

902005 - VARS Annotation Assistance

Week 52

1. Brian Schlining
 - a. Wrapping up development, testing and integration of the new Sharktopoda 2 video player.
 - i. First release of VARS with Sharktopoda 2 integration is [1.4.0-rc8](#).
 - ii. Setup instructions with VARS are [here](#).

Week 51

1. Duane Edgington
 - a. Continued work on ReID model runs and stress testing
 - b. Exploring AWS Secrets Manager
2. Brian Schlining
 - a. This week has been all about testing and integrating the new Sharktopoda video player.

Week 50

1. Duane Edgington
 - a. Continued work on VAA testing and benchmarking
2. Carlos Rueda
 - a. More ReID training exercises on the DiGiTS-Dev-Box-Fish.

Week 49

1. Kevin Barnard
 - a. Working on automating Deep Sea AI track → VARS annotation load process
2. Carlos Rueda
 - a. Running various ReID training exercises on the DiGiTS-Dev-Box-Fish with (subsets) of the big “315k” dataset. Interesting results but still being gathered and to be discussed with the team.
3. Brian Schlining
 - a. Most of my Brian’s time this week has been running tests and integrating the new Sharktopda video player. Involved repos are:
 - i. [Sharktopoda](#) (private repo)
 - ii. [vars-annotation](#) (feature/sharktopoda2 branch)
 - iii. [vcr4j](#) (develop branch)

Week 48

1. Duane Edgington
 - a. Continuing work on Benchmark training/inference with Danelle and Carlos on ReID network
2. Carlos Rueda
 - a. More good progress with ReID training on our data, now obtaining 86.1% mean average accuracy with the resnet18 model (using 30 epochs for training). Various other models also [evaluated](#).
 - b. Wrote [blaise](#), a Rust implementation of [voc-cropper](#), mainly as a learning exercise but it might actually become a potential alternative especially for when processing larger image datasets for training/testing.
3. Brian Schlining
 - a. Started testing the new Sharktopoda 2 video player. Also starting work on integrating it with VARS for integration testing.

- b. Migrating the code that ingests ML output into VARS from its [own repo](#) into [m3-support](#) to reduce duplicated code across projects.
- c. Updated [m3-registrar](#) to manage issues that occurred while registering videos for VAA Benchmarks.

Week 46

1. Kevin Barnard
 - a. Started investigating automation of Deepsea AI DB tracks → VARS annotation load process
2. Duane Edgington
 - a. Continued work with Danelle and Carlos on Benthic 2017 model training, inference run, and AWS new account setup (quotas and testing)
3. Carlos Rueda
 - a. More progress with ReID training using our image data. On our “crops256” dataset of 10553 images, obtaining mAP 81.2% (30 epochs) with the ‘osnet_x1_0’ model. Now trying some other models for comparison.
4. Brian Schlining
 - a. Continuing to work with Paul Rogers on new video player

Week 45

1. Duane Edgington
 - a. Continued work with Danelle and Carlos
 - b. Made a model using localizations from benthic 2017 benchmark annotations
 - c. Testing model against D232 dive data
2. Carlos Rueda
 - a. Good progress setting up “ReID” to train it with our data, including initial runs with s3://902005-reid-training-test/benthic2017/crops256/. (Using [private clone](#) of the original codebase.)
3. Brian Schlining
 - a. [Integrating image ML endpoint into VARS](#).

Week 44

1. Danelle Cline
 - a. Set up the deepsea-ai python module in our new VAA production subaccount (thanks Kevin G. and Adriana, especially for setting this up!). After patiently waiting for quota to be approved, used this to train the new mbari315K model on an 8 GPU p3.xlarge instance.
 - b. Tested the new mbari315K model on short 1 second videos per the [instructions](#). Fixed a few bugs. Release notes can be found in the [CHANGELOG](#). Duane is doing further testing with some select dives.
2. Duane Edgington
 - a. Work with Danelle and Carlos on new AWS credentials, login, and on VAA tasks.
3. Carlos Rueda
 - a. AWS working session with Danelle and Duane.
 - b. Setting up the ReID code on AWS has proved difficult but I was able to have it in place on my computer, where I’m able to run the training exercises. Thanks Danelle for your assistance. Now looking into understanding the input specs to then train it on our image/video data.
4. Brian Schlining
 - a. Running tests against Paul Roger’s video player project (replacement for Sharktopoda/Cthulu). [#1](#), [#2](#)
 - b. Meets with Paul to discuss video player development

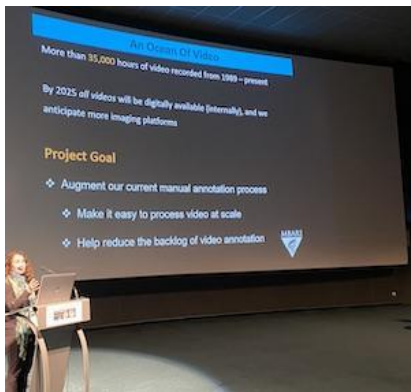
Week 43

1. Kevin Barnard

- a. Wrote API spec for CVision AI FastAPI object detection model server
 - b. Wrote StrongSort to custom visual event conversion script
 - c. Looking into setting up model server proxy service
2. Danelle Cline
- a. Mostly testing in new AWS subaccount (using MBARI login) which gives us better cost reporting and control of our production environment:
 - i. Tested setup and training command in [DeepSeaAI](#) pip module in our new AWS subaccount; data prepared and uploaded, but waiting on quota increase to try full training run on all of the training data (315K localizations) on an 8 GPU instance.
 - ii. CDK object detection and StrongSort tracking pipeline stack deploys ok in new AWS subaccount; added support for more flexible stack config through environment variables.

Week 42

1. Danelle Cline
- a. Working on tutorial on FathomNet object detection training in the [deepsea-ai](#) module
 - b. Presentation on cloud-enabled benthic annotation at the Marine Imaging Workshop; PDF of that is [here](#). This was well received with questions on cost, time, data augmentation efforts, etc.



2. Carlos Rueda
- a. Met with Danelle to discuss ReID and related components in video tracking workflow. She set me up on AWS and entered a description of the task [here](#).
3. Brian Schlining
- a. Investigated [discrepancies](#) between the number of localizations pulled using [m3-download](#) and the number actually in the database. On the off chance that you ever need it, [here's a script to convert Pascal VOC files to a CSV](#).
 - b. Continuing work with Paul Rogers on a [new Sharktopoda video player](#) that integrates Cthulhu localization functions.

Week 39

1. Danelle Cline
- a. MIW22 Presentation finished and dry-run with team (thanks, Kevin, Brian, and Lonny for the good feedback and shared materials!)
 - b. Moved all docker repositories from private to public ECR for use; finally figured out how to run automated github action docker releases. One small step for womankind.
 - c. Fixed [issue 3](#) in strongsort pipeline
 - d. Exploring demo notebook using FathomNet data with deepsea-ai pip module
2. Carlos Rueda
- a. Going through some of the pointers provided by Lonny and Danelle. Quite a learning curve.
3. Brian Schlining
- a. Created [presentation](#) for the Marine Imaging Workshop.

- b. Set up a [public VARS server](#) for interactive sessions at the Marine Imaging Workshop. Working on materials for the interactive session. Also created Windows builds of [VARS Annotation](#) and [jsharktopoda](#) so that researchers can try out VARS during the session. During the setup, Brian has been [tracking issues to resolve](#) as part of next year's "VARS for the masses" project.

Week 38

1. Brian Schlining
 - a. Paul Rogers has accepted the contract to work on the new [Sharktopoda/Cthulhu video player](#). Development has started in a the private repo at [dingosky/Sharktopoda](#)

Week 37

1. Carlos Rueda
 - a. Group mtg. Will look into some pointers provided by Lonny and Danelle related to object detection/tracking.
2. Brian Schlining
 - a. Meetings with freelance developers for work on the [new Sharktopoda video player](#).

Week 35

1. Duane Edgington
 - a. Continued work on Yolov5 and StrongSort tracker.
2. Carlos Rueda
 - a. Group meeting.
3. Brian Schlining
 - a. Starting [search for developers](#) to work on [Sharktopoda 2](#). First developer to be interviewed will be former MBARI-an Paul Rogers!

Week 34

1. Duane Edgington
 - a. Started work on StrongSort tracker. Trying to get it to build on my machine and in SageMaker.

Week 33

1. Duane Edgington
 - a. Work on tracking pipeline
 - b. Preparation for overview presentation and project meeting with video lab staff Aug 17.
2. Carlos Rueda
 - a. Meetings. Awaiting definition of next tasks for me in this project.
3. Brian Schlining
 - a. Updated [docs](#) and [client/server implementations](#) based on the feedback from the team on the spec for the new video player.
 - b. Brian decided that the older Cthulhu spec was not sufficient enough for the new player and has started a new [UI spec](#).
 - c. Addressed frame capture failures on a recent Rachel Carson cruise.
 - d. Group meeting

Week 32

1. Duane Edgington
 - a. Intern Manuel Gozzi meetings. Presentation and final report preparation.
 - b. Continued testing updates to batch processing pipeline

2. Brian Schlining
 - a. Integrated [beholder](#) into the docker stacks in both the [m3-quickstart](#) (for external users) and [m3-microservices](#) for (internal users).
 - b. Completed both the client and server implementations for a new remote video control protocol.
 - i. Issue is tracked at <https://github.com/mbari-org/vcr4j/issues/9>
 - ii. [Updated a video player](#) to use this protocol.
 - iii. "Nearly" [finalized spec](#) has been written.
 - iv. Brian is starting work on getting an external contractor to update [Sharktopoda](#) to use this protocol and to add the new localization features in the spec.

Week 31

1. Danelle Cline
 - a. Finished PR5 <https://bitbucket.org/mbari/vaa-track-pipeline/pull-requests/5> a minor performance improvement to batch process faster.
 - b. Merged PR13 <https://bitbucket.org/mbari/deepsea-ai-backend/pull-requests/13> a series of performance improvements to the CDK stack to speed-up tear up/down. Cloud processing time now at 15-40 minutes per 15 minute video with minimal overhead for spin up/down of EC2 GPU instances.
 - c. No team meeting this week :(
2. Duane Edgington
 - a. Conference call and working session with Ted Zamborsky, AWS, on EFS charges and SageMaker Studio
 - b. Continued work with intern Manuel Gozzi, who presents Weds August 10.
 - c. Continued testing updates to the batch processing pipeline.
3. Brian Schlining
 - a. Created a new microservice, [beholder](#), for capture/caching images from videos. For ML workflows, this allows viewing localizations without having to store/manage thousands of images per video. API docs are at <http://singularity.shore.mbari.org:8088/docs/>
 - b. Integrated beholder with [raziel](#). Switched Raziel from using [Scalatra](#) to [Tapir](#) so that API docs can be automatically generated. API docs are at <http://nexus.shore.mbari.org:8400/docs/>

Week 30

1. Duane Edgington
 - a. Continued work with intern Manuel Gozzi. He is working on final report and presentation.

Week 29

1. Duane Edgington
 - a. Continued work with intern Manuel Gozzi
 - b. Continued work on batch processing testing

Week 28

1. Duane Edgington
 - a. Proposal work
 - b. Continued good progress by intern Manuel Gozzi. He is working in AWS SageMaker Studio with yolov5 and wandb
 - c. Test runs of batch pipeline code planned for next week.
2. Brian Schlining
 - a. [Merged ML generated localizations](#) from a staging database into VARS.

Week 27

1. Danelle Cline
 - a. Intern support
 - b. Added cluster tab to dashboard <http://deepsea-ai.shore.mbari.org/#/clusters> to monitor high-level information about AWS ECR clusters like tasks and queue messages; some other updates to dash to improve track auto playback.
 - c. Improvements to batch processing graceful termination
2. Duane Edgington
 - a. Continuing work with Intern Manuel Gozzi. Great progress!
 - b. Continuing work with Danelle on testing batch processing. Working through a remaining issue.
 - c. 2023 follow-on work discussions with Steve Haddock and Danelle.

Week 26

1. Duane Edgington
 - a. Continued testing and production run of VAA batch processing.
 - b. Continued work with Intern Manuel Gozzi. Great progress.
 - c. Discussed road-map and 2023 potential applications/project work with Steve Haddock.
2. Brian Schlining
 - a. Still working on new [vcr remote control protocol](#). Testing tcp vs udp.
 - b. Modifying [jsharktopoda](#) to use as a test app for the new protocol.
 - c. Worked on loading Benchmark videos into the video asset manager which unearthed a [bug](#) in handling a new use case (videos with the same name but different durations). Working on a fix.

Week 25

1. Duane Edgington
 - a. Continued testing Batch processing pipeline with Danelle.
 - b. Proposal discussions.
2. Carlos Rueda
 - a. Group meeting
 - b. Brian has merged [PR](#) that addresses [this issue](#) in Cthulhu. Thanks Brian.
3. Brian Schlining
 - a. Continuing to work on new vcr/localization remote protocol and reference implementation.
 - b. Attempted to run a merge/sync operation between many localizations staged in a temporary database into the main VARS database. The attempt failed due to a database deadlock from a large SQL query (executed by a researcher). Follow up is waiting on the testing database on Fog to be synchronized with the production database. (It appears that the sync operation hasn't been working for a few months, IS has been notified)

Week 24

1. Danelle Cline
 - a. Batch processing going well. AWS elastic compute cluster is scaling and fine-tuning almost complete.
 - b. Added support for Job deletion and autoloading by user of processed data.
 - c. Added more detail to jupyter notebooks on track database use
 - d. (virtual) team meeting due to COVID
2. Duane Edgington
 - a. Continued testing of the batch processing pipeline.
 - b. Continued work with intern Miguel Gozzi.
 - c. Team meeting via teleconf.
3. Brian Schlining

- a. Working through [merge code](#) to pull ML generated bounding boxes from a staging database into VARS.

Week 23

1. Duane Edgington
 - a. Continued work on testing ECS/SQS batch processing video files with yolov5-deepsort detection and tracking

Week 22

1. Duane Edgington
 - a. Continued project work. Testing new Docker image and production workflow.
 - b. Team meeting 5/31
 - c. Meeting with Intern Manuel Gozzi to develop project plan

Week 21

1. Kevin Barnard
 - a. Several new features/fixes to BoxJelly + Cthulhu
 - i. UI for persistent app settings
 - ii. Track timeline view selection/seeking
 - iii. Cthulhu highlight on track select
 - iv. Read/write deepsea-track artifacts
2. Danelle Cline
 - a. Drafting [jupyter notebooks](#) to help the team with integration/editing against tracks database
 - b. Ongoing work to test micro EC2 auto-scaling CDK stack is going well with short 1-minute video clips processing.
 - c. Zoom call with summer intern Manuel Gozzi
3. Duane Edgington
 - a. Continued work on project assignments
 - b. Weekly Team meeting

Week 20

1. Kevin Barnard
 - a. Implemented several BoxJelly features to prepare for VL introduction
2. Danelle Cline
 - a. Added support for mirrored Titan prefixes with unique ISO tags in processing workflow S3 buckets. Testing looks good on that.
 - b. Moved YOLOv5 detection-tracking docker image to docker hub instead of ECR; added linux/amd64 and linux/arm64 builds.
 - c. Testing batch CDK stack. Working through issues with IAM, but expect this work to be finished soon.
 - d. Finished up ansible deployment of [deepsea-ai](#) stack.
3. Duane Edgington
 - a. Continued project work.
 - b. Weekly team meeting.
4. Brian Schlining
 - a. Running analysis comparing human annotations to ML annotations.
<https://github.com/mbari-org/vaa-track-analysis>

Week 19

1. Kevin Barnard

- a. Completed BoxJelly/Cthulhu integration
2. Danelle Cline
 - a. Automated deployment of backend/frontend code using Ansible now in place.
 - b. Working on adding supporting code for batch processing to the Dockerized deployment of the video processing pipeline
3. Duane Edgington
 - a. Continue VAA project work. Updates to inference script processor.
4. Carlos Rueda
 - a. Group meeting.
5. Brian Schlining
 - a. Working on analysis comparing ML annotations to human annotations
 - i. Analysis notebooks at <https://github.com/mbari-org/vaa-track-analysis>
 - ii. Testing boxjelly with V4244 ML output to cleanup data for analysis.
 - iii. Updated [Cthulhu](#) to run on M1 macs for testing with box jelly
 - b. Working on abstract for [2022 Marine Imaging Workshop](#)

Week 18

1. Kevin Barnard
 - a. Worked with Carlos R. on BoxJelly/Cthulhu setup
2. Duane Edgington
 - a. Project work.
 - b. Team discussed 2023 project trajectory (902005 ends in 2022)
3. Carlos Rueda
 - a. Did adjustments in Cthulhu that seem to help with the issue of “disappearing boxes” during playback. A screencast (captured with Camtasia) doesn’t really reflect the improvement, so, hoping others can give it a try from this [branch](#). Also fixed a subtle issue exposed during rewind.
4. Brian Schlining
 - a. Working on analysis comparing ML output with human annotations

Week 17

1. Kevin Barnard
 - a. Continued to polish BoxJelly + Cthulhu integration
2. Danelle Cline
 - a. Tracking pipeline benchmarking and optimization with Duane. Current MOTA is ~53%. Need more fully annotated videos to measure accurately. BoxJelly is a potential tool for this.
 - b. Syslog setup on production server deepsea-ai to start logging dashboard and database API use.
 - c. Fix issues with postgres after sql server migration to M3_TRACKS database broke a few things. Improved handling of AWS security keys and S3 track data sync/loads.
 - d. Next steps are to return the batch processing, inserting the optimized tracking docker container into the elastic EC2 pool that I paused on to focus on database migration.
3. Carlos Rueda
 - a. Set up BoxJelly+Cthulhu as a means to reproduce Cthulhu issues. Many thanks Kevin B. for the great assistance.
4. Brian Schlining
 - a. Working on [Sharktopoda's](#) communication specifications to integrate [Cthulhu's](#) localization functions and remove dependencies on ZeroMQ. We'll use this spec to contract the development of an updated Sharktopoda video player that supports localizations on video. Once the spec is done, Brian will create [a test client and server](#) for testing new development. The video lab hopes to contract out development of the new video player ASAP.

Week 16

1. Kevin Barnard
 - a. BoxJelly/Cthulhu integration now working; still needs polishing before release
2. Duane Edgington
 - a. Continued runs of AWS sagemaker processing jobs to nail down parameters, ENV variables, instance types, performance, cost. Reproduce Lonny colab results in AWS.
3. Carlos Rueda
 - a. Group meeting.
 - b. Looking into reproducing the Cthulhu box display issue to hopefully start diagnosing it.

Week 15

1. Kevin Barnard
 - a. Continued investigating slow video playback on MacOS
2. Duane Edgington
 - a. Completed deepsortyolotracking model sweep.
 - b. Preparing for summer intern.

Week 14

1. Kevin Barnard
 - a. Investigated alternative Qt-compatible video decoder plugins/playback frameworks
2. Duane Edgington
 - a. Parameter sweeps and model variant runs of deepsortyolov5 against fully annotated benthic transect video analyzed by Linda Kuhnz and intern Peyton Lee in 2020.

Week 13

1. Duane Edgington
 - a. Testing deepsort-yolov5-tracker continues. Ran Benchmark video from our summer intern 2020 Peyton Lee. Next step is to compare tracker performance with his hand-annotation results, and to prepare sweeps with different parameter settings.

Week 12

1. Kevin Barnard
 - a. Looked into ReID/OSNet training
2. Duane Edgington
 - a. Lots of testing and refinement of processing job script and docker image. Testing fix from maintainer for "t5" bug in deepsort-yolov5-tracker

Week 11

1. Kevin Barnard
 - a. Ran several trial detection+tracking jobs on AWS SageMaker to tease out any differences in output between deepsort-yolov5 codebase versions
2. Duane Edgington
 - a. Worked on refinement of processing job script for early production use, and build of deepsort-yolov5-tracker docker image for debugging. Both were released to the team after testing.
3. Carlos Rueda
 - a. Now looking into Cthulhu issues.
4. Brian Schlining
 - a. [Ported Danelle's event tracks DB schema from Postgresql to SQL Server](#)

- b. Putting together a system diagram.
- c. [Investigating issues with visualization of ML output](#) in [Cthulhu](#). Carlos will be picking that up.

Week 10

1. Kevin Barnard
 - a. Ran comparisons between several modes of ML inference to check for differences in data products
 - i. YOLOv5 detect.py with/without –agnostic-nms (agnostic non-maximum suppression)
 - ii. PyTorch Hub model backbone vs. YOLOv5 codebase
2. Duane Edgington
 - a. Team working session March 3. Released python command line script to initiate AWS SageMaker processing jobs of deepsort-yolov5 detect and track model against M3 videos uploaded to AWS S3. Script updated to add upload from Titan M3 directly to S3, and to upload from Titan M3 and Process in one command line. Installation procedure and running tested by team.
3. Carlos Rueda
 - a. Set up dev environment for the DeepSeaAI Dashboard (thanks, Danelle).
4. Brian Schlining
 - a. Worked on porting the [deepsea-ai-backend](#) from postgresql to SQL server so we can run on our production database. Port is stalled as Prisma seems to require writing to the master database on the server. Looking for a workaround.
 - b. Gamed out alternative database designs for deepsea-ai backend.
 - c. Added a [script to load Yolo output into Cthulhu](#) to visualize localizations.
 - d. Team was able to process a dive using an ML pipeline. Reviewing the output.

Week 9

1. Duane Edgington
 - a. Explored CDK and Lambda for project work
 - b. Team meeting March 1
 - c. AWS ProServe meeting March 2.
 - d. Working session planned for March 3 afternoon. Preparing for that working session.
2. Carlos Rueda
 - a. Met Danelle to discuss possible tasks in the context of the dashboard she has put together.
3. Brian Schlining
 - a. Investigating porting [deepsea-ai database](#) from Postgresql to SQL Server.

Week 8

1. Duane Edgington
 - a. Reviewing AWS VPC for work on pipelines.

Week 7

1. Duane Edgington
 - a. Team meeting Feb 15. Focus on the processing pipeline.

Week 6

1. Kevin Barnard
 - a. Met with team for internal project updates on production workflow, detect+track experiments, BoxJelly status
2. Duane Edgington
 - a. Continuing deepsort test runs.

- b. Very useful meeting the AWS ProServe team Feb 8 on cloud formation tools (a way to build a processing pipeline). Reading about the Cloud Development Kit (CDK) and how to write code to configure cloud resources.

Week 5

1. Danelle Cline
 - a. Working on infrastructure roll-out and back-end deployment
 - b. Finished dockerized deepsort tracker which the team is testing
 - c. So far so good. Hoping to have bulk batch testing finished next week.
2. Duane Edgington
 - a. Ran cpu-based instance tests with battery of video files using CSRT detect-track pipeline
 - b. Running gpu-based instance tests of battery of video files using new Deep-sort detect-track pipeline. So far so good (one bug in the underlying algo implementation found – Kevin B. has identified a fix from the maintainers).

Week 4

1. Duane Edgington
 - a. Project meeting Jan 20
 - b. Running tracking tests 2K, 4K videos, CPU-only instances
 - c. Discussions on architecture and 2022 plans and goals
 - d. Teleconference with AWS Proserve team regarding automation and scaling
 - e. Built m3-quickstart on my workstation

Week 3

1. Kevin Barnard
 - a. Met with Danelle and Duane to review ML object track proposals in new web dashboard and BoxJelly
2. Danelle Cline
 - a. Pushing hard to get a webapp up and running on deepsea-ai. This will be our ML dashboard with models, processing jobs, etc. all in one place. Vue3 front-end and postgres db backend design. Hope to get some help from Carlos to take it further.
 - b. Finished bulk loader to quickly load machine results to summarize and manage the job data and experimental tests.
 - c. A preview of the machine generating tracks in BoxJelly look promising!
 - d. Planned discussion with AWS ProServe team next week
3. Duane Edgington
 - a. Spinning up work on testing of Yolov5 detections/tracking with updated processing image and tracking parameters
 - b. Reading up on Apache airflow...
4. Carlos Rueda
 - a. Kick-off meeting.

Week 2

1. Kevin Barnard
 - a. Finished implementation of track split, batch rename, and merge features in BoxJelly

Week 1

1. Kevin Barnard
 - a. Implemented several track editing features in BoxJelly

- b. Figured out CloudWatch log insights for visualizing logged time series data in the AWS console
- 2. Duane Edgington
 - a. Continuing work on VAA testing with Danelle and Kevin B.