SegBuilder: Semi-automatic Annotation for Semantic Segmentation

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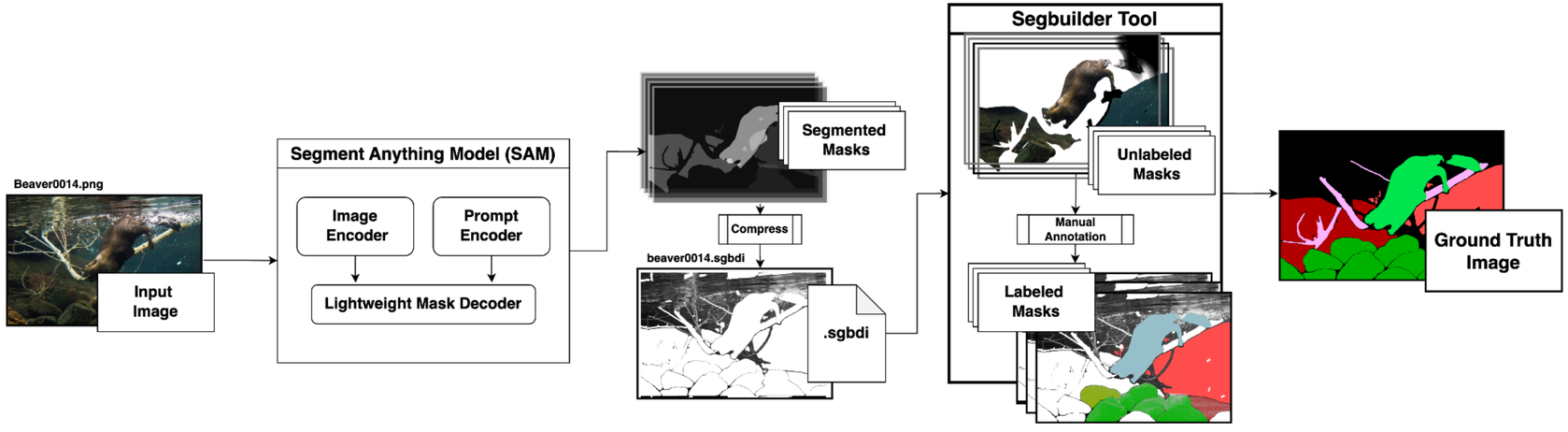
Motivation

- The goal of semantic segmentation is to find labels for every pixel in an image.
- Sufficiently amount of pixel-level image annotation data plays a crucial role in training deep neural network models for semantic segmentation task.
- Manual image annotation using tools such as Label Studio faces scalability challenges as the process is time-consuming, labor-intensive, and requires user expertise.

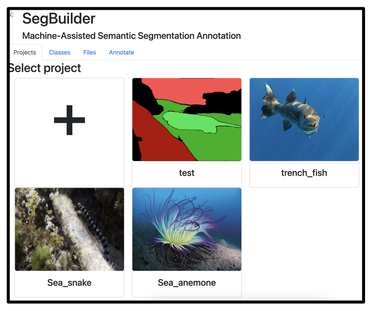
SegBuilder Framework

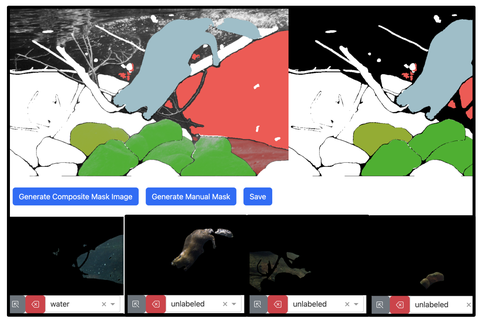
- We propose a semi-automatic tool called SegBuilder that addresses the efficiency concern of manual annotation.
- SegBuilder simplifies the process by using a vision-foundation model like **Segment Anything Model (SAM)**, to create object masks. This solution is quicker, requires less labor, and is more cost-effective than current tools.

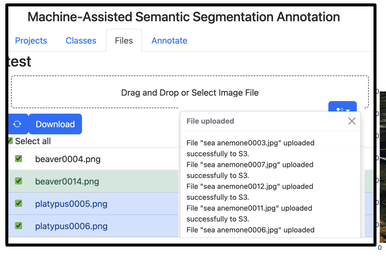
Semi-Automatic Pixel-Level Annotation Process using SegBuilder

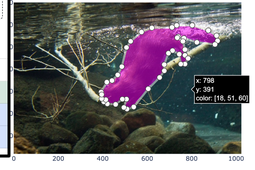


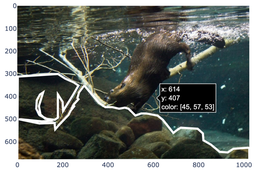
SegBuilder Interface





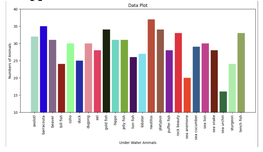


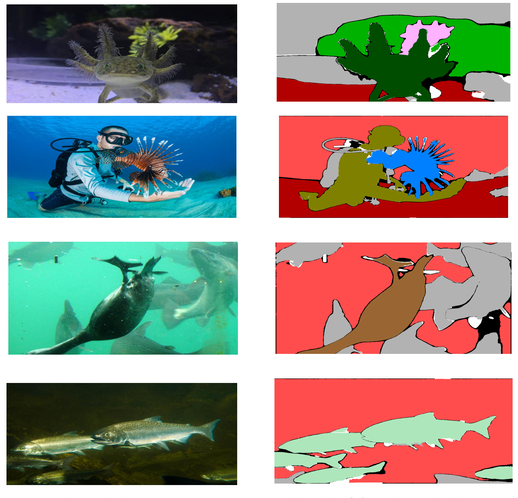




Annotation Results

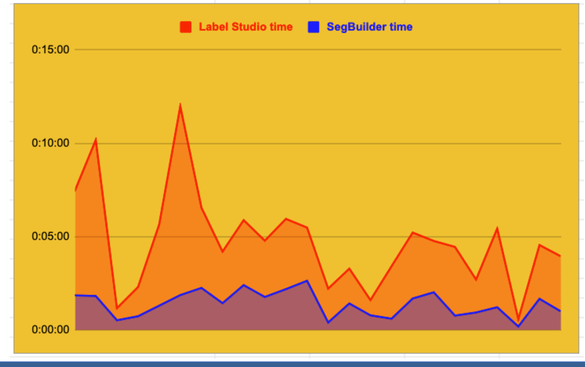
- We are releasing a new dataset **UWS-v2** consisting of images for 24 new animal categories complementing our existing underwater segmentation dataset introduced in [2].





Tool Comparison: SegBuilder vs. Manual

- We annotated sample images from 24 animal categories to test the efficiency of our framework. We compared the timings with those of the existing publicly available annotation tool, Label Studio [1].
- SegBuilder achieved significantly faster annotation speeds, as demonstrated in the graph.



Future Work

- The semi-automatically annotated images will be used to train deep neural network based semantic segmentation models.
- We will be publicly releasing our dataset with our tool to the computer vision and robotics research community.

References

1. Label Studio: https://labelstud.io
2. I. Kabir, S. Shaurya, V. Maigur, N. Thakurdesai, M. Latnekar, M. Raunak, D. Crandall, and M. Reza, “Few-shot segmentation and Semantic Segmentation for Underwater Imagery” - International Conference on Intelligent Robots and Systems (IROS’23)
3. A. Kirillov, E. Mintun, N. Ravi, H. Mao, C. Rolland, L. Gustafson, T. Xiao, S. Whitehead, A. Berg, W. Lo, P. Doll'ar, and R. Girshick, “Segment Anything” - arXiv’2023