Fish92: A Novel Dataset for Indigenous Fish Classification

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1   Existing Dataset

There are various fish datasets like Fish4Knowledge [2], Rockfish [1], QutFish [3], and DeepFish [4] in a large number of scales especially underwater.

Fish4Knowledge dataset contains 27470 fish images. The images are captured in video frame, where the videos are recorded as 524086 unique video frames using 9 cameras at multiple coastal areas of Taiwan. One objective of the dataset was to extract and study the under water marine ecology, but later R.B.Fisher et al focused on fish detection and tracking. The original dataset captured 23 various classes of marine object, out-off which 15 classes are observed fish species of size 320×240. Figure. 1 shows example data sample from Fish4Knowledge dataset.

QUT dataset contains 3960 images from 468 different species. The data are collected from real world fish images in three different conditions, namely "controlled", "out-of-the water" and "in-situ". The "controlled" images feature fish specimens with their fins extended, photographed against a uniform background under consistent lighting conditions. In case of "in-situ" images, the captured fish images are in natural condition. In these images, background and lighting are uncontrolled, and the unique conditions of underwater imaging present additional challenges. The "out-of-the-water" images feature fish specimens removed from their aquatic environment, with a variable background and limited control over lighting conditions. In QUT dataset the images are of size About half of the images were taken under "controlled" conditions. About half of the images were taken under "controlled" conditions. One-third of the images were captured in the "in-situ" condition at underwater, rest of the images were also taken "out-of-the-water". Figure. 2 shows example data sample from QUT dataset.

Rockfish dataset is released as "labeled fishes in the wild" dataset, where the fish images are mainly rockfishes and they are captured in in-situ condition. We found around 4300 images of size 1280×720. The fish images are captured from southern California coastal area by an ROV. The dataset is divided in three components, a training set (training and validation set), a test set, and a negative image set. The non negative image set basically contains images with no fish present in that. Figure. 3 shows example data sample from Rockfish dataset.
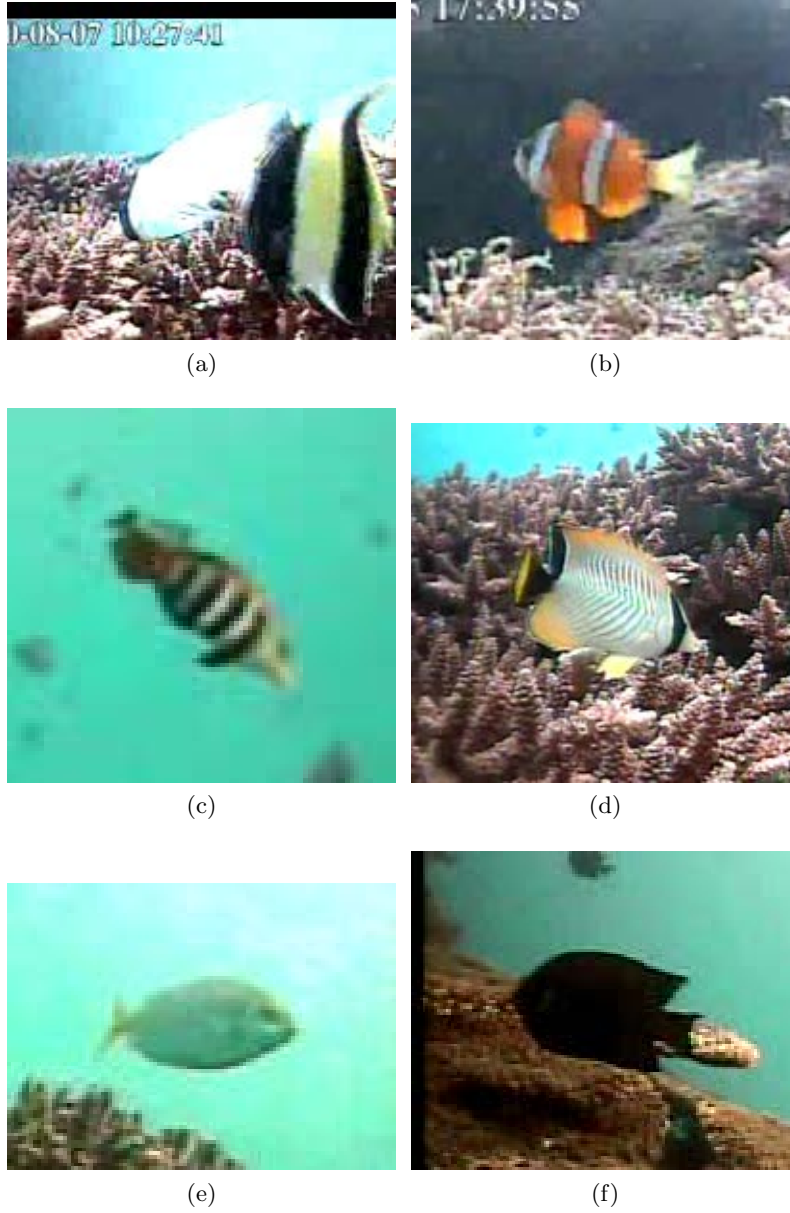
(a)

(b)

(c)

(d)

(e)

(f)

Fig. 1: Image sample of Fish4Knowledge dataset. (a), (b), (c), (d), (e) and (f) are sample images from dataset.
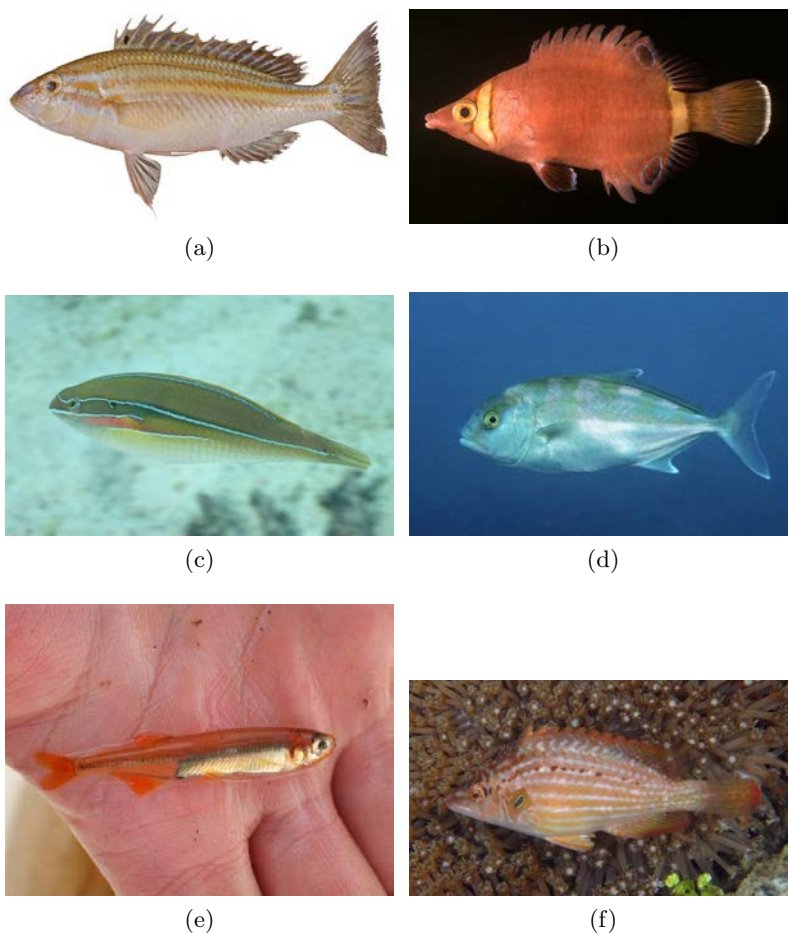
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Fig. 2: Image sample of QUT fish dataset. (a) "controlled", (b)"controlled" , (c) "in-situ", (d) "in-situ", (e)"out-of-the-water" (f) "out-of-the-water".

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Deepfish dataset contains around 40000 images of size 1920×1080. Thee is 20 different fish class with annotations. The labels are suitable for mainly classi- fication task. It basically indicates that weather the fish is present in the image or not. The data samples are collected from the Hinchinbrook/Palm Islands re- gion in North Eastern Australia, the rest from Western Australia using video camera. The camera is installed on metal frames and lowered over a vessel's side to record underwater video. Later the fish images are extracted from the videos. There are two types of annotation present in dataset, one is point level annotation and another is pixel level annotation. The goal of point level anno- tation is to focus on model learning to perform fish crowd counting. Around
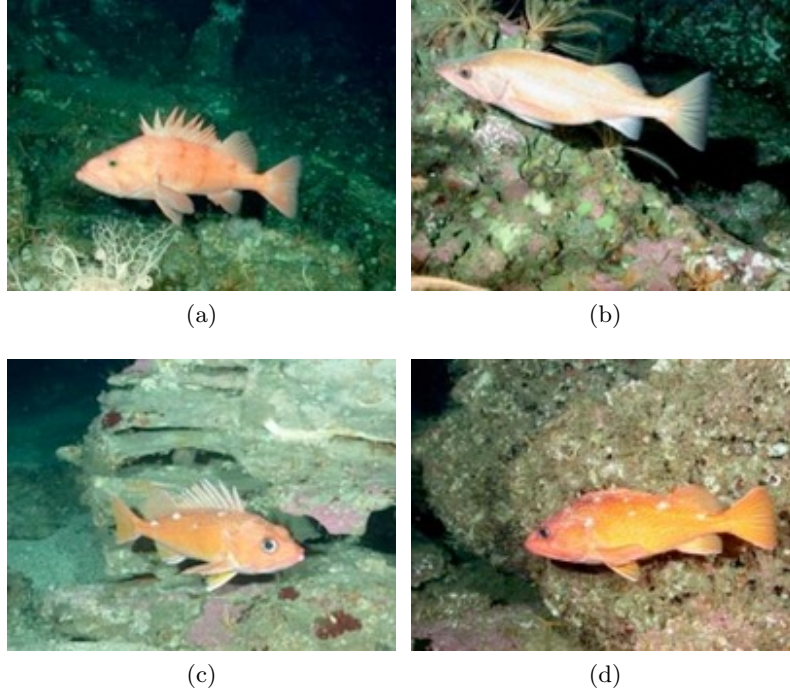
Fig. 3: Image sample of Rock fish dataset. (a), (b), (c), and (d) are sample images from dataset.

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3200 images are annotated at point-level. On the other hand pixel level annotations were made for model training to perform fish segmentation. The authors collected 620 images and annotated per pixel. The entire Deepfish dataset has three different sub datasets- FishClf, FishLoc and FishSeg. FishClf was used for fish classification, FishLoc was used for counting and localization and FishSeg for the segmentation task. Figure. 4 shows example data sample from Deepfish dataset.

2   Fish92: The Proposed Dataset

The followings images (from Fig: 5 to Fig: 96) are few images per class from proposed **Fish92 dataset**.

References

1. Cutter, G., Stierhoff, K., Zeng, J.: Automated detection of rockfish in unconstrained underwater videos using haar cascades and a new image dataset: Labeled fishes in the wild

(a)   (b)

Fig. 4: Image sample of Deepfish dataset. a) class: 7117 Caranx sexfasciatus juvenile b) class: 7585 F1.

2. Fisher, R.a.: Fish4knowledge deliverable d7.6, fnal report to ec-technical. https://bit.ly/2ex7dnz (2013)
3. Kaneswaran, A., Ge, Z., Mccool, C., Denman, S., Fookes, C., Corke, P., Tjondrone-goro, D., Sridharan, S.: Local inter-session variability modelling for object classifi-cation. 2014 IEEE Winter Conference on Applications of Computer Vision, WACV 2014 (2014)
4. Saleh, A., Laradji, I., Konovalov, D., Bradley, M., Vázquez, D., Sheaves, M.: A realistic fish-habitat dataset to evaluate algorithms for underwater visual analysis (2020)

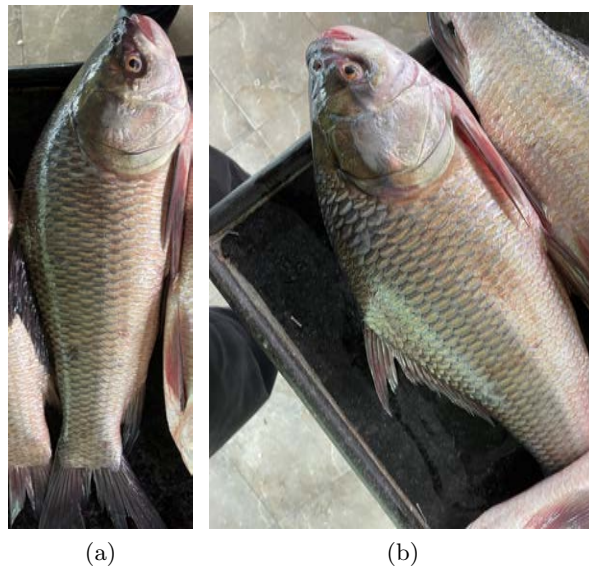Fig. 5: Image sample from Fish92 dataset. Class: Rui(Labeo Rohita)

Fig. 6: Image sample from Fish92 dataset. Class: Catla(Catla Catla)

Fig. 7: Image sample from Fish92 dataset. Class: Mrigal(Cirrhinus cirrhosus)

Fig. 8: Image sample from Fish92 dataset. Class: Ilish(Tenualosa ilisha)

Fig. 9: Image sample from Fish92 dataset. Class: Chitol(Notopterus chitala)

Fig. 10: Image sample from Fish92 dataset. Class: Borali(Lebeo boga)

Fig. 11: Image sample from Fish92 dataset. Class: Sippi(Osteobrama belangeri)

(a)   (b)

Fig. 12: Image sample from Fish92 dataset. Class: Kornag(Cyprinus barila)

(a)   (b)

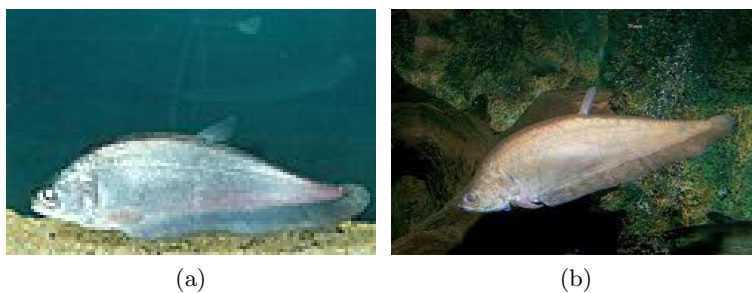Fig. 13: Image sample from Fish92 dataset. Class: Kangon(Eutropiichthys vacha)

Fig. 14: Image sample from Fish92 dataset. Class: Kundali(Notopterus notopterus)

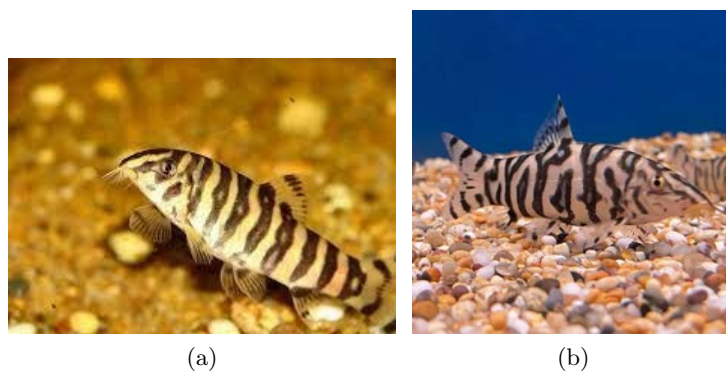Fig. 15: Image sample from Fish92 dataset. Class: Khas(Labeo dyocheilus)

Fig. 16: Image sample from Fish92 dataset. Class: Bou mach(Botia dayi)

Fig. 17: Image sample from Fish92 dataset. Class: Chuno(Trichogaster chuna)

Fig. 18: Image sample from Fish92 dataset. Class: Kornag(Cyprinus barila)

Fig. 19: Image sample from Fish92 dataset. Class: Telapia(Oreochromis mossam-
bicus)

Fig. 20: Image sample from Fish92 dataset. Class: Boaal(Wallago attu)

Fig. 21: Image sample from Fish92 dataset. Class: Nur pur(Nandus nandus)

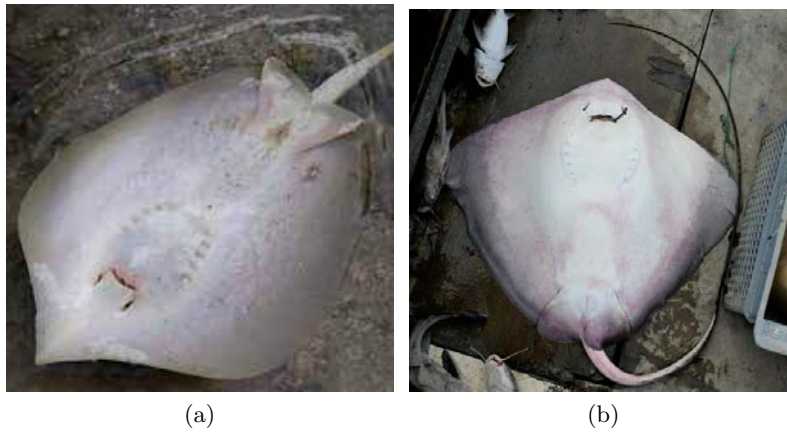Fig. 22: Image sample from Fish92 dataset. Class: Puiya(Lepidocephalichthys berdmorei)

Fig. 23: Image sample from Fish92 dataset. Class: Sapla Pata(Dasyatis zugei)

Fig. 24: Image sample from Fish92 dataset. Class: Shutki(Katsuwonus pelamis)

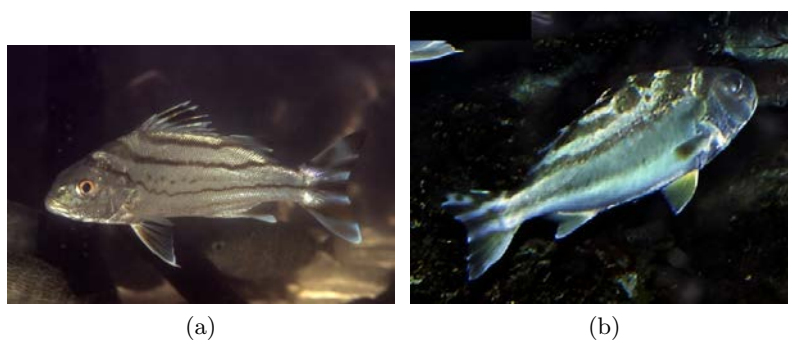Fig. 25: Image sample from Fish92 dataset. Class: Ghol(Protonibea diacanthus)

Fig. 26: Image sample from Fish92 dataset. Class: Borguni(Terapon jarbua)

Fig. 27: Image sample from Fish92 dataset. Class: Pabda(Callichrus pabda)
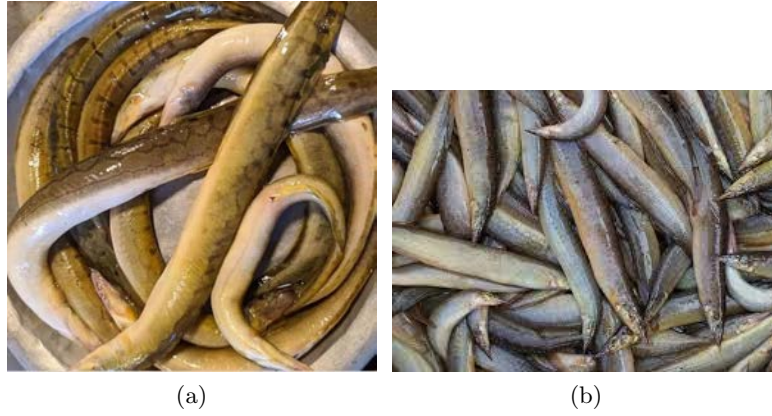
Fig. 28: Image sample from Fish92 dataset. Class: Pakal Mach(Anguilliforme sp.)

Fig. 29: Image sample from Fish92 dataset. Class: Shol Mach(Channa striata)

Fig. 30: Image sample from Fish92 dataset. Class: Karoti(Gudusia chapra)

Fig. 31: Image sample from Fish92 dataset. Class: Rup Chad(Pampus argenteus)

Fig. 32: Image sample from Fish92 dataset. Class: Ari(Sperata seenghala)

Fig. 33: Image sample from Fish92 dataset. Class: Gagol(Hemibagrus menoda)

(a)   (b)

Fig. 34: Image sample from Fish92 dataset. Class: Gura tengra(Chandramara chandramara)

(a)   (b)

Fig. 35: Image sample from Fish92 dataset. Class: Litha(rita)

(a)   (b)

Fig. 36: Image sample from Fish92 dataset. Class: Bangladesi(Schistura savona)

(a)   (b)

Fig. 37: Image sample from Fish92 dataset. Class: Kondali(Ailia coila)

Fig. 38: Image sample from Fish92 dataset. Class: Bacha(Pangasius bocourti)

Fig. 39: Image sample from Fish92 dataset. Class: Bordaia(Pachypterus atherinoides)

Fig. 40: Image sample from Fish92 dataset. Class: Koi(Anabas testudineus)

Fig. 41: Image sample from Fish92 dataset. Class: Bami(Mastacembelus armatus)

(a)   (b)

Fig. 42: Image sample from Fish92 dataset. Class: Lomba Chanda(Chanda nama)

(a)   (b)

Fig. 43: Image sample from Fish92 dataset. Class: Tuna(Thunnini)
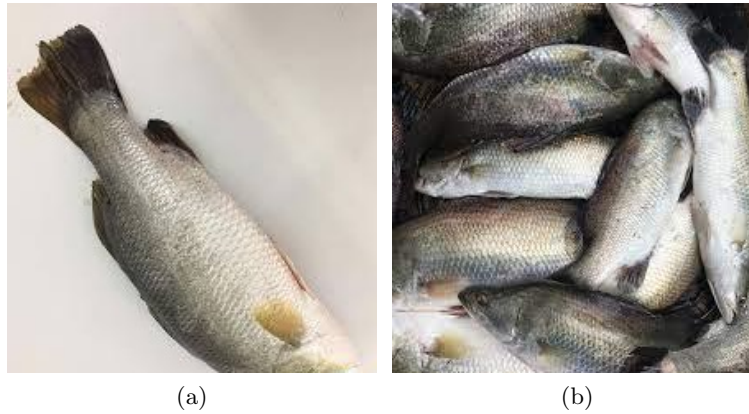

(a)   (b)

Fig. 44: Image sample from Fish92 dataset. Class: Vetki(Lates calcarifer)

(a)   (b)

Fig. 45: Image sample from Fish92 dataset. Class: Batasi(Neotropius atheri-noides)

(a)   (b)

Fig. 46: Image sample from Fish92 dataset. Class: Loitta(Harpadon nehereus)

(a)   (b)

Fig. 47: Image sample from Fish92 dataset. Class: Pangas(Pangasius)

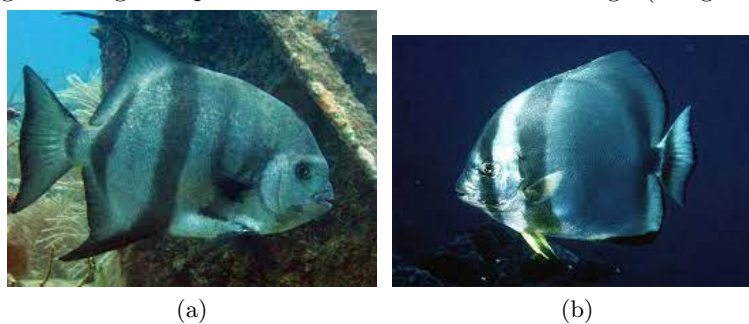(a)   (b)

Fig. 48: Image sample from Fish92 dataset. Class: Hatir Kaan(Chaetodipterus faber)

(a)   (b)

Fig. 49: Image sample from Fish92 dataset. Class: Aom Mach(Gerres oyena)

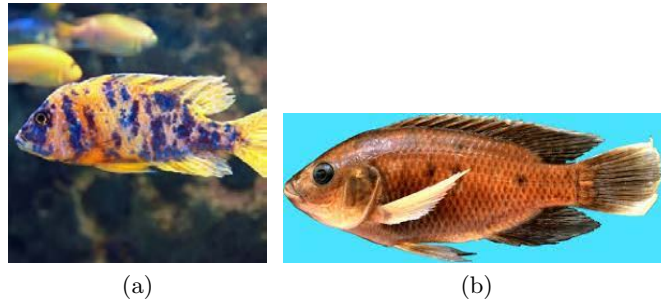(a)   (b)

Fig. 50: Image sample from Fish92 dataset. Class: Pann Mach(Cichlidae)

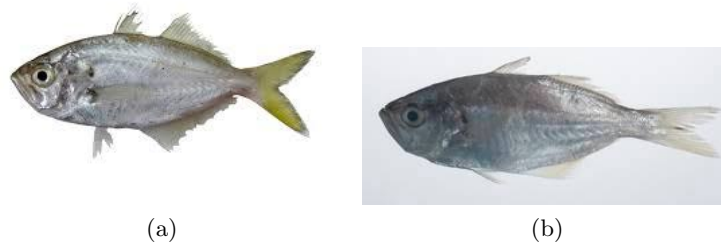(a)   (b)

Fig. 51: Image sample from Fish92 dataset. Class: Sada Mach(Lactarius lactarius)

(a)   (b)

Fig. 52: Image sample from Fish92 dataset. Class: Chan Chanda(Lampris)

(a)   (b)

Fig. 53: Image sample from Fish92 dataset. Class: Sonali Bata(Mullidae)

Fig. 54: Image sample from Fish92 dataset. Class: Tapsi(Polynemus paradiseus)

Fig. 55: Image sample from Fish92 dataset. Class: Pomfret(bramidae/Brama brama)

Fig. 56: Image sample from Fish92 dataset. Class: Ganga Tope(Tetraodon cutcutia)

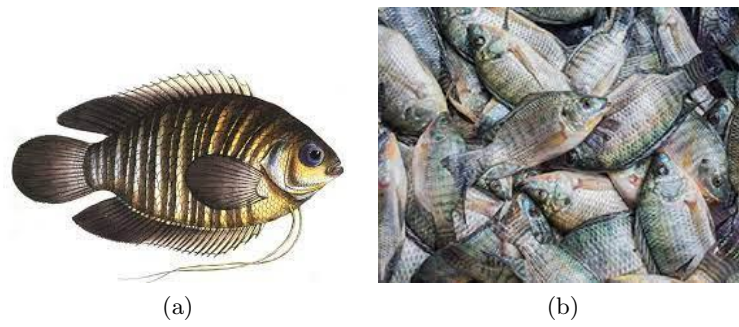Fig. 57: Image sample from Fish92 dataset. Class: Tural Turi(Macrognathus pancalus)

(a)   (b)

Fig. 58: Image sample from Fish92 dataset. Class: Kholihona(Colisa fasciata)

(a)   (b)

Fig. 59: Image sample from Fish92 dataset. Class: Ptimutura(Glossogobius giuris)

(a)   (b)

Fig. 60: Image sample from Fish92 dataset. Class: Keshi(Rhinomugil corsula)

(a)   (b)

Fig. 61:   Image   sample   from   Fish92   dataset.   Class: Silver carp(Hypophthalmichthys molitrix)

(a)   (b)

Fig. 62: Image sample from Fish92 dataset. Class: Singi Magur(Heteropneustes fossilis)

(a)   (b)

Fig. 63: Image sample from Fish92 dataset. Class: Neftani(Ctenops nobilis)

(a)   (b)

Fig. 64: Image sample from Fish92 dataset. Class: Keyakeatta(Nangra assamensis)

(a)   (b)

Fig. 65: Image sample from Fish92 dataset. Class: Neria(Clupisoma garua)

Fig. 66: Image sample from Fish92 dataset. Class: Nau Matchee(Balitora brucei)

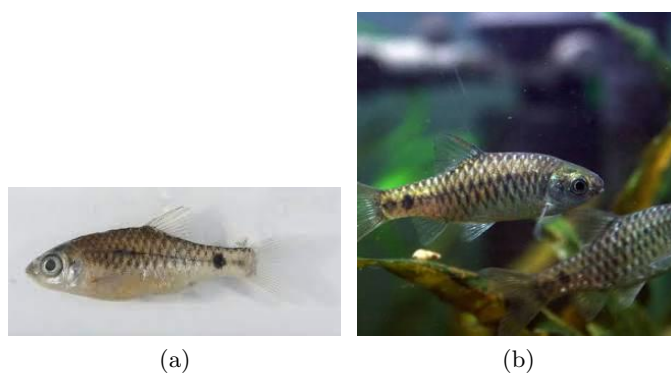Fig. 67: Image sample from Fish92 dataset. Class: Lobura(Neolissochilus hexagonolepis)

Fig. 68: Image sample from Fish92 dataset. Class: Phabounga(Pethia shalynius)

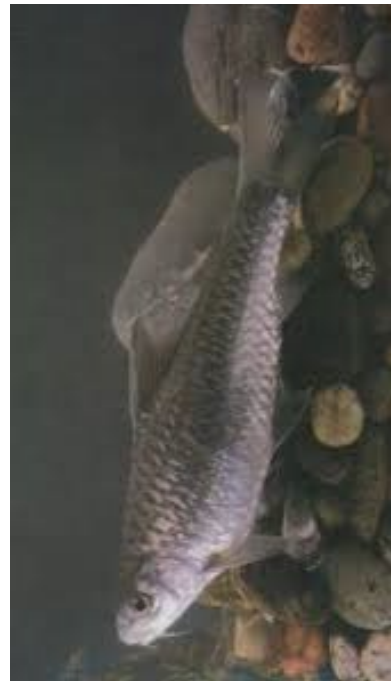Fig. 69: Image sample from Fish92 dataset. Class: Hato(Osteobrama cotio)

Fig. 70: Image sample from Fish92 dataset. Class: Chena puti(Systomus sarana)

Fig. 71: Image sample from Fish92 dataset. Class: Bokar(Neolissochilus hexagonolepis)

Fig. 72: Image sample from Fish92 dataset. Class: Kurhi(Labeo gonius)

Fig. 73: Image sample from Fish92 dataset. Class: Bata Mach(Labeo bata)

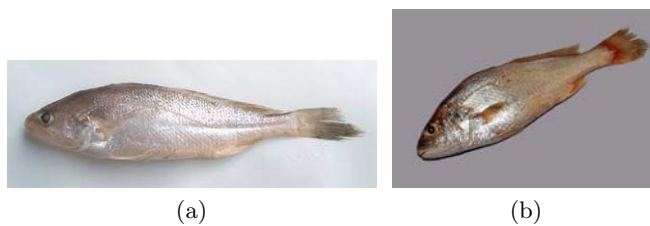Fig. 74: Image sample from Fish92 dataset. Class: Chapa Kori(Scomberoides commersonnianus)

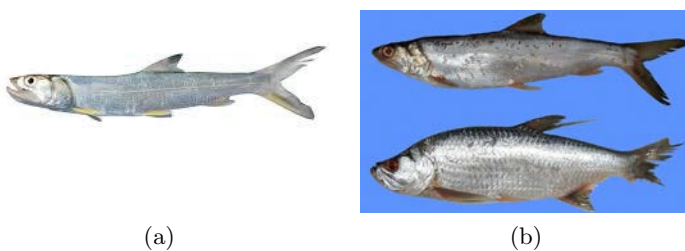Fig. 75: Image sample from Fish92 dataset. Class: Lambu(Otolithoides pama)

Fig. 76: Image sample from Fish92 dataset. Class: Toral Andi(Elops saurus)

Fig. 77: Image sample from Fish92 dataset. Class: Chingri(Caridea)

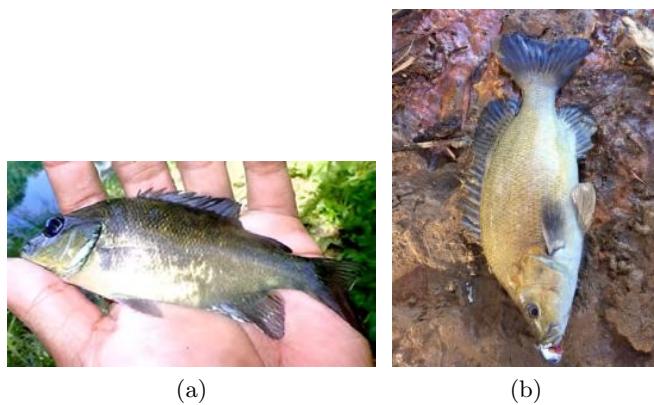Fig. 78: Image sample from Fish92 dataset. Class: Baila(Awaous grammepomus)

<center>(a)   (b)</center>

Fig. 79: Image sample from Fish92 dataset. Class: Sada Aatina(Hephaestus fuliginosus)

<center>(a)   (b)</center>

Fig. 80: Image sample from Fish92 dataset. Class: Kakia(Xenentodon cancila)

<center>(a)   (b)</center>
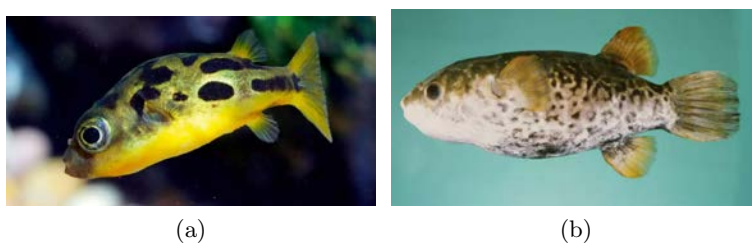
Fig. 81: Image sample from Fish92 dataset. Class: Potka(Tetraodon fluviatilis)

<center>(a)   (b)</center>

Fig. 82: Image sample from Fish92 dataset. Class: Choukya(Ilisha megaloptera)

(a)   (b)

Fig. 83: Image sample from Fish92 dataset. Class: Kukkurish(Cynoglossus lingua)

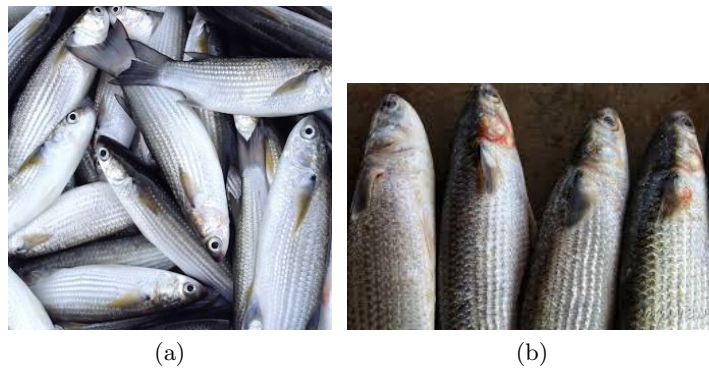(a)   (b)

Fig. 84: Image sample from Fish92 dataset. Class: Parshe(Mugil cephalus)

(a)   (b)

Fig. 85: Image sample from Fish92 dataset. Class: Nuna tangra(Chrysichthys nigrodigitatus)

(a)   (b)

Fig. 86: Image sample from Fish92 dataset. Class: Kata Mach(Siluriformes)

(a)   (b)
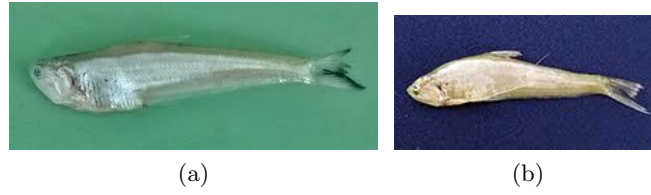
Fig. 87: Image sample from Fish92 dataset. Class: Salo Ichalo(Setipinna phasa)

(a)   (b)

Fig. 88: Image sample from Fish92 dataset. Class: Laupati(Chela cachius)

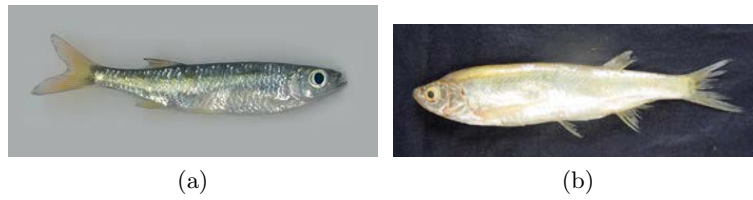(a)   (b)

Fig. 89: Image sample from Fish92 dataset. Class: Selkona(Salmostoma bacaila)

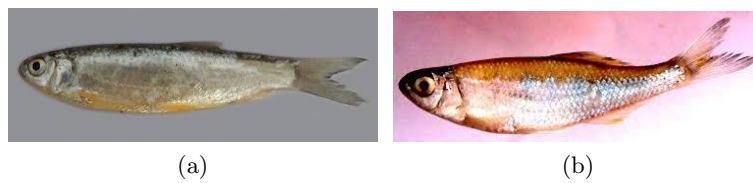(a)   (b)

Fig. 90: Image sample from Fish92 dataset. Class: Mouah(Aspidoparia jaya)

(a)   (b)
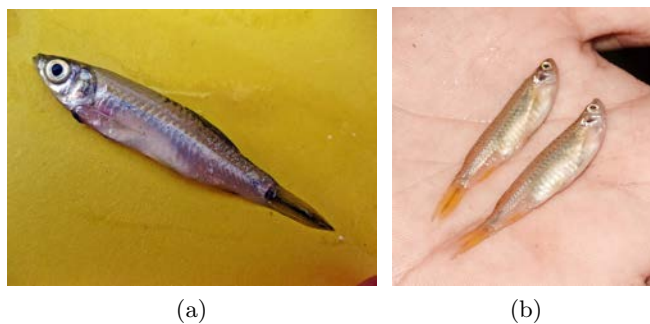
Fig. 91: Image sample from Fish92 dataset. Class: Puti(Puntius chola)

(a)   (b)

Fig. 92: Image sample from Fish92 dataset. Class: Salo Ichalo(Esomus danricus)

(a)   (b)

Fig. 93: Image sample from Fish92 dataset. Class: Laupati(Opsarius barna)

(a)   (b)

Fig. 94: Image sample from Fish92 dataset. Class: Selkona(Amblypharyngodon microlepis)

(a)   (b)

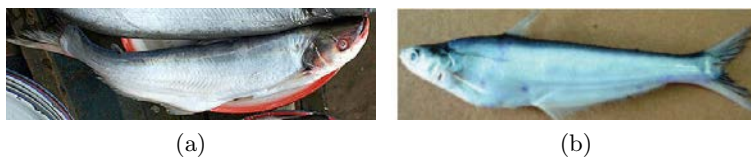Fig. 95: Image sample from Fish92 dataset. Class: Mouah(Silonia silondia)

(a)   (b)

Fig. 96: Image sample from Fish92 dataset. Class: Puti(Toxotes chatareus)