

MELANOMA SEGMENTATION WITH DENSENET

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Abstract

The significance of cancer detection at an early stage makes it more treatable and increases the individual's chance of survival. Deep Convolutional Neural Networks and Dense Networks provide state-of-the-art performance of image segmentation, detection, and classification. The expansion of the public dataset offers scope for the extension of the research to aim for more accurate and robust models.

Introduction

- Melanoma is highly prevailing Skin cancer. The mortality rate is inclining every year.
- Competitions such as International Skin Imaging Collaboration (ISIC) are conducted for detection of Melanoma with growing significance of delivering Deep Learning driven solutions.
- The dermoscopic image diagnosis offers only 84% accuracy.
- In this project we are aiming for segmentation of Skin lesions using the DenseNet model.
- We followed the previous work using the models like U-Net and R2UNet used for the segmentation.

Dataset

- Dataset used is the ISIC 2017 dermoscopic images and the corresponding ground truth.
- Training samples has 2000, with 150 validation and 600 testing images.

Methodology

- Our model has 5-layer Dense Block with a growth rate of $k=16$. Each layer takes all the preceding feature-maps as inputs.
- We have tried DenseNet architectures for solving the Task1 challenge of ISIC which is Skin lesion segmentation.
- Then we have compared both the DenseNet and the U-Net segmentation results.

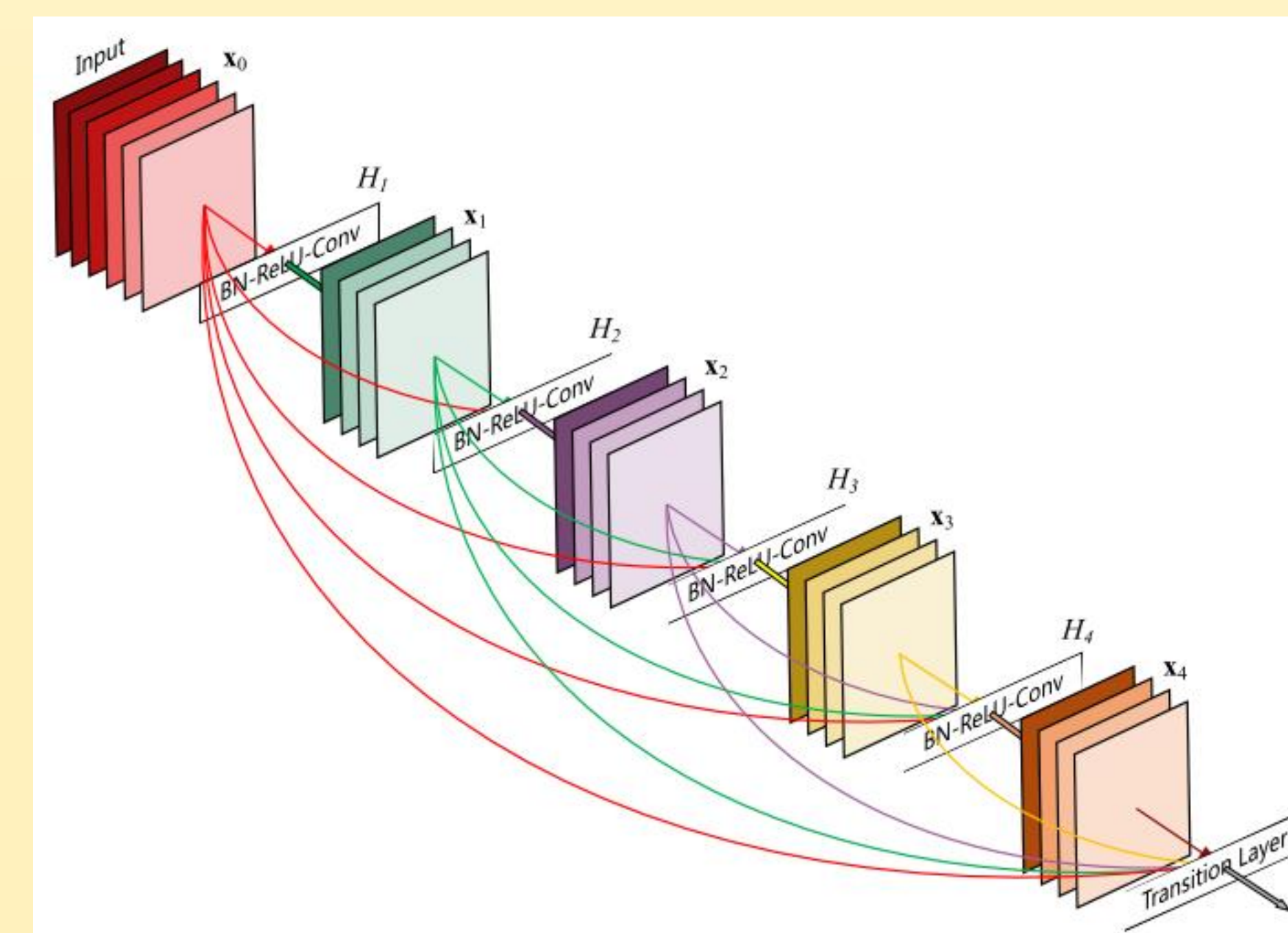


Figure1: DenseNet Architecture

Segmentation:

Automated predictions of lesion segmentations from dermoscopic images in the form of binary masks

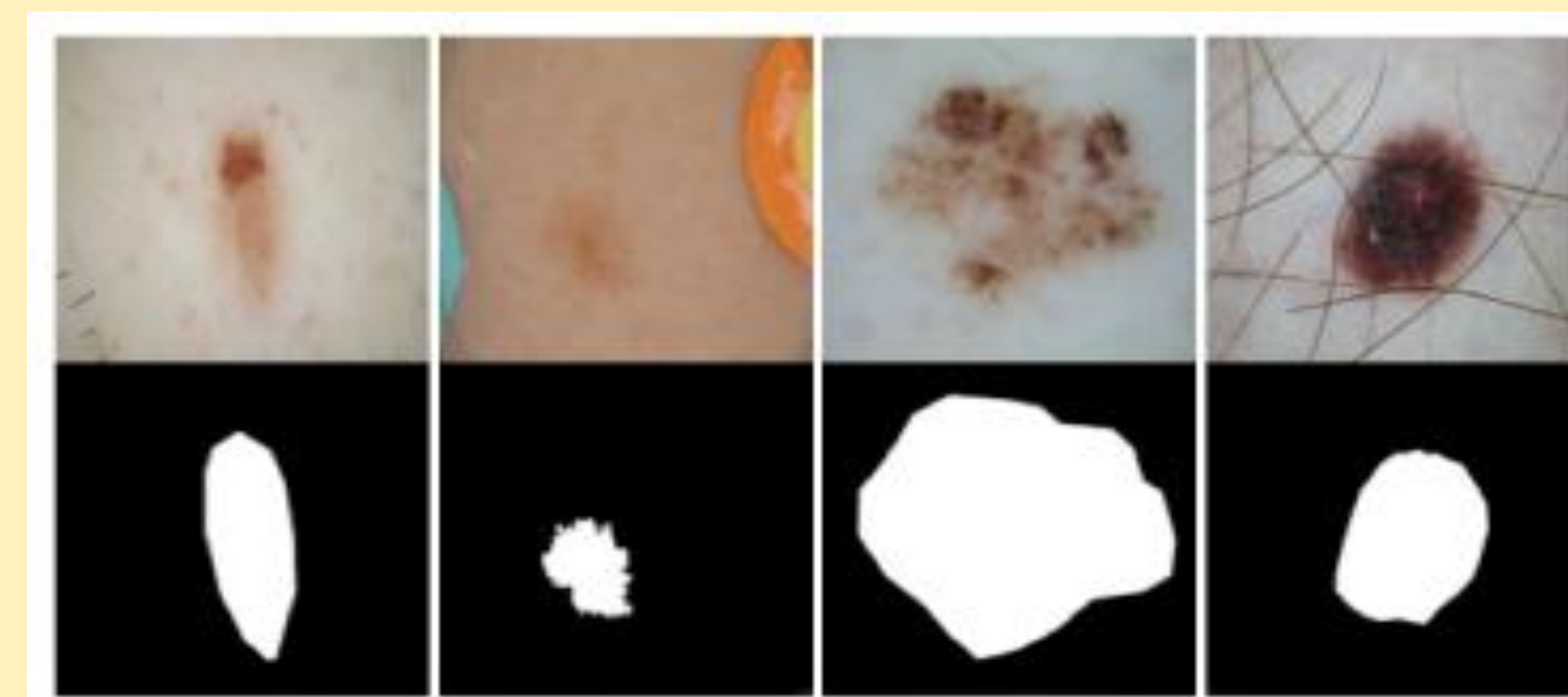


Figure2: Task 1 Segmentation of ISIC

Results

DensetNet obtained comparable results. We achieved the average IOU as 80%.

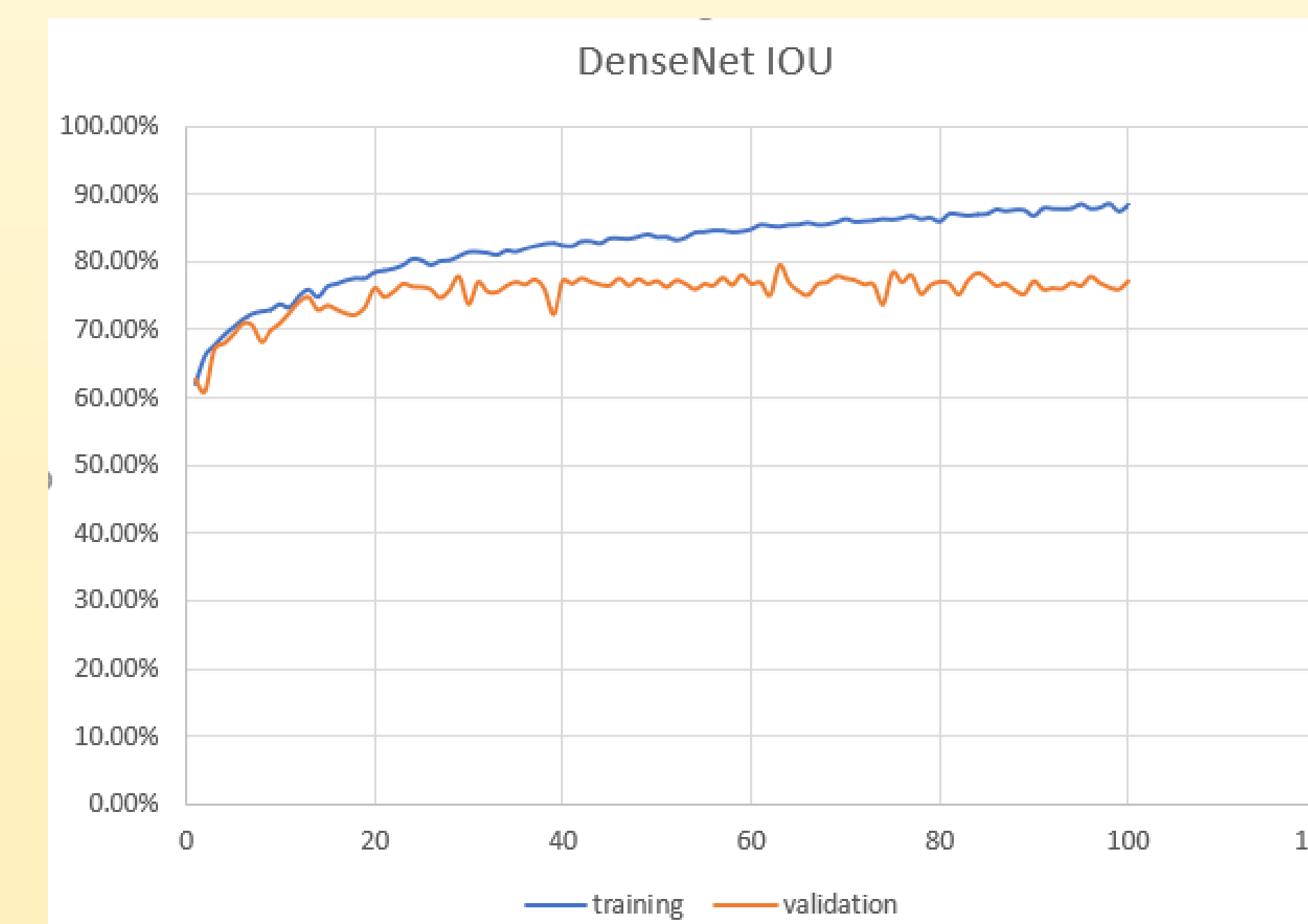


Figure3: Densenet IOU

For reference purpose we have implemented UNET model on the same dataset. We achieved the average IOU as 90%

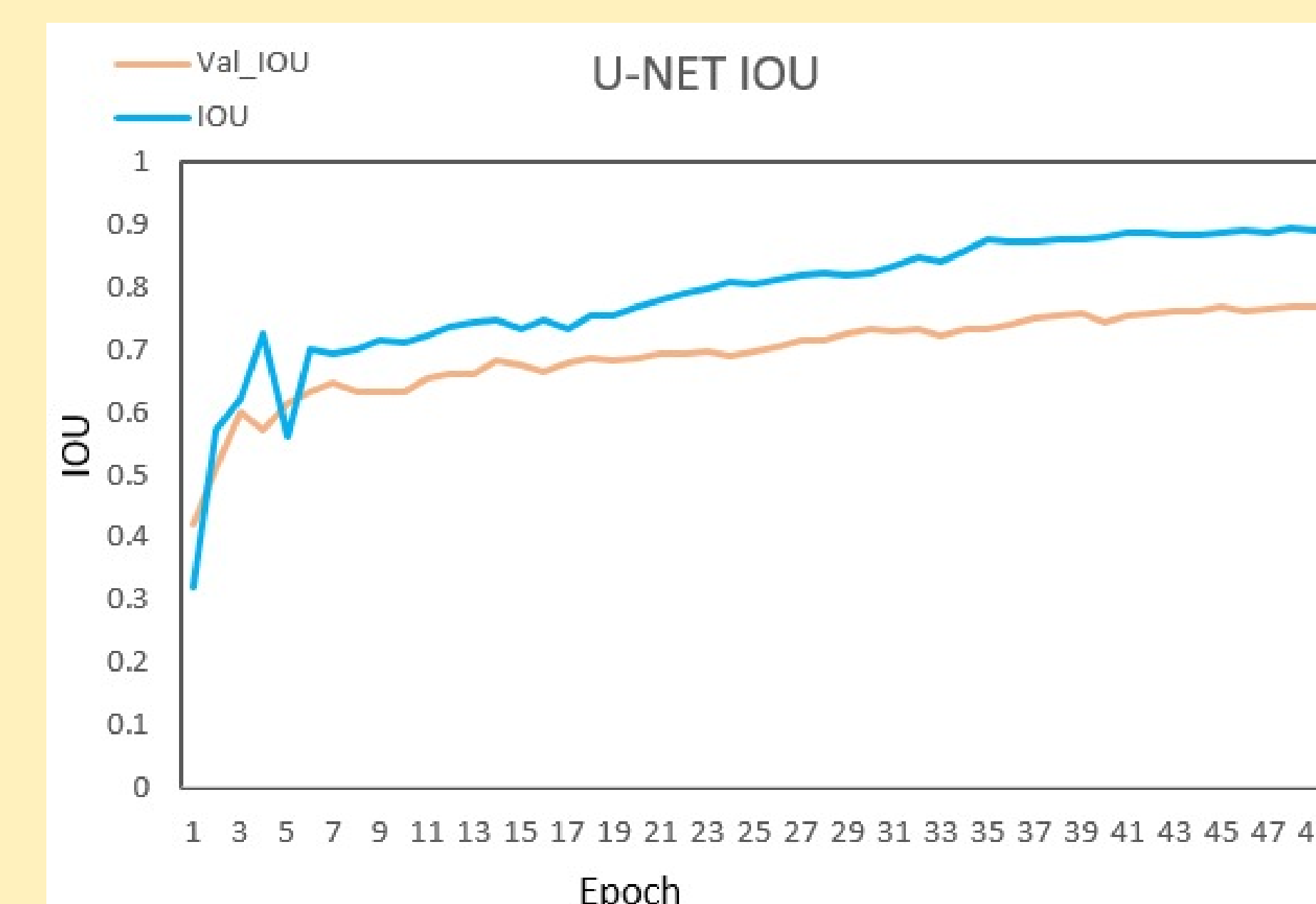


Figure4: U-Net IOU

Conclusion

The goal of this project is to obtain optimal accuracy for the segmentation of skin lesion for Melanoma with comparable results to the work submitted to ISIC challenge.

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