

#### Motivation

- Image annotation is essential for training semantic segmentation models, but manual annotation is time-consuming and prone to errors.
- Automated tools have improved efficiency, but they can struggle with complex images and may require user input.

### SegBuilder Tool

- Utilizing automatically generated mask from SAM, our tool SegBuilder offers a solution that is less time-consuming and labor-intensive compared to existing tools.
- **SegBuidler** enables the integration of SAM while simultaneously providing functionality to correct and refine the segmentation annotations.
- Using the zero-shot capabilities of SAM, SegBuilder creates useful segments that human annotators can further tag using a drop-down list.





## **SegBuilder:** A Semi-automatic Annotation Tool for Segmentation Md Alimoor Reza, Eric Manley, Sean Chen, Sameer Chaudhary, Jacob Elafros

### Drake University

#### UWSv2: New Animal-Centric Underwater Dataset

• By adding more diversity, we introduced a new dataset of 635 images with by adding 21 new underwater animal categories, including various fish species like goldfish and jellyfish, as well as animals like beavers and lobsters along with 8 background categories such as coral and sand.





### SegBuilder for Camouflage and Shadow Scenes

- SAM excels in general image segmentation but struggles with camouflage and shadows.
- We tested it with 13 shadow images and 11 camouflage images from the database. Our SegBuilder allows manual adjustments, addressing SAM's limitations and ensuring more accurate, high-quality segmentation.

#### References

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)

dense pixelwise annotations using SegBuilder, enhancing the UWS dataset<sup>2</sup>

RGB

SegBuilder





- and pose estimation.
- segmentation.

#### Evaluated efficiency using 23 randomly selected animal images comparing it to Label Studio.

 Four in-house annotators participated, SegBuilder is 🛱 abou 3.34 times faster than Label Studio<sup>1</sup> in segmentation annotations.

the UWSv2 dataset.

Model	Class Names										
	Sea Anemone	Sea Urchin	Coral	Rock	Water	Sand	Plant	Human	Reef	Other	Beaver
HRNetV2 [34]	0.7456	0.2799	0.0000	0.3085	0.7933	0.4409	0.3277	0.4157	0.4502	0.0794	0.7796
	Duck	Dugong	Hippo	Lobster	Platypus	Nautilus	Sea Cucumber	Sea Lion	Sea Snake	Barracouta	Billfish
HRNetV2 [34]	0.6061	0.8479	0.7757	0.8587	0.7377	0.9222	0.5058	0.6634	0.7358	0.7945	0.7692
	Coho	Eel	Goldfish	Jellyfish	Lionfish	Puffer	<b>Rock Beauty</b>	Sturgeon	Tench		mIoU
HRNetV2 [34]	0.8233	0.5877	0.7133	0.8382	0.9234	0.6311	0.5132	0.7360	0.7847		0.6254





Object part segmentation is essential for tasks like object classification

• Tested SegBuilder with 11 super-category containing 48 total images. SAM struggles with precise part identification, in contrast, SegBuilder excels in editable annotations, making it a robust tool for accurate part

#### SegBuilder vs. LabelStudio<sup>1</sup>



#### **Semantic Segmentation Evaluation on UWSv2**

# Trained the HRNetV2 model using SegBuilder-annotated images from