



FISHIAL.AI

FISHIAL RECOGNITION™





Fishial.AI project - Background

- Wye Foundation, was established 2014 as a non-profit 501-c3 family foundation dedicated to local needs of Children, Veterans, Historical Preservation, Education, and Conservation affords .
- 2019 the Fishial.AI project was formed as a moonshot educational & conservation effort
- Initial work was performed within the FishAngler sports fishing mobile app
- Seed funding contributed by the Wye Foundation was \$250,000 and since then has increased to over \$1million!
- Staffing is approximately 10 Full time people mainly doing fish identification and labeling!
- Most of the code development for project is done out of Poland by the Codahead company (5 developers)



OUR MISSION

The Fishial.AI project is seeking the development of a highly accurate open-source AI model that can identify fish species by scientific name worldwide.

OUR GOALS

- Create a highly accurate open-sourced AI model that can identify fish species worldwide
- Provide a Fishial developers API, empowering diverse projects to effortlessly offer fish identification to their communities
- Provide a FREE citizen science portal for image collection and labeling of fish species images
- Act as the central hub for the combination of various fish image datasets into a single open-source, ML ready, labeled fish image dataset
- Publish the world's largest labeled (by species scientific name) fish image database for machine learning that can be used for commercial and non-commercial purpose

FORECASTED SIZE OF LABELING PROJECT

- Estimated number of fish species worldwide: 33,000
- Estimated number of photos needed for the ML per species: 1,000
- Estimated number of photos needed to complete the database: 33,000,000
- Estimated minutes to upload, label, do the polygon in each photo, each fish traits and metadata: 10
- Man hours needed to complete species labeling: 13,750,000 hours
- Working hours full time (Annually): 2080 hours
- 1 Person working 8 hours daily to meet the current goal: 6,610.5 years
- 100 people working 8 hours daily to meet the current goal: 66.1 years
- 1000 people working 8 hours daily to meet the current goal: 6.61 years



HOW WE ARE ACCOMPLISHING OUR MISSION

Fishial Recognition offers a range of powerful features designed to streamline and enhance the process of fish species analysis, labeling and data management.

These features are tailored to meet the needs of researchers, conservationists, and enthusiasts who are passionate about aquatic life.

Explore the key components that make **Fishial Recognition** an indispensable tool in the field of fish species identification.



FISH IDENTIFICATION MODEL:

The Fishial Recognition project offers a pre-built fish identification and segmentation AI model that is published on GitHub



IMAGE MANAGEMENT PORTAL:

Created a web-based portal that allows user to upload, tag images with species names and polygons



FISHIAL DEVELOPER'S API:

The Fishial Project offers a Fish Identification RESTful API SAAS service for developers of mobile apps and websites

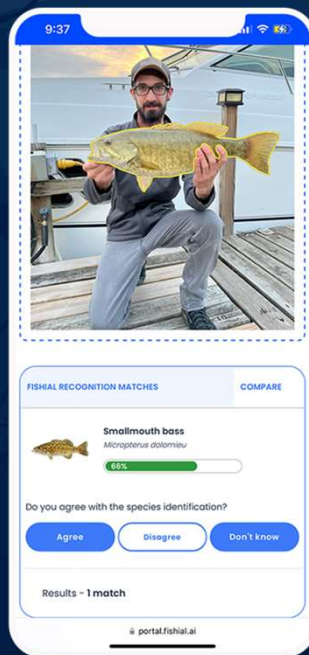


LABELED DATASETS FOR ML:

We are building a labeled fish image dataset that will be available as an open-source dataset for other projects to use



FISH IDENTIFICATION MODEL



- The Fishial Recognition project offers a prebuilt fish identification AI model that is published on GitHub. Includes:
 - Segmentation model - will identify all of the fish species within a photograph
 - Classification model - will identify the fish species by scientific name (289+ unique species)
 - Training scripts for machine learning
 - Github link: <https://github.com/fishial/fish-identification>
- Give it a try **DEMO LINK!** <https://portal.fishial.ai/search/by-fishial-recognition>



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IMAGE Management System (IMS)

Image Management System (IMS)

Free IMS portal to upload, label and process images

- Image collections:
- Individual user collections, Team collection
- Fishial collection (common dataset)
- Advanced image search by species and metadata
- Export image collections as COCO formatted files



ABOUT

PRIVATE COLLECTION

TEAM

FISHIAL COLLECTION

Fishial AI Summary

Fishial Collection (115.5K+)(4)

ADMIN

IMPORT | EXPORT

Fishial Collection

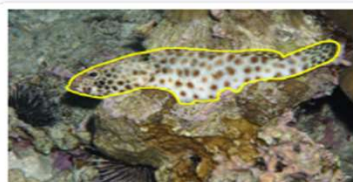
Status All

Species All

Assigned All

Search

UW NF NRL XRAY PQ IR TEST OOM



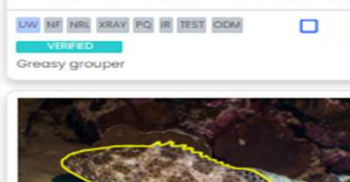
UW NF NRL XRAY PQ IR TEST OOM

VERIFIED
Greasy grouper



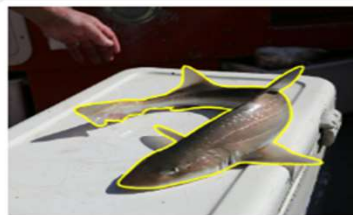
UW NF NRL XRAY PQ IR TEST OOM

VERIFIED
Greasy grouper



UW NF NRL XRAY PQ IR TEST OOM

VERIFIED
Greasy grouper



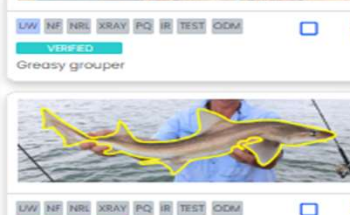
UW NF NRL XRAY PQ IR TEST OOM

VERIFIED
Spotted estuary smooth-hound



UW NF NRL XRAY PQ IR TEST OOM

VERIFIED
Spotted estuary smooth-hound



UW NF NRL XRAY PQ IR TEST OOM

VERIFIED
Spotted estuary smooth-hound



UW NF NRL XRAY PQ IR TEST OOM

VERIFIED
Spotted estuary smooth-hound



UW NF NRL XRAY PQ IR TEST OOM

VERIFIED
Spotted estuary smooth-hound



UW NF NRL XRAY PQ IR TEST OOM

VERIFIED
Spotted estuary smooth-hound



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IMAGE IMS – Image uploads & Metadata

Fish Image upload processing

- Upload images by drag & drop, batch CSV, and developers API
- Automatic AI fish detection (segmentation) and classification of fish within image
- Privacy human face blurring
- Copyrights on a per image basis
- <https://portal.fishial.ai>

[← Back to collection](#) **ENABLING FISHIAL RECOGNITION™** [Previous Image](#) [Next Image](#) [Submit for Review](#)

Total Images: 1 Display by species:

Image ID: 422303

Blacktip shark

Type name of species you are looking for

Fish Detection Save Tag Species




Image Information

Image ID: 422303

Status **NEW**

Taken 7/5/2020 - 8:00pm

Added 8/16/2022 - 4:14am

Last Modified 5/1/2024 - 2:18pm

Place taken -

GPS 28.416158, -96.320277

Water Depth -

Accepted general 0

Accepted ODM 0

Tagged Species 1

Blacktip shark (Carcharhinus limbatus)

[User Feedback](#) [Delete image](#)

Species Bounding Boxes

Blacktip shark

Image Meta Data

Photo taken Under Water

No Fish in Photo

Not a real fish (drawing)

X-ray image

Poor Image Quality

Inspection Required

Test Photo (will be used in AI verification testing only)

Should be included in the Object Detection Model

Copyrights

Other



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IMAGE IMS – Fish Species Labeling

← Back to collection

ENABLING FISHIAL RECOGNITION™

Previous Image

Next Image

Submission Review

Fish species Labeling

- Built-in species scientific name database
- Fish Traits can be labeled such as eye's, head, tails etc.
- Metadata per fish species (age, gender, weight, length, girth, etc.)


Total Images: 1 Display by species: ☐

Image ID: 1042443

Spotted estuary smooth-hound

Type name of species you are looking for

Fish Detection



Pointed

Head Shape Flat

Eyes Standard

Body Patterns laterally blotched--

Pelvic/Ventral Fin Absent

Adipose Fin Shape Absent

Dorsal Fin Shape Continuous with no...

Pectoral Fin Pointed

Anal Fin Shape 1st Pointed

Finlets 1 Present

Body Scales Placoid

Body Lateral Line Deep

Fish Traits

Sex

Age

Spawning

Dead or Mutilated ☐

Fish meat/filet ☐

Poor Polygon Quality ☐

Species suspicious ☐

Weight

Length

Girth



IMAGE IMS – Fish Species Submit to Fishial Collection










After labeling Image

- Next task is to submit images to the Fishial Collection for review!
- Image status will go from status “NEW” to “Pending Review”
- Once image is reviewed the status will be updated to “Verified” or Rejected to send back to submitter

[← Back to collection](#)

ENABLING FISHIAL RECOGNITION™

Submit

<input checked="" type="checkbox"/>	IMG	IMG/SPECIES	BODY POLYGONS	FISH TRAITS	STATUS	META DATA
<input checked="" type="checkbox"/>		Image ID: 422184			NEW	UW NF NRL XRAY PQ IR TEST CDM ✎ ↗
		Blacktip shark	<div><div>✕ Caudal Fin</div><div>✕ Head Shape</div><div>✕ Eyes</div><div>✕ Pelvic/Ventral Fin</div><div>✕ Adipose Fin Shape</div><div>✕ Dorsal Fin Shape</div><div>✕ Pectoral Fin</div><div>✕ Anal Fin Shape</div><div>✕ Finlets</div><div>✕ Body Scales</div></div>	<div><div>✕ Sex</div><div>✕ Age</div><div>✕ Spawning</div><div>✕ Dead or Mutilated</div><div>✕ Fish meat/fillet</div><div>✕ Poor Polygon Quality</div><div>✕ Species suspicious</div><div>✕ Weight</div><div>✕ Length</div><div>✕ Girth</div></div>		
<input checked="" type="checkbox"/>		Image ID: 421765			NEW	UW NF NRL XRAY PQ IR TEST CDM ✎ ↗
		Blacktip shark	<div><div>✕ Caudal Fin</div><div>✕ Head Shape</div><div>✕ Eyes</div><div>✕ Pelvic/Ventral Fin</div><div>✕ Adipose Fin Shape</div><div>✕ Dorsal Fin Shape</div><div>✕ Pectoral Fin</div><div>✕ Anal Fin Shape</div><div>✕ Finlets</div><div>✕ Body Scales</div></div>	<div><div>✕ Sex</div><div>✕ Age</div><div>✕ Spawning</div><div>✕ Dead or Mutilated</div><div>✕ Fish meat/fillet</div><div>✕ Poor Polygon Quality</div><div>✕ Species suspicious</div><div>✕ Weight</div><div>✕ Length</div><div>✕ Girth</div></div>		
<input checked="" type="checkbox"/>		Image ID: 422303			NEW	UW NF NRL XRAY PQ IR TEST CDM ✎ ↗
		Blacktip shark	<div><div>✕ Caudal Fin</div><div>✕ Head Shape</div><div>✕ Eyes</div><div>✕ Pelvic/Ventral Fin</div><div>✕ Adipose Fin Shape</div><div>✕ Dorsal Fin Shape</div><div>✕ Pectoral Fin</div><div>✕ Anal Fin Shape</div><div>✕ Finlets</div><div>✕ Body Scales</div></div>	<div><div>✕ Sex</div><div>✕ Age</div><div>✕ Spawning</div><div>✕ Dead or Mutilated</div><div>✕ Fish meat/fillet</div><div>✕ Poor Polygon Quality</div><div>✕ Species suspicious</div><div>✕ Weight</div><div>✕ Length</div><div>✕ Girth</div></div>		
<input checked="" type="checkbox"/>		Image ID: 421727			NEW	UW NF NRL XRAY PQ IR TEST CDM ✎ ↗
		Blacktip shark	<div><div>✕ Caudal Fin</div><div>✕ Head Shape</div><div>✕ Eyes</div><div>✕ Pelvic/Ventral Fin</div><div>✕ Adipose Fin Shape</div><div>✕ Dorsal Fin Shape</div><div>✕ Pectoral Fin</div><div>✕ Anal Fin Shape</div><div>✕ Finlets</div><div>✕ Body Scales</div></div>	<div><div>✕ Sex</div><div>✕ Age</div><div>✕ Spawning</div><div>✕ Dead or Mutilated</div><div>✕ Fish meat/fillet</div><div>✕ Poor Polygon Quality</div><div>✕ Species suspicious</div><div>✕ Weight</div><div>✕ Length</div><div>✕ Girth</div></div>		
<input checked="" type="checkbox"/>		Image ID: 284318			REJECTED	UW NF NRL XRAY PQ IR TEST CDM ✎ ↗
			<div><div>✕ Caudal Fin</div><div>✕ Head Shape</div><div>✕ Eyes</div></div>			

Fishial dataset - IMAGE Review Process





Fishial Collection – QA Review tools

Fishial Collection & QA Review

- Structured gallery QA review tools
- All photos submitted to the Fishial collection are reviewed for accuracy by a biologist
- All changes to images are tracked in an history log so errors can be back-traced to the source



① ABOUT

🔒 PRIVATE COLLECTION

👤 TEAM

📁 FISHIAL COLLECTION

Fishial AI Summary

Fishial Collection (115.5K+)(4)

⚙️ ADMIN

📄 IMPORT | EXPORT

 **Thomas**
INSTITUTIONAL
FishAngler, LLC

QA Review Fishial Collection

Status Verified

Species All

Assigned All

Search

Species Review

ODM Review

General Review

Image review



UW NF NRL XRAY PQ IR TEST ODM VERIFIED

☐ Poor quality ☐ Test ☐ ODM

REJECT

ACCEPT

SKIP REVIEW

Accepted ODM reviews:
0

Polygon review

Polygon



Banded sunfish

[Enneacanthus obesus](#)

Accepted species reviews:
0

☐ Species ID suspicious

☐ Poor quality

☐ Dead or mutilated

☐ Fish meat/filet

☐ Sex: Not specified

☐ Age: Juvenile

☐ Spawning: Not specified

ACCEPT

Show records

30

50

100

«

<

1

2

3

4

5

...

3617

>

»

Go to page

2

Total records: 108499



Fishial.AI – Developers API

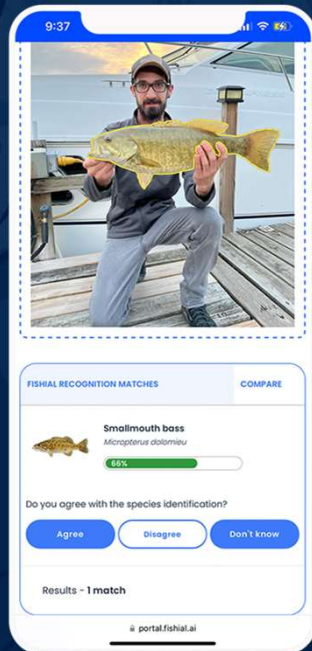
FISHIAL Fish Identification API



- RESTful based API with authorization
- Image upload to user & team collections
- Fish Identification (289+ species)
- Returns detected species list with probability percentage of a match
- Over 5000+ Fish Species thumbnail images
- Feedback mechanism for third party API users to agree or disagree with the fish identification
- API Documentation:
<https://github.com/fishial/devapi/blob/main/tutor.adoc>



Fish Identification Website Widget



- **Coming Soon (July 2024)!**
- Allow anyone to embed a Fish Identification widget into their website for fish identification of species!
- Adding a few simple HTML statements to enable
- Fishial will target the 50 USA fish & Game sites
- Fish species identification educational sites
- www.Takemefishing.org

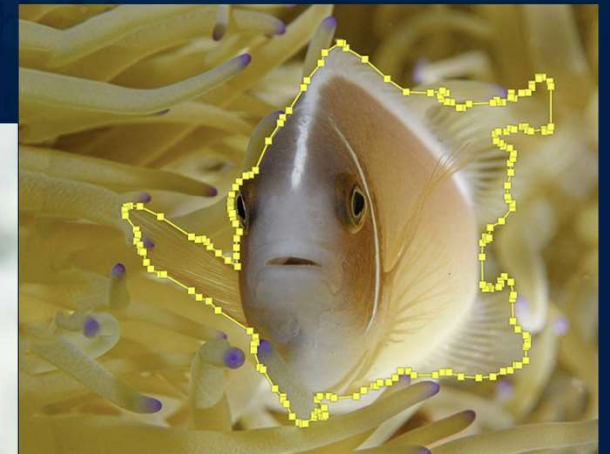


Creating a benchmark dataset

- **Open-source benchmark dataset - Coming Soon (4Q-2024)!**
- Current internal benchmark dataset stats
 - 100 unique species with > 50 images per species
 - 300 unique species with < 50 images per species
- We seek to create a benchmark process that can be run on each new AI model built to compare accuracy of new model vs. old model
- We are looking for others to help build this out!

LABELED DATASETS

- **Labeled Image Datasets (Targeting 2025)**
 - Each image polygon and species is hand verified
 - “Non-commercial use only” labeled image dataset
 - “Commercial & Non-commercial” image dataset
 - “Testing/Benchmark” image dataset (In Q4-2024)





PARTNERSHIPS



Some Mobile APP & Web PROJECTS USING FISHIAL TECH:



Future Fishial Plans

- Collaborating with projects worldwide to expand and enrich Fishial's datasets, fostering a global community dedicated to accurate fish species identification.
- Build out a Benchmark dataset and scripts to test various AI models
- Release multiple open source labeled fish species image datasets
- Create a FREE mobile app that serves as an educational tool for kids, educators, anglers, and fisheries management, harnessing AI for fish identification.



SUPPORT US!

We have a range of volunteer opportunities that contribute to our mission of advancing fish data collection and conservation efforts. We welcome volunteers for tasks such as:

- Image Labeling: Help label fish images to train our AI model accurately
- QA of datasets – Species identification verification
- Data Collection: Contribute by sharing fish images
- Community Engagement: Assist in spreading awareness, organizing events, and engaging with fellow enthusiasts
- Tech Support: Offer technical skills to enhance our platforms and tools.
- Research: Contribute by conducting research related to fish species and ecosystems.

Join our community of volunteers to make a meaningful impact, together we can change the way humanity sees fish.



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<https://www.fishial.ai/> - Website

<https://portal.fishial.ai> – Free Image Management system

<https://docs.fishial.ai> – Project Documentation

<https://github.com/fishial/fish-identification> - AI models available for download

DEMO LINK! <https://portal.fishial.ai/search/by-fishial-recognition>

Contact: Tom Wye support@fishial.ai or Twye@fishial.ai