



# Skin Cancer Diagnosis

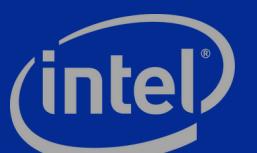


Magnifying Team



Members

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01

# Problem Statement



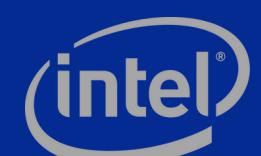
World  
Cancer  
Research  
Fund

## According to WCRF:

- There were **331,722** new cases of skin cancer in 2022.
- Skin cancer is the **17th** most common cancer worldwide.
- The **14th** common cancer in men.
- The **14th** common cancer in women.

Source: [Skin Cancer Statistics - WCRF.ORG](https://www.wcrf.org/skin-cancer-statistics)

Rank	Country	Number	ASR/100,000
	World	331,722	3.2
1	US	101,388	16.5
2	Germany	21,976	16.5
3	UK	19,712	15.3
4	Australia	16,819	37.0
5	France (metropolitan)	15,729	13.5
6	Italy	13,769	12.7
7	Russia	12,903	5.3
8	Canada	11,383	14.5
9	Brazil	9,676	3.3
10	China	8,789	0.37



# Main cause of most skin cancers



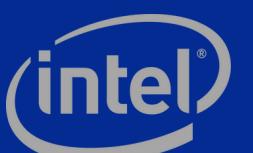
## Ultraviolet (UV) Radiation



# Another big reason is:



***“People do not know they are about to get skin cancer”***





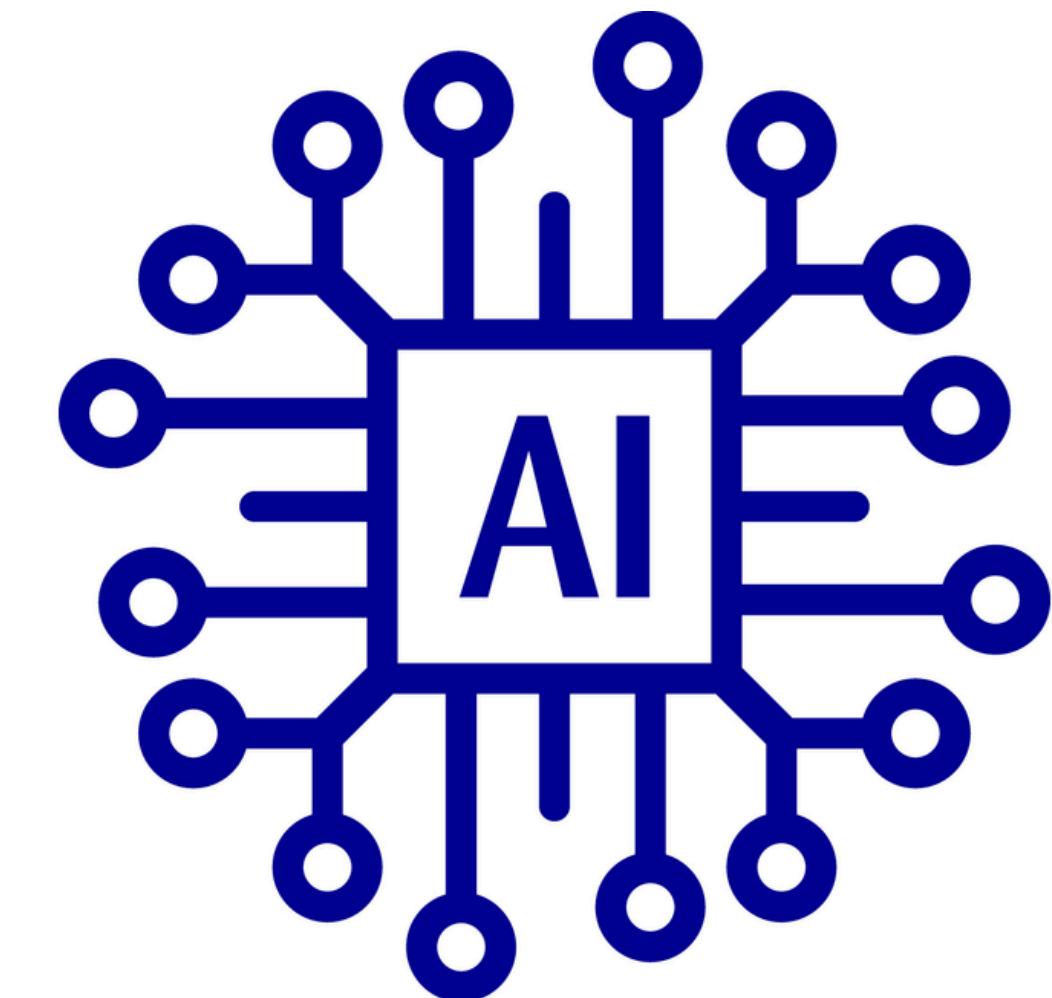
02

# Introduction

# Say “hello” to: The Skin Cancer Diagnosis (SCD)



UP4000 - edge



SCD - Model



# What is SCD?

- A deep learning model
- Can assist in the early diagnosis of skin cancer by identifying different types of skin lesions from dermoscopic images.



03

# Core Functionality

# Diagnosing 7 Common Types of Pigmented Skin Lesions



# Disease Information

Thông tin loại bệnh



Thông tin chi tiết các loại bệnh

**BKL:**  
Tổn thương giống dày sừng lành tính  
⚠ Mức độ nguy hiểm: **Lành tính**

**BCC:**  
Ung thư biểu mô tế bào đáy  
⚠ Mức độ nguy hiểm: **Ung thư nhẹ**

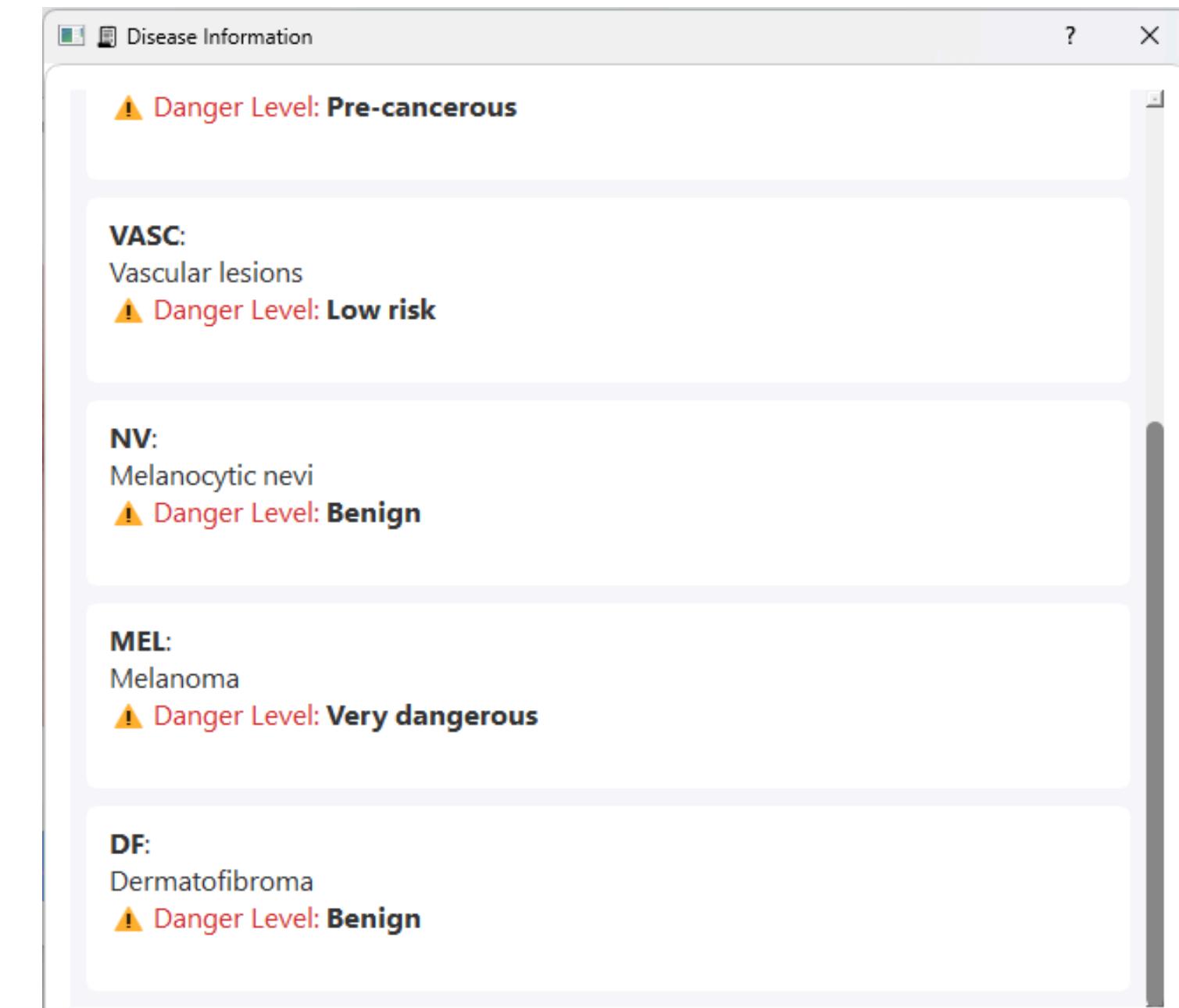
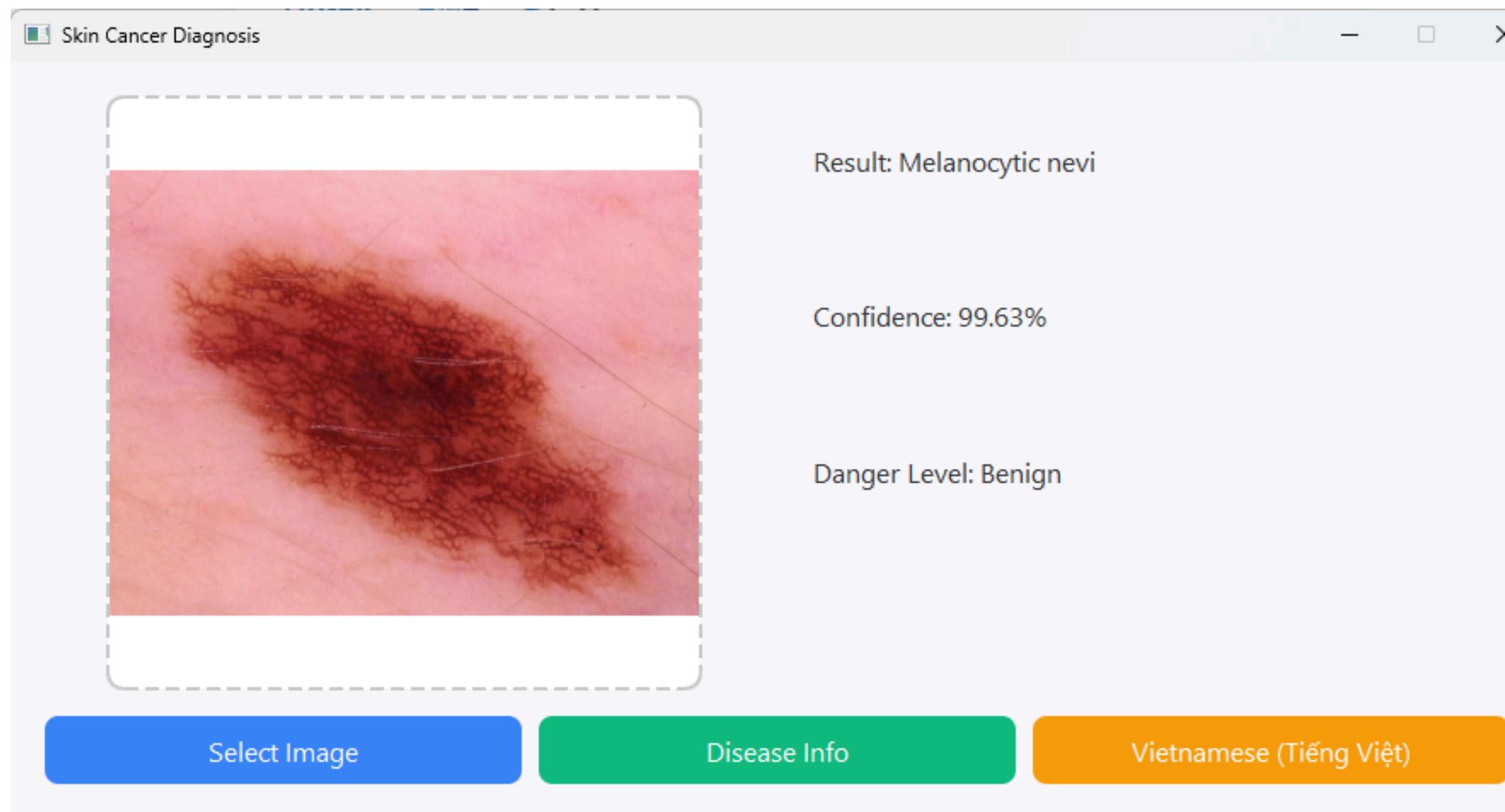
**AKIEC:**  
Dày sừng quang hóa và ung thư biểu mô tại chỗ  
⚠ Mức độ nguy hiểm: **Tiền ung thư**

**VASC:**  
Tổn thương mạch máu  
⚠ Mức độ nguy hiểm: **Ít nguy hiểm**

**NV:**  
Nốt ruồi sắc tố



# A user-friendly interface that supports both Vietnamese and English.



## Lightweight SCD





04

# Architecture



# Dataset: HAM10000 Harvard

 HARVARD  
Dataverse

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[ViDIR Dataverse](#)  
(Medical University of Vienna)

Harvard Dataverse > ViDIR Dataverse >

## The HAM10000 dataset, a large collection of multi-source dermatoscopic images of common pigmented skin lesions

Version 4.0

 Tschandl, Philipp, 2018, "The HAM10000 dataset, a large collection of multi-source dermatoscopic images of common pigmented skin lesions", <https://doi.org/10.7910/DVN/DBW86T>, Harvard Dataverse, V4, UNF:6:KCZFcBLiFE5ObWcTc2ZBOA== [fileUNF]

Cite Dataset ▾ Learn about [Data Citation Standards](#).

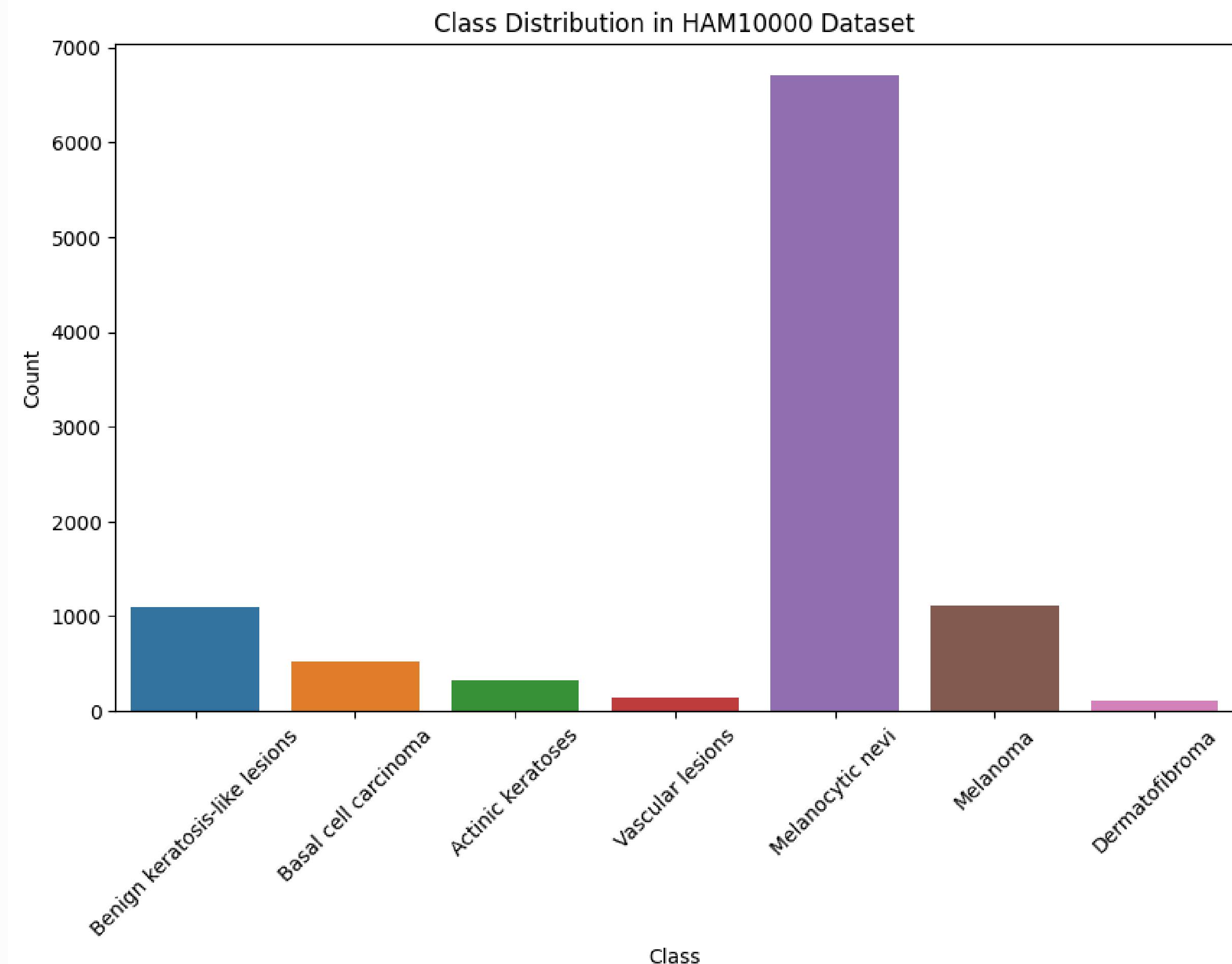
Access Dataset ▾  
Contact Owner Share

Dataset Metrics ?  
185,830 Downloads ?

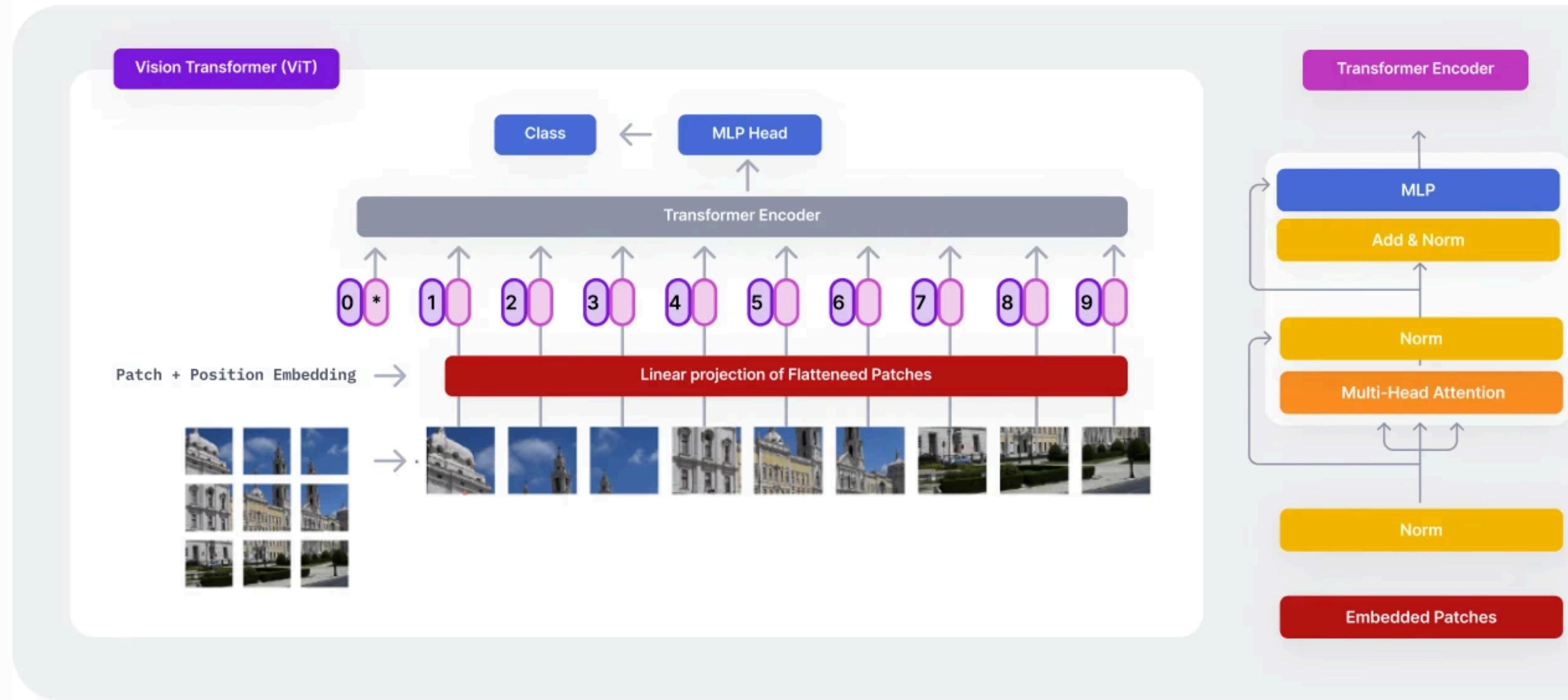


# Class Distribution

- 10015 images
- 7 Classes



# Architecture: Vision Transformer



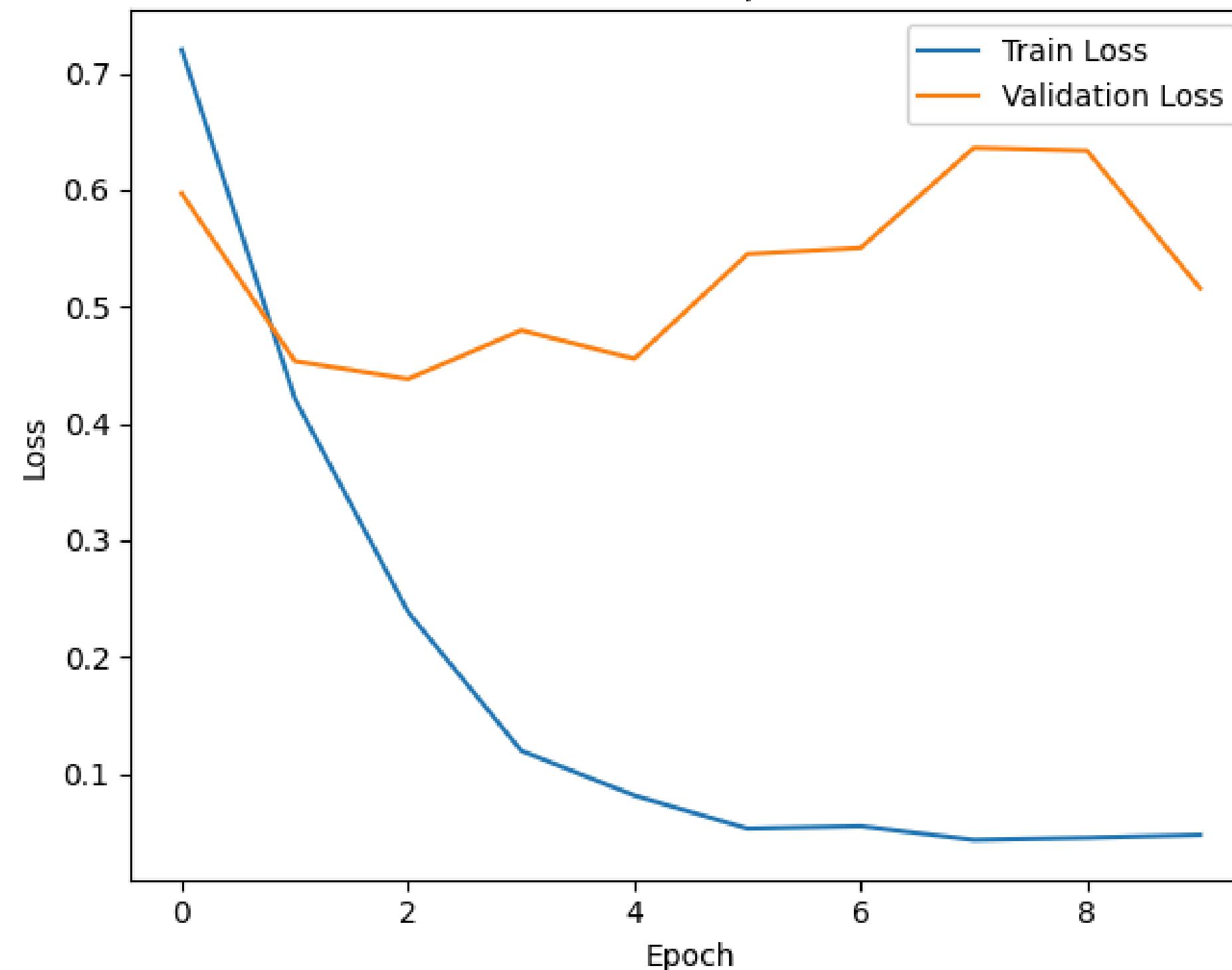
Source: [Vision Transformer: What It Is & How It Works](#)

# What did we do?

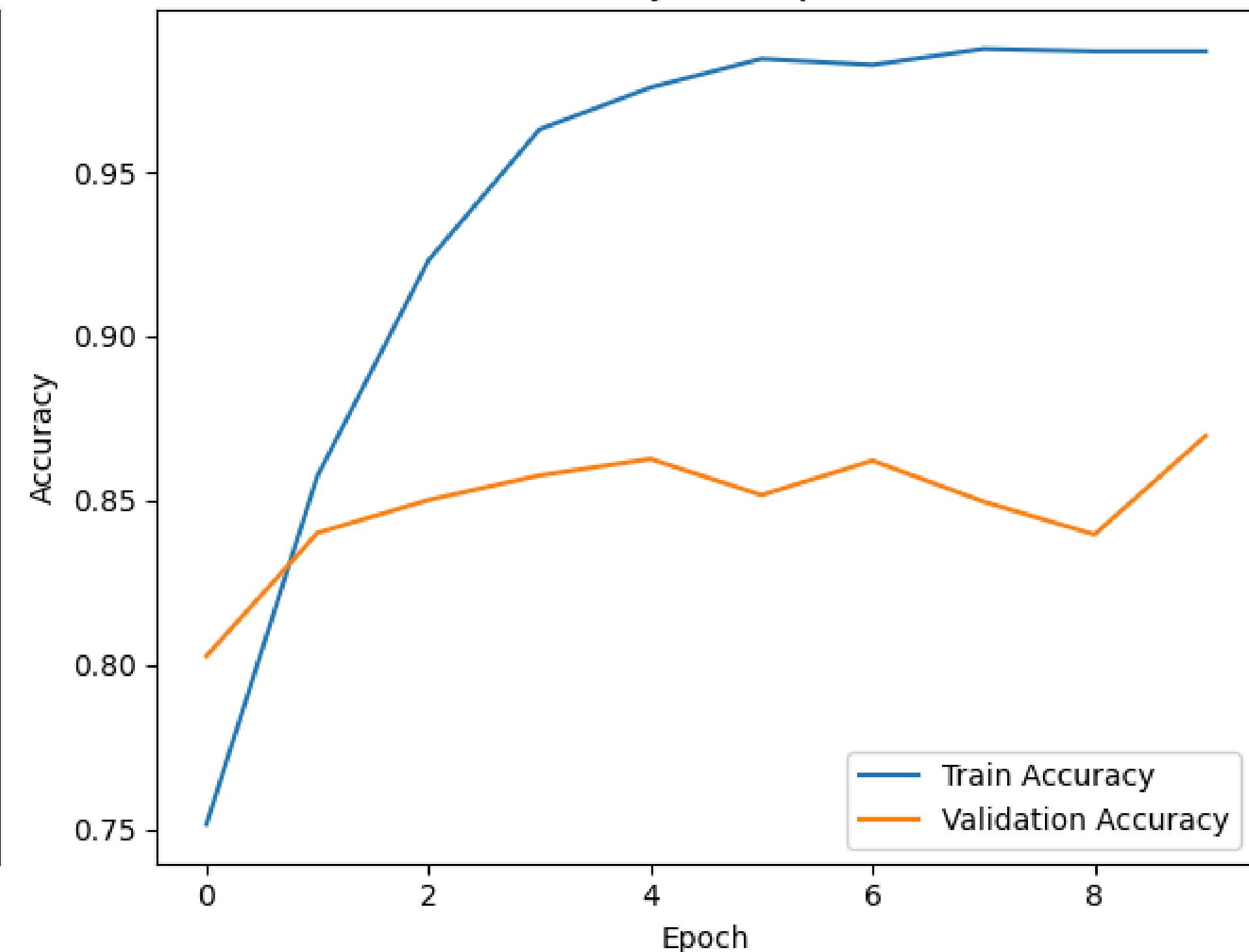
- Use pre-trained ViT model from Hugging Face Transformer.
- Replace the classification heads to match the HAM10000 labels.
- Process data (resize, normalize, ...).
- Fine tune (Cross-entropy loss, Adam optimizer).
- Evaluate the outcome model.

# Training: 10 epochs

Loss Over Epochs

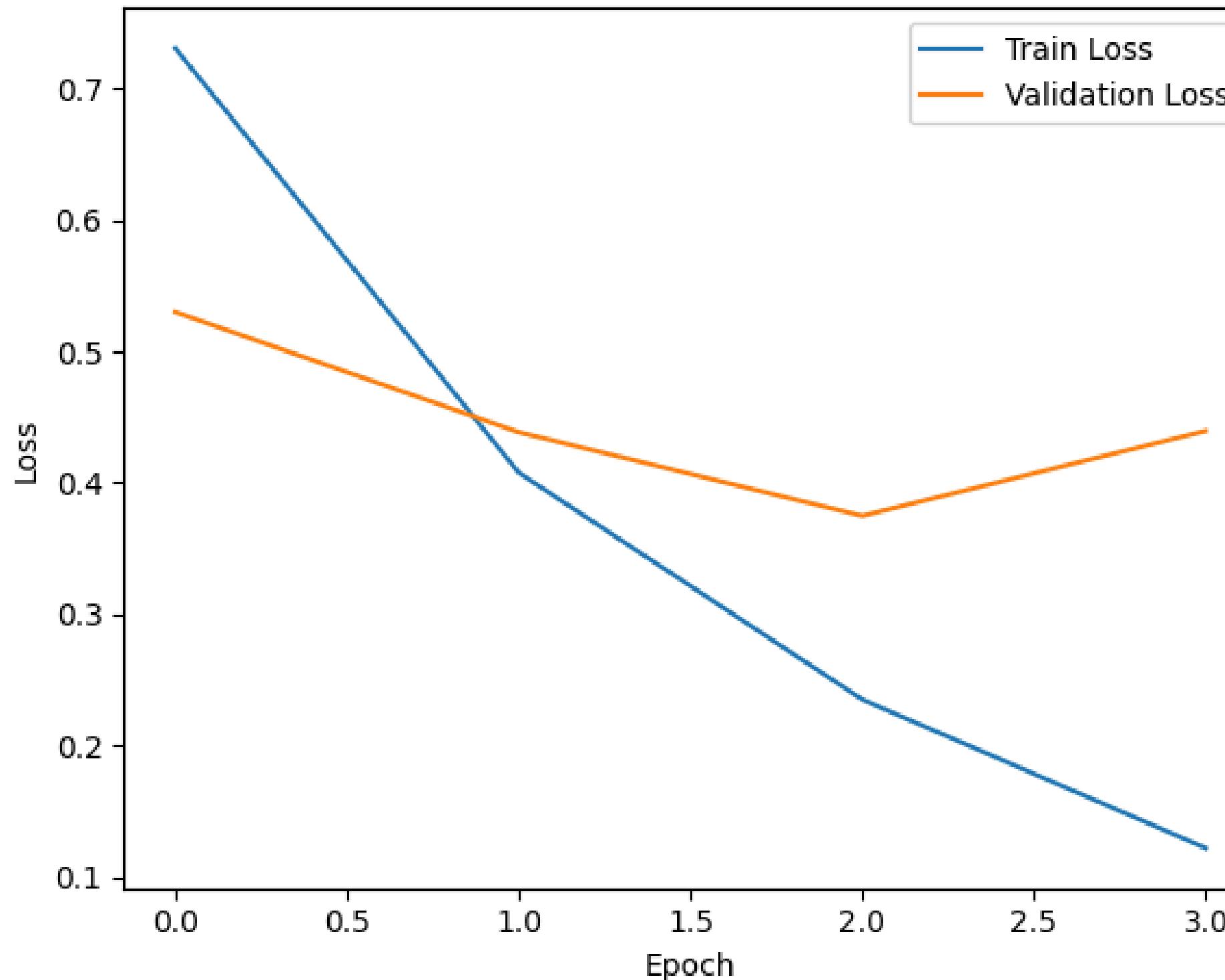


Accuracy Over Epochs

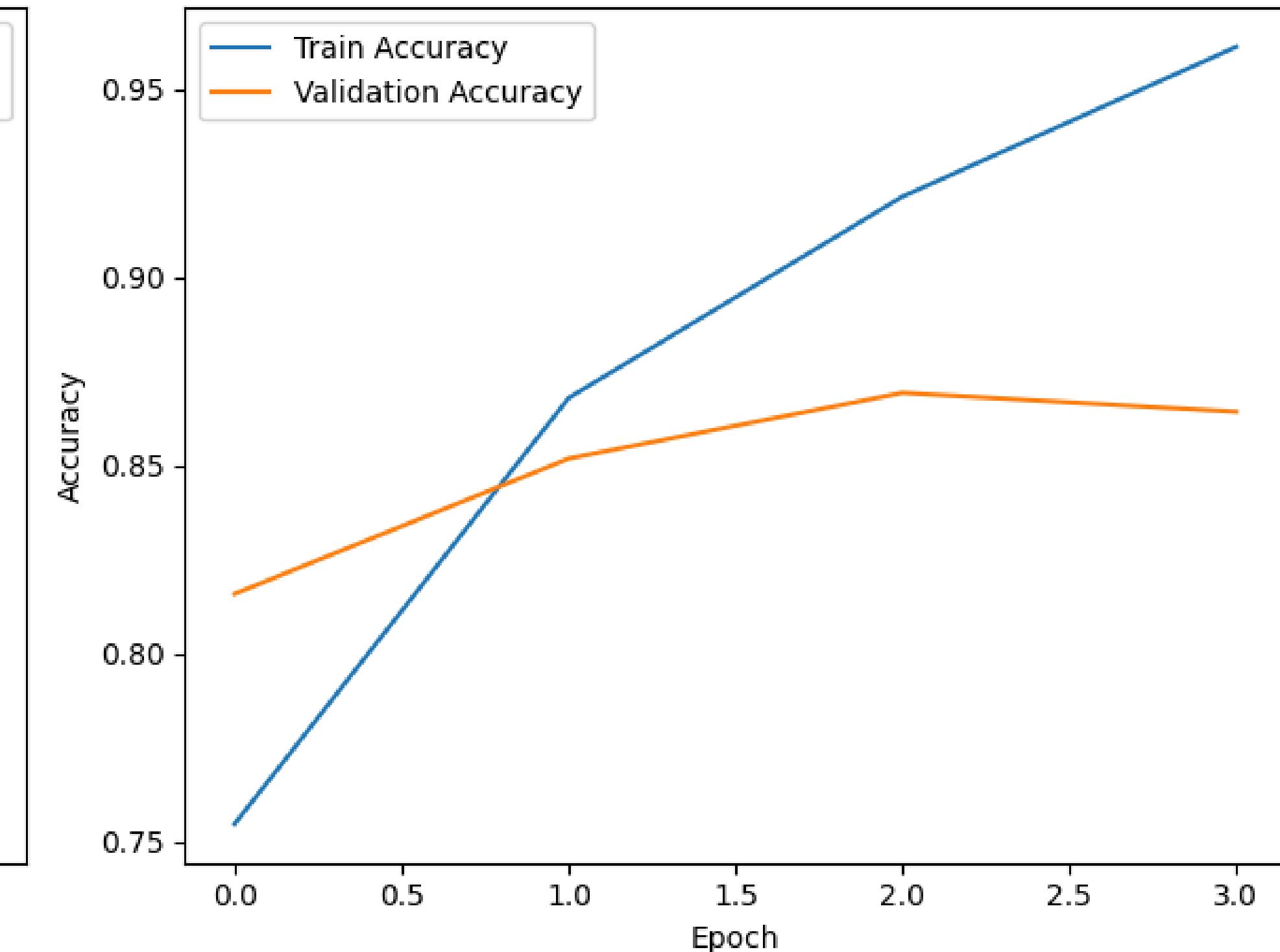


# Training: 4 epochs

Loss Over Epochs



Accuracy Over Epochs

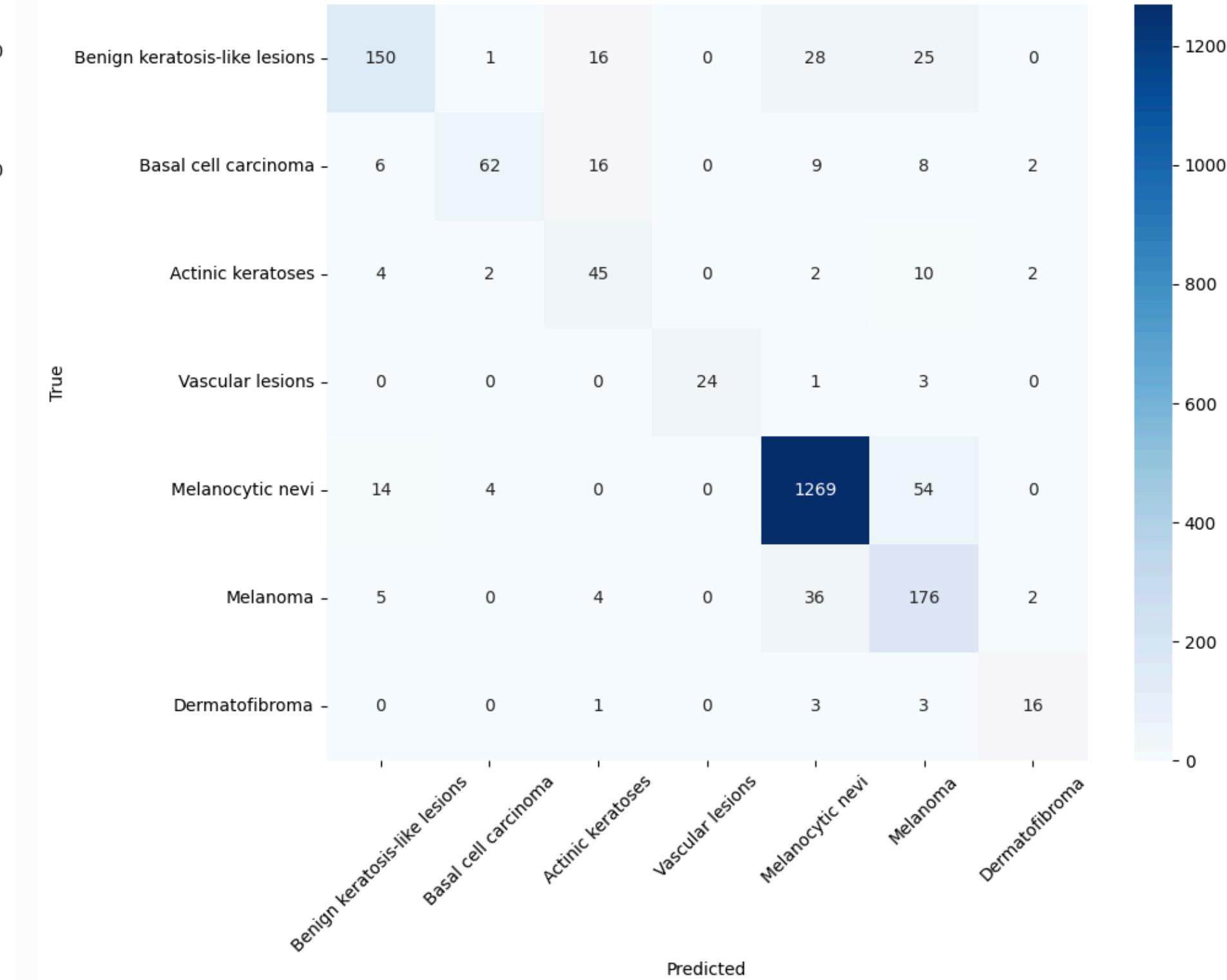
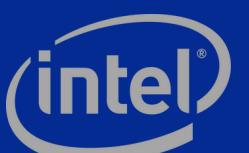


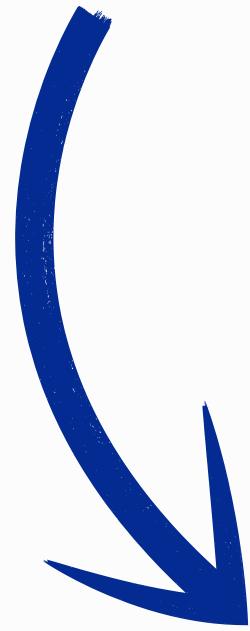


Confusion Matrix

**4 epochs**

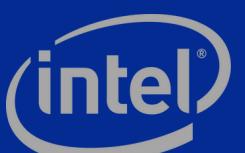
Confusion Matrix

**10 epochs**



**Choose the model trained with 4 epochs**

**Overfitting**



# Classification report

Classification Report:

	precision	recall	f1-score	support
Benign keratosis-like lesions	0.85	0.62	0.72	220
Basal cell carcinoma	0.80	0.77	0.78	103
Actinic keratoses	0.49	0.83	0.62	65
Vascular lesions	1.00	0.89	0.94	28
Melanocytic nevi	0.93	0.95	0.94	1341
Melanoma	0.69	0.61	0.65	223
Dermatofibroma	0.60	0.91	0.72	23
accuracy			0.86	2003
macro avg	0.77	0.80	0.77	2003
weighted avg	0.87	0.86	0.86	2003

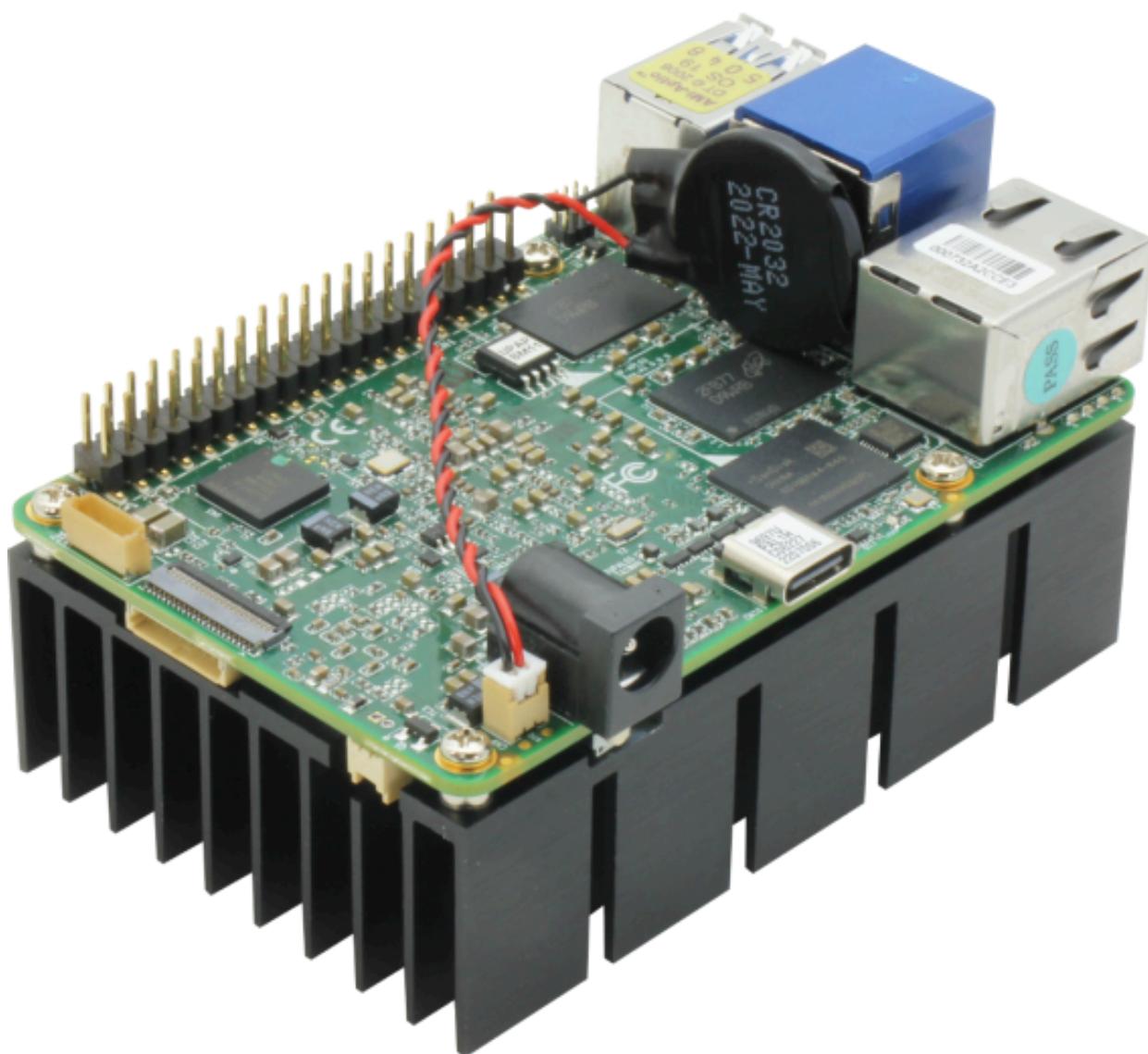
86%!



05

# Estimated Budget

# Estimated Budget



## UP 4000 Celeron 02/32 Low Heatsink

- Processor: Intel® Celeron® N3350
- Graphics: Intel® HD Graphics 500
- Memory: 2GB
- eMMC / Storage: 32 GB

Price: 149\$ (Tax-exclusive)

*It is free for everyone  
if deployed on the web!*

**YEAH!**



06

# Future Enhancement



# Future Enhancement

- Collecting more data (from hospital, International Skin Imaging Collaboration (ISIC), ...)
- Augmenting data
- Retraining model
- Creating a Multi-language-friendly user interface
- Deploying on the web (free for everyone)





07

# Conclusion

# Conclusion

- This work illustrates how state-of-the-art transformer models **can be adapted to medical domains**, offering **promising support tools** for early and accurate skin cancer detection.
- However, challenges such as class imbalance affected the performance on rare categories
- This suggests future improvements can focus on enhancing data diversity through augmentation or rebalancing techniques.



***Everyone is welcome to contribute to this project!***



DinhXuanKhuong/Skin-Cancer-Diagnosis-with-...



1  
Contributor

0  
Issues

0  
Stars

0  
Forks



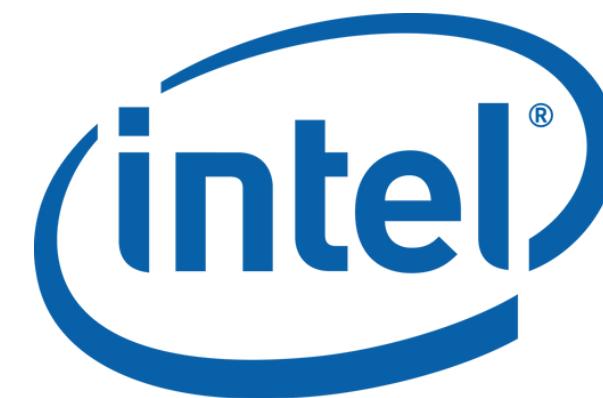
<https://github.com/DinhXuanKhuong/Skin-Cancer-Diagnosis-with-Vision-Transformer>

**It's open on my github**





# Big thanks!



**Do you have any questions?**  
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