

# APPLYING SEGMENT ANYTHING MODEL FOR THREE-STAGE SEGMENT-BASED GRAY-SCALE IMAGE COLORIZATION

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## What ?

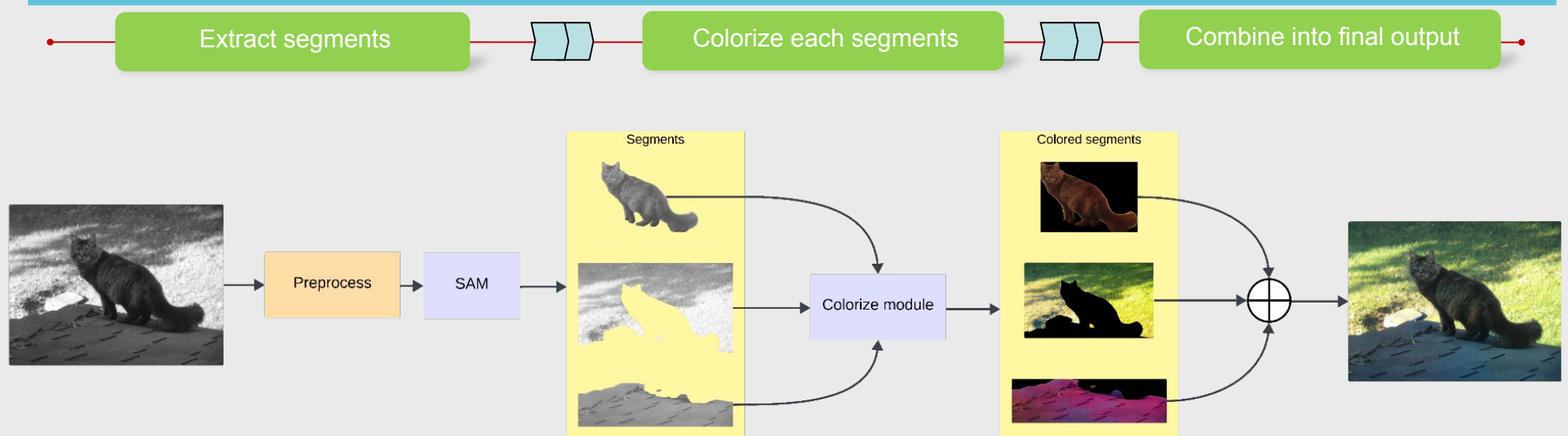
We introduce new approach to colorize grayscale images:

- Proposed a pipeline to extract segments in grayscale images, color these segments and combine into output image with realistic color.
- Evaluated the pipeline performance on several benchmark and compare with existing methods.

## Why ?

- Segments are the cornerstone of an image and provide useful information if harnessed correctly. Existing methods mainly focused on pixels and the correlation between them and the whole image or local context but within a **fixed** area rather than a dynamic one.
- With the recent advance in segmentation methods (typically SAM), extracting segments can now be performed easily and therefore made this approach more viable.

## Overview



## Description

### 1. Extract segments

- We propose the **Segment Anything Model** for this stage for its robustness and computational efficiency.
- Define a maximum number of segments in order not to over-segmentation, leaving the pipeline with details too fine-grained to contain any useful information.

### 2. Colorize module

- We compare vision models with performance, speed and lightweight-ness as criteria.
- Select best models to experiment as implementation for this module.
- As of the aforementioned criteria, **Stable Diffusion** is a viable candidate.

### 3. Combine module

- This module is responsible for combining colored segments into the final result.
- We propose using a simple method (image matrix adding as one). However, this is an important component and will be experimented with more advanced methods

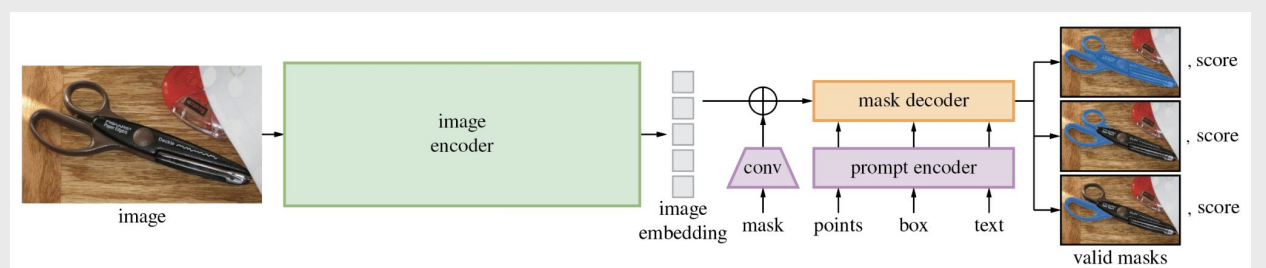


Figure 1 . Segment Anything Model

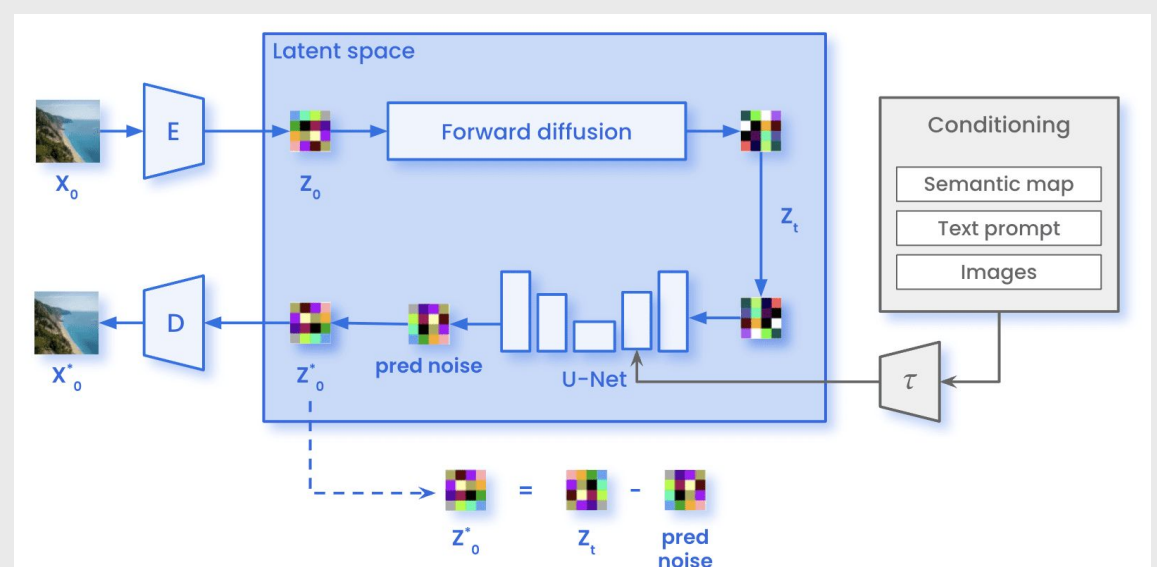


Figure 2 . Stable Diffusion model.