

Fisheries-Database (GitLab repository)



- September 2022
- December 2022
- January 2023



- **Ocean fish**
 - tuna
 - bonito
 - etc.
- **Pelagic fish**
 - dogtooth tuna
 - greater amberjack
 - mahi mahi
 - barracuda
 - giant trevally
 - needlefish
 - etc.
- **Small pelagic fish**
 - sardine
 - mackerel scad
 - horse mackerel
 - halfbeak
 - flying fish
 - doudle-lined fusilier
 - yellowtail blue snapper
 - etc.
- **Demersal fish**
 - grouper
 - snapper
 - goat fish
 - etc.
- **Reef fish**
 - unicornfish
 - parrotfish
 - etc.
- **Uncategorized fish**
 - many images



2.3. Fisheries Database

- Analysis methods (workflows) have been consolidated
 - (1) Annotation (2) Segmentation (3) Sorting images
 - (4) Adding Fisheries-Database
- We plan to work on (2) Segmentation in with Tojo Lab (Hokkaido Univ.)
→ If you are interested, why don't you analyze together?
- But (3) Sorting images (including species identification) is difficult.
→ Suhendar-san, could you introduce us to Indonesian researchers who can take charge of fish species identification?

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3. Publication and Outreach



200+ people

400+ people

Fiscal year	Month/Year	Summary
YR2022	January 2023	<ul style="list-style-type: none"> • Training WS in Lombok, Indonesia
	February	<ul style="list-style-type: none"> • Oral presentations (96 people) at FRA's meeting (online)
	March	<ul style="list-style-type: none"> • Oral presentations (76 people) at FRA's meeting
YR2023 1st half	June	<ul style="list-style-type: none"> • Oral presentations at academic conferences in Japan (97)
	July	<ul style="list-style-type: none"> • Lecture in ITI in Jakarta & Training WS in Lombok, Indonesia
	August	<ul style="list-style-type: none"> • Lectures at "Value chain training course" by Hokkaido University/JICA (11 trainees from developing countries)
	September	<ul style="list-style-type: none"> • Poster presentations at academic conferences in Japan (300) • Tech catalogue by JIRCUS, Japan
YR2023 2nd half	October	<ul style="list-style-type: none"> • Oral presentations (96 people) at FRA's meeting (160) • Poster presentations at PICES2023 in Seattle, USA (???)

Enquiries to FishGIS

- Japan [Mizuho Bank](#) (whale watching)
- Japan [FRA](#) (Salmon Research Dep. → HydroColor)
- Japan [Prefectural Research Institutes](#) (Fisheries Dep. → FishGIS)

- I received many enquiries from research institutes in Japan.
- There are diverse needs (from free use to use of enterprise version).

- We need to consider Data-Policy of FishGIS for paid distribution.
→ [Discussion by Agenda7](#)

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3. Plans for the second half of FY2023

Tasks	Location	Time	Person(s) in charge
Modification of FishGIS	— Extend distribution of apps beyond PICES member states?	Until Nov 2023	GFL Multilingualisation of HydroColor?
Maintenance of FishGIS	—	Until Mar 2023	GFL
Collection of catch images	Lombok, Indonesia	Winter 2024 & + α?	Indonesia team & PICES team
Analysis of catch images	Lombok, Indonesia	From winter 2024	(2) Annotation →PICES team
			(3) Sorting images →Indonesia team?
Fisheries database	Lombok, Indonesia	After (3) Sorting images	(4) Adding to DB →PICES team
Horizontal deployment to PICES member countries	PICES member countries	As needed	Needs identification, trial data collection, etc. →PICES team
Publications	Japan	Feb/Mar 2024	PICES Japan team
	Seattle, USA (WFC 2024)	Mar 2024	TAKEMURA & MAKINO