CRCV REU 2025

Syn Nguyen

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CIFAR100 dataset, and keras classification





01. About Me

Education:

- California State University, Long Beach
- Major: Computer Science
- Concentration: Artificial Intelligence
- Rising senior

Prior Coursework:

- Linear Algebra
- Data Structure
- Discrete Structure
- Artificial Intelligence

Computer Vision Experience:

- Hackathon winner using CNN, LSTM
- AI4ALL fellowship
- Research in Deep Learning

02

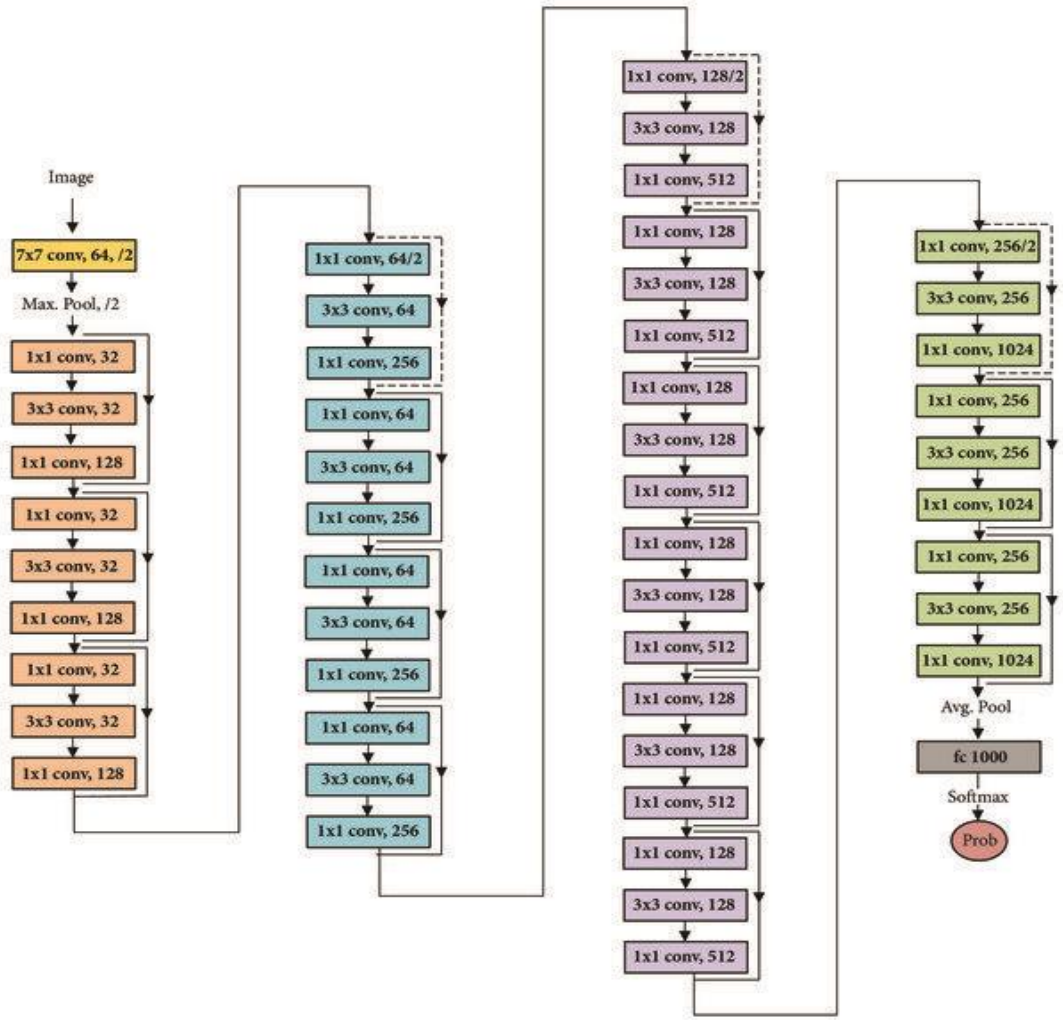
Assignment 1

Transfer Learning with Resnet on CIFAR100

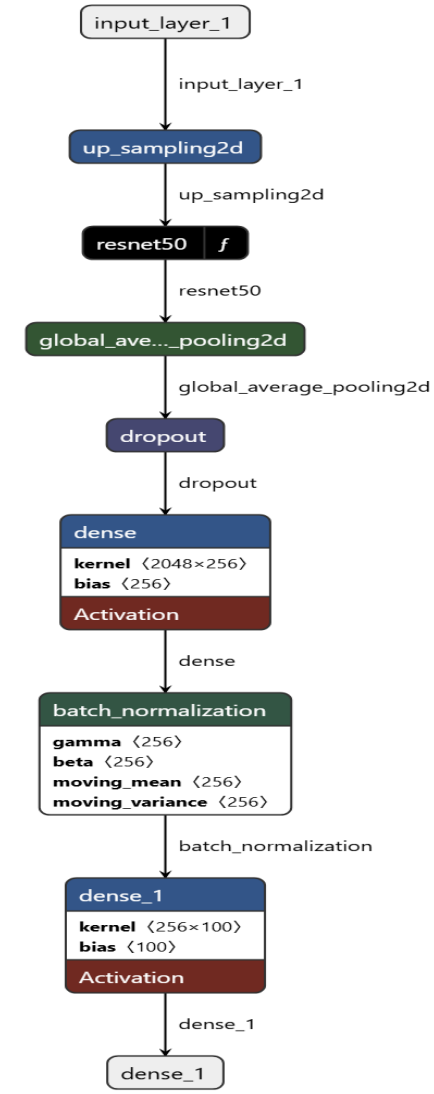


Transfer learning with Resnet50

Resnet50

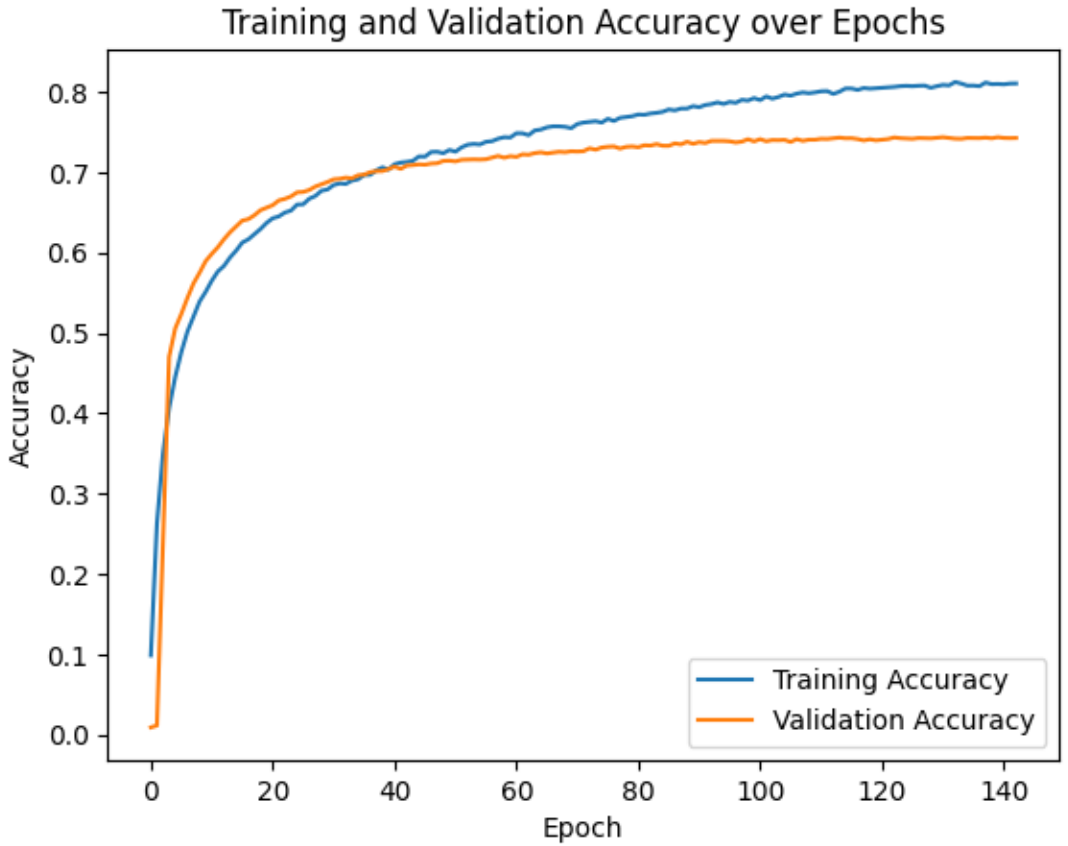


Fully Connected Model



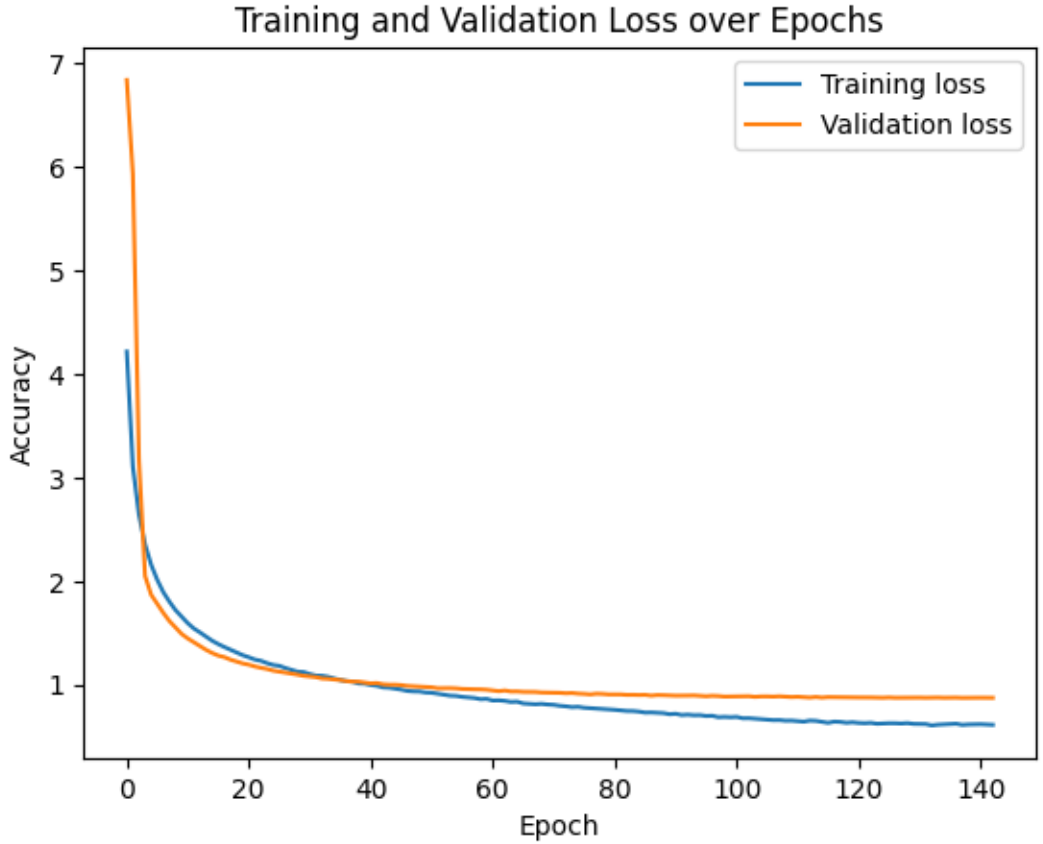
Results

Validation Accuracy



Test accuracy: 74%

Validation Loss



03

Project Overview

SAM 2 for Video Medical Segmentation



Related Work

Segment Anything Model

- SAM
  - A foundation model for image segmentation
  - Trained on 11M images with 1.1B masks
- SAM 2
  - A foundation model for image + video segmentation
  - Trained on 11M images with 11B masks
- MedSam 2
  - A medical foundation model for image + video segmentation
  - Trained on 530K + video frames

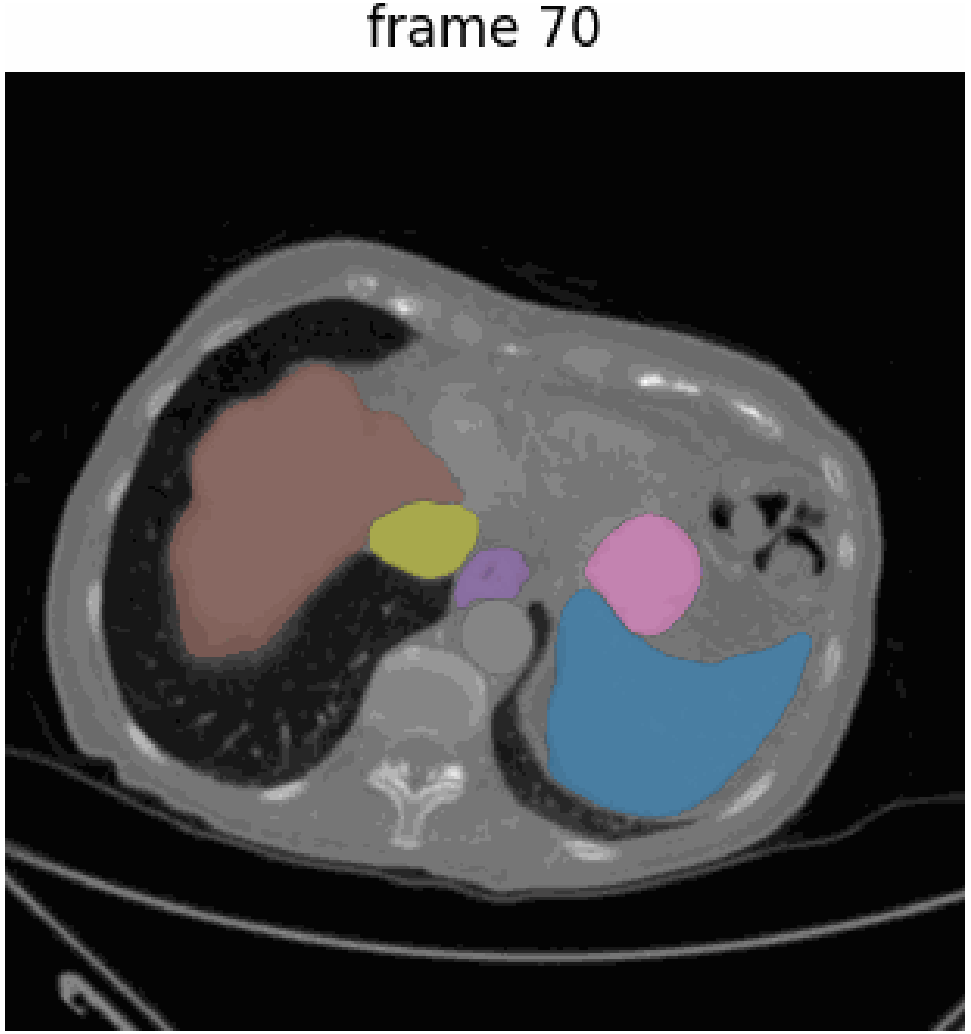
Problem

- SAM
  - No temporal awareness
  - Require prompts
  - Require external tracker
- SAM 2
  - Require prompts
  - No category awareness
  - Perform poorly on Medical dataset (60%)
- SAM 2
  - Require at least one prompt
  - No category awareness

SAM 2 Demo



Med SAM 2 Demo



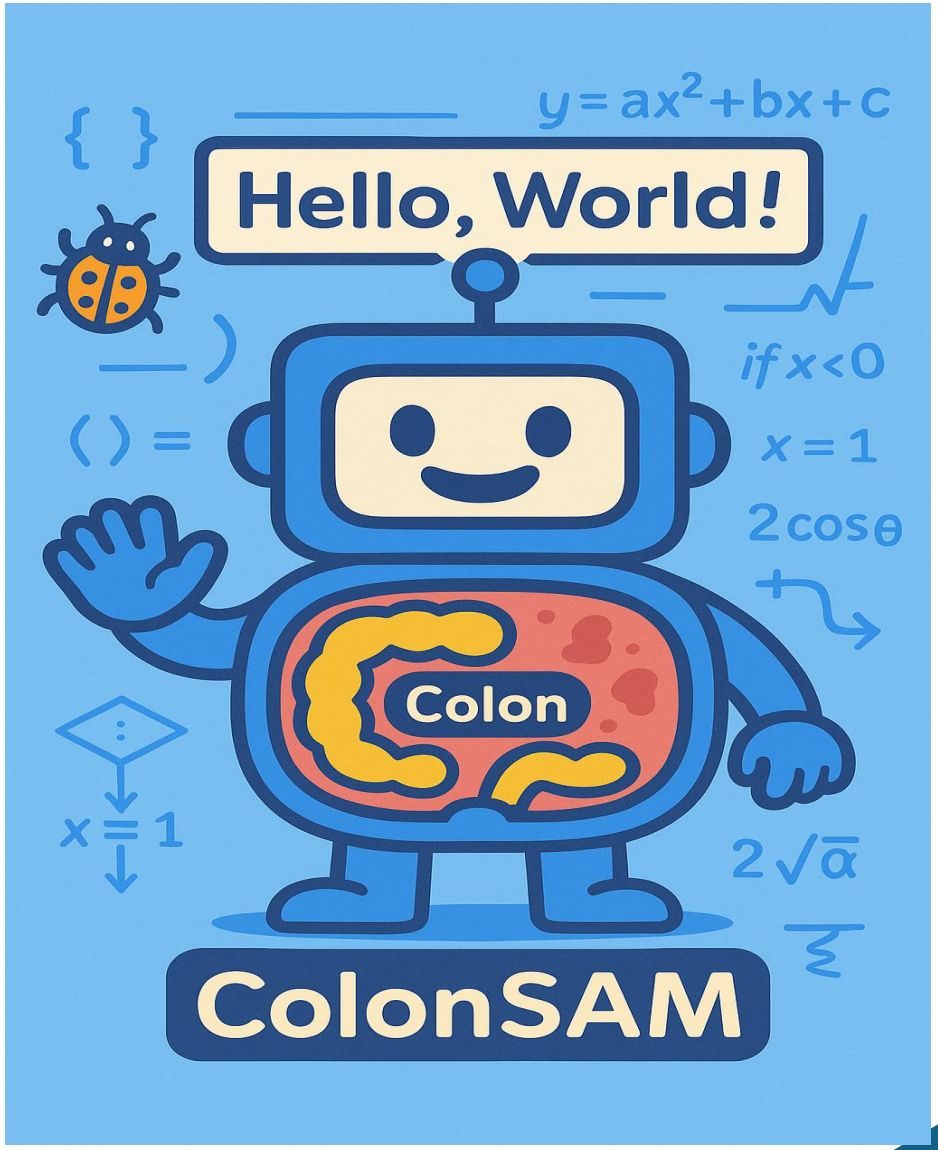
ColonSAM 2

What is it?

A universal prompt free segmentation model.

Goal

- ❑ Automatically labels masks in medical media (CT, MRI, X-Ray, etc):
  - No prompt
  - Semantic awareness
- ❑ Achieve state of the art in Tumor/Polyp detection.



Weekly Plan

Week 1-2

- Read papers about SAM2, CLIP-SAM, MedSAM2
- Replicate results from MedSAM2 paper

Week 3-4

- Read papers about universal prompt free segmentation model
- Implement code and algorithm

Week 5-

TBA

What I have done

- Read papers about SAM, SAM2, MedSAM2
- Setup environment/codespace for MedSAM2 training

References

Kirillov, Alexander, et al. *Segment Anything*. 2023. arXiv, https://arxiv.org/abs/2304.02643.

Ravi, Nikhila, et al. *SAM 2: Segment Anything in Images and Videos*. 2024. arXiv, https://arxiv.org/abs/2408.00714.

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Ji, Ge-Peng, et al. "Video Polyp Segmentation: A Deep Learning Perspective." *Machine Intelligence Research*, vol. 19, no. 6, Nov. 2022, pp. 531–549. Springer Science and Business Media LLC, https://doi.org/10.1007/s11633-022-1371-y.

Chen, Zhen, et al. *UN-SAM: Universal Prompt-Free Segmentation for Generalized Nuclei Images*. 2024. arXiv, https://arxiv.org/abs/2402.16663.

THANK YOU!

