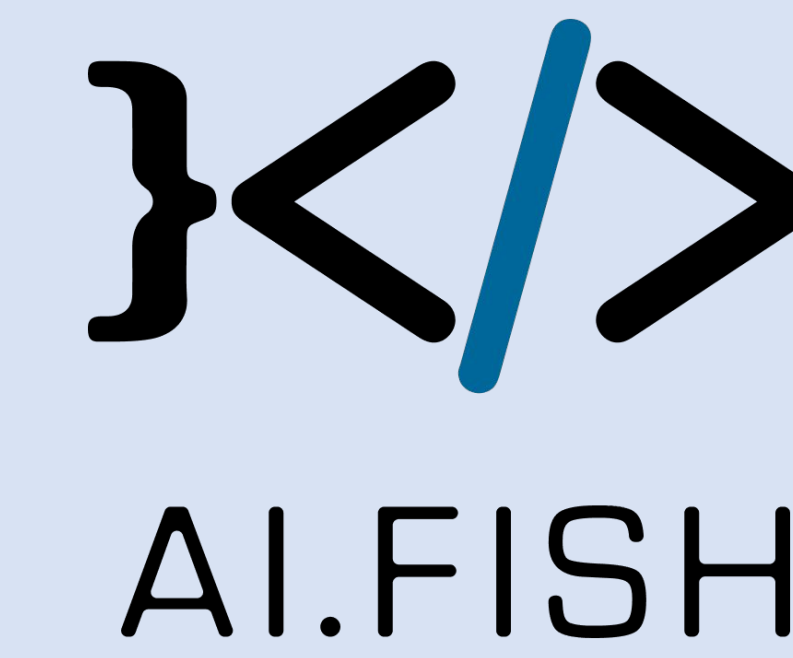


# Computer Vision Dataset Management at Scale

Winston Co, Jayden Tactay, Wilson Tran

Sponsor: Jimmy Freese, Ai.Fish

ICS 496 Capstone Project – Spring 2024



## Introduction

Ai.Fish is a private company focused on the application of computer vision systems to ocean conservation and sustainable fishing issues. Their computer vision models are able to detect, classify, and track various fishing activity; however, these models require extensive photograph and video data during training, necessitating the facilitated management of these large datasets. More specifically, the project called for:

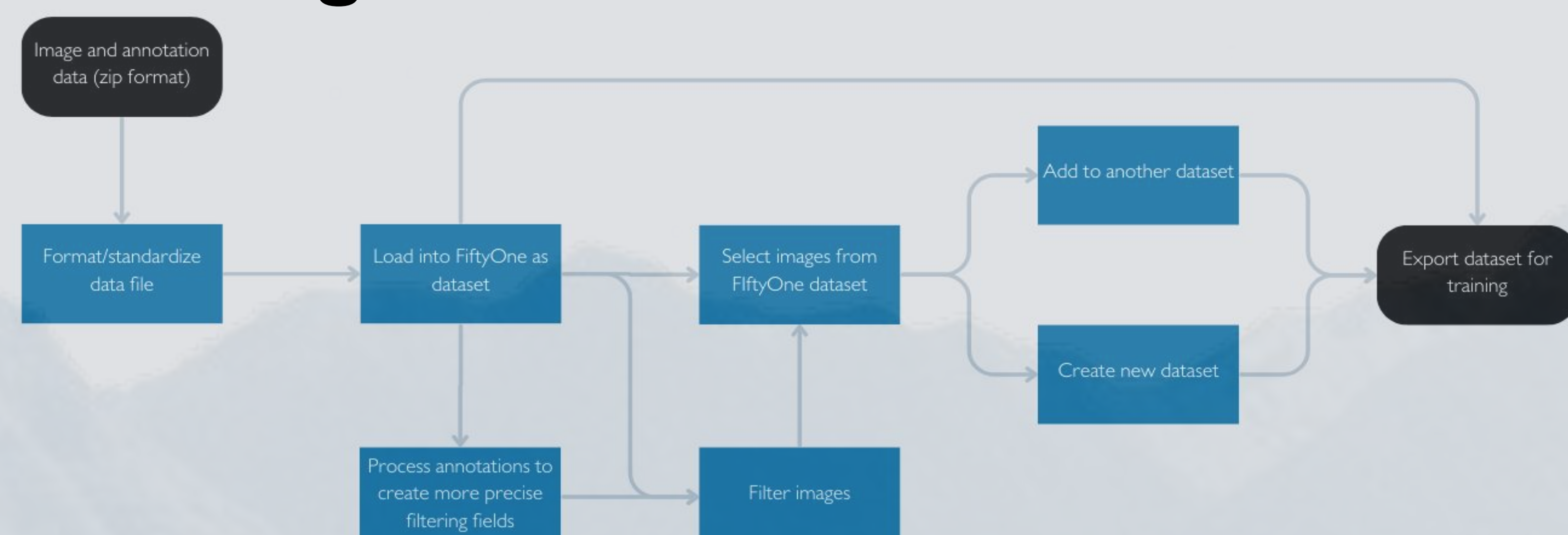
- Automated overlaying of annotations over images
- Standardized data formatting and import/export
- Enhanced filtering through specific metadata and object hierarchies
  - Metadata extraction from standardized data files
- Improved data labeling
- Assembly and retrieval of data subsets for training

## Solution

FiftyOne, an open source library for datasets and computer vision tasks, provided some of the desired functionality with its base features, such as annotation overlaying, image labeling capabilities, and data import/export. FiftyOne also supports the development of Python and JavaScript plugins for additional functionality:

- Large-scale dataset loading
- Efficient data labeling
  - Annotation parser that creates easily queryable labels
- Dataset management
  - Assembly from selected images/addition to existing datasets
  - Retrieval of stored datasets
- Data formatting for integration with final product
  - Standardization of imported data for parsing and labeling

## Workflow diagram



## Methodology

- Agile project development
- Weekly meetings with sponsor and team members
  - Frequent communication with sponsor and team through Discord and Slack
- Team roles:
  - Wilson - communications lead, requirements lead
  - Jayden - meeting scribe, test lead
  - Winston - technical lead

## Challenges

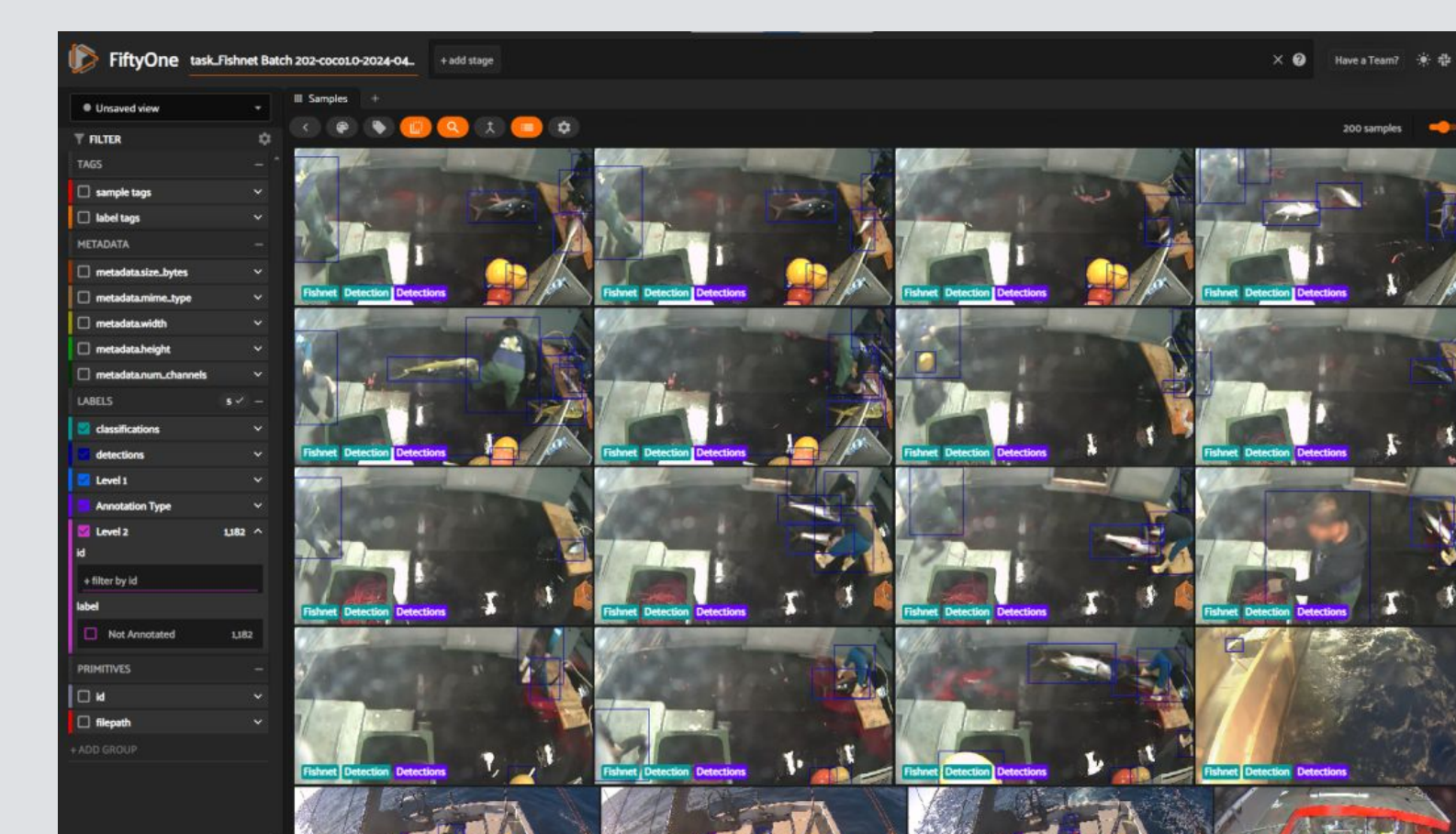
- Inexperience with commercial projects
- Unfamiliarity with FiftyOne and Python development
- Complicated/vague documentation
- Adapting to the existing workflow of a team in an unfamiliar field
- Unclear project direction/end goal

## Technology Stack

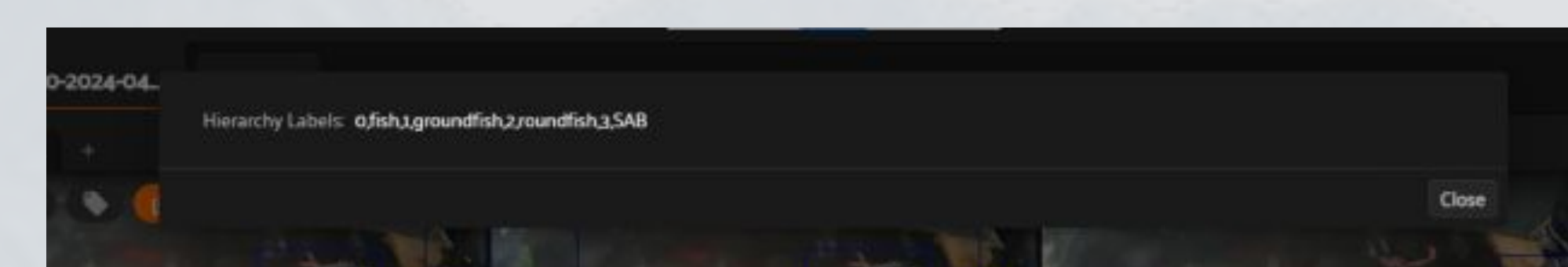


## Learnings

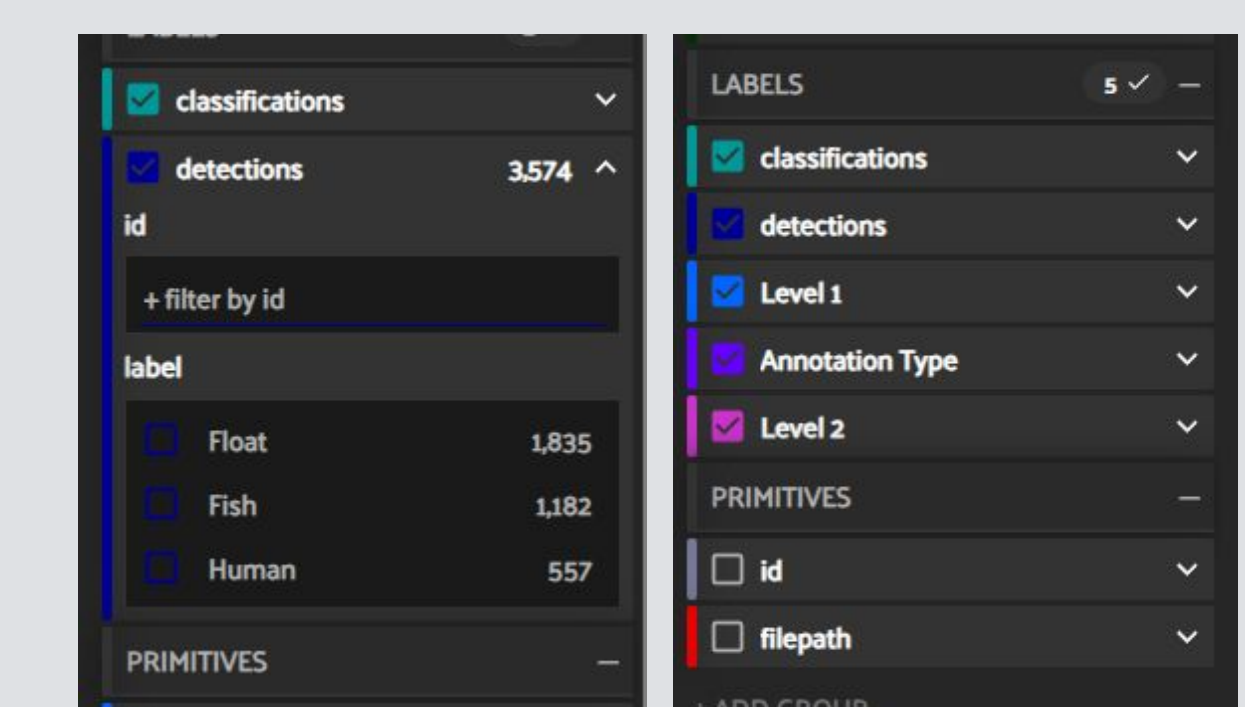
- Improved client communication skills
- Increased proficiency in Python
- Improved documentation reading ability
- Appreciation for setting standards early on to mitigate future mishaps



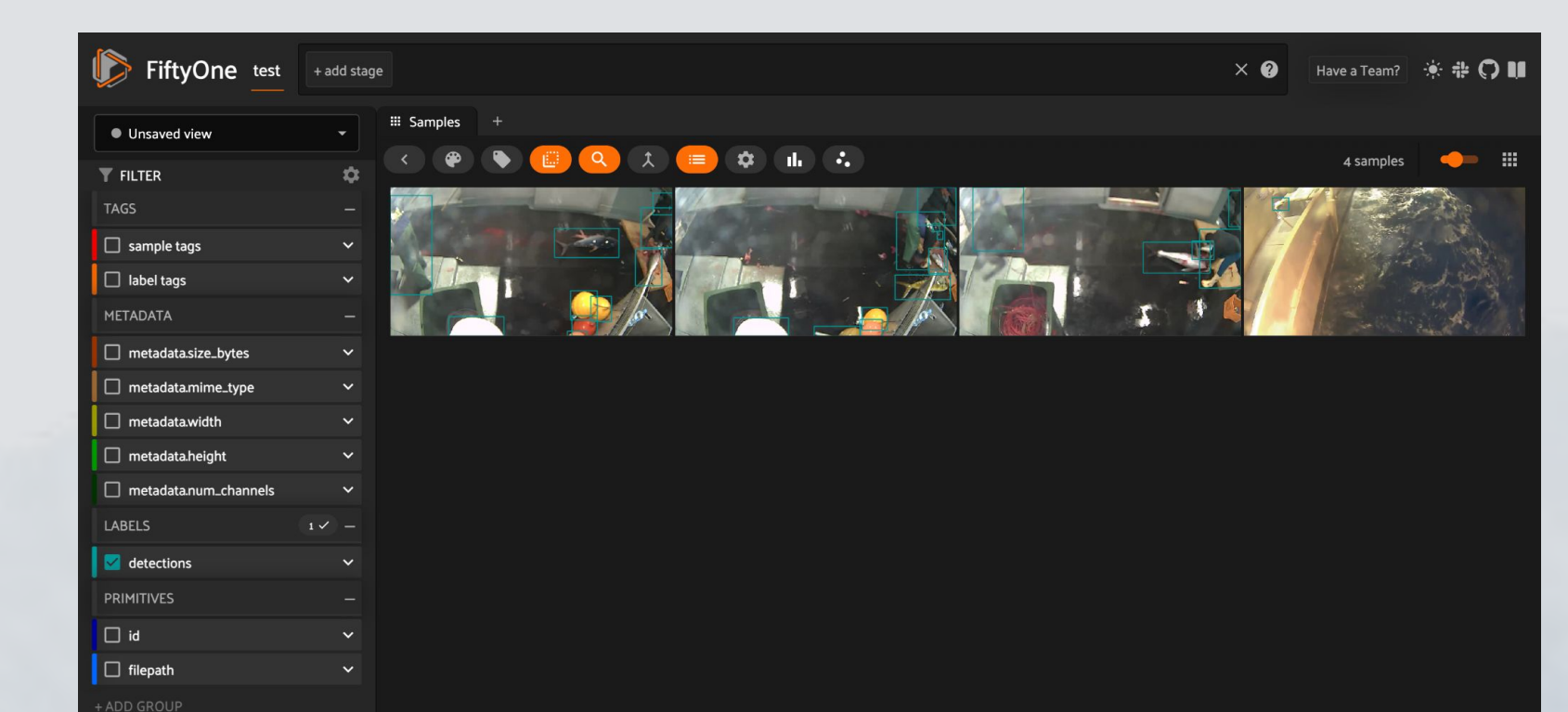
Data annotation labeling



Label hierarchy



Advanced filtering criteria



New dataset from existing images