

# **Analysis of Machine Learning Models For Image Classification on Cifar-10**

Nicolae Mogage – ICA

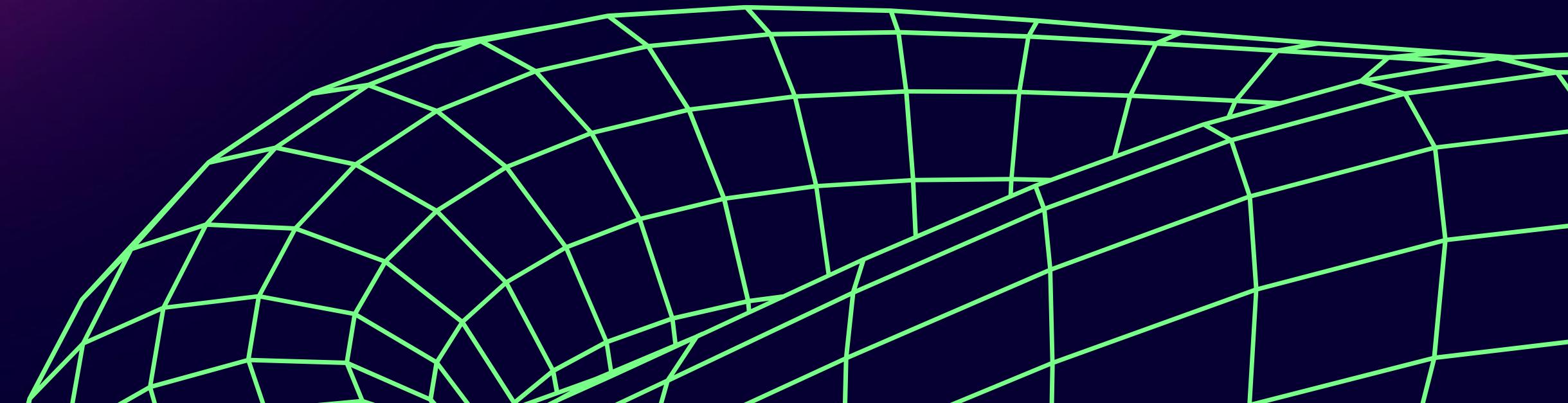
# CONTENT

1 CIFAR-10

2 MODELS

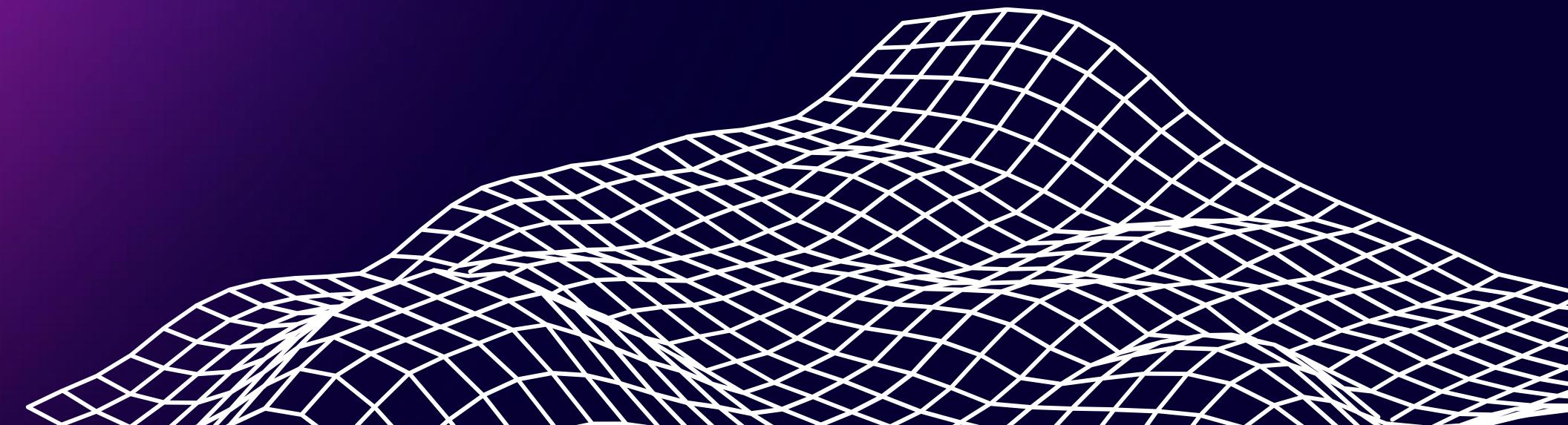
3 EXPERIMENTS

4 CONCLUSIONS

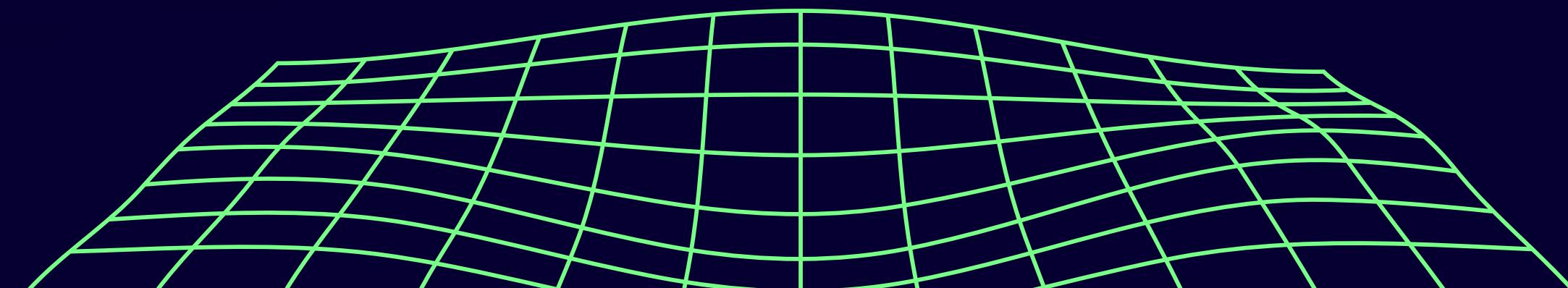
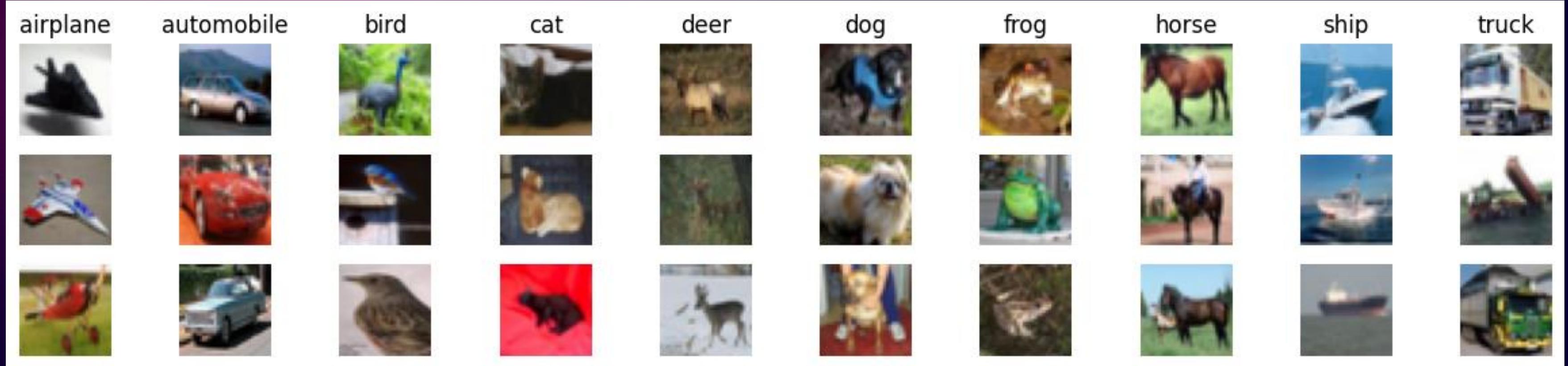




CIFAR-10

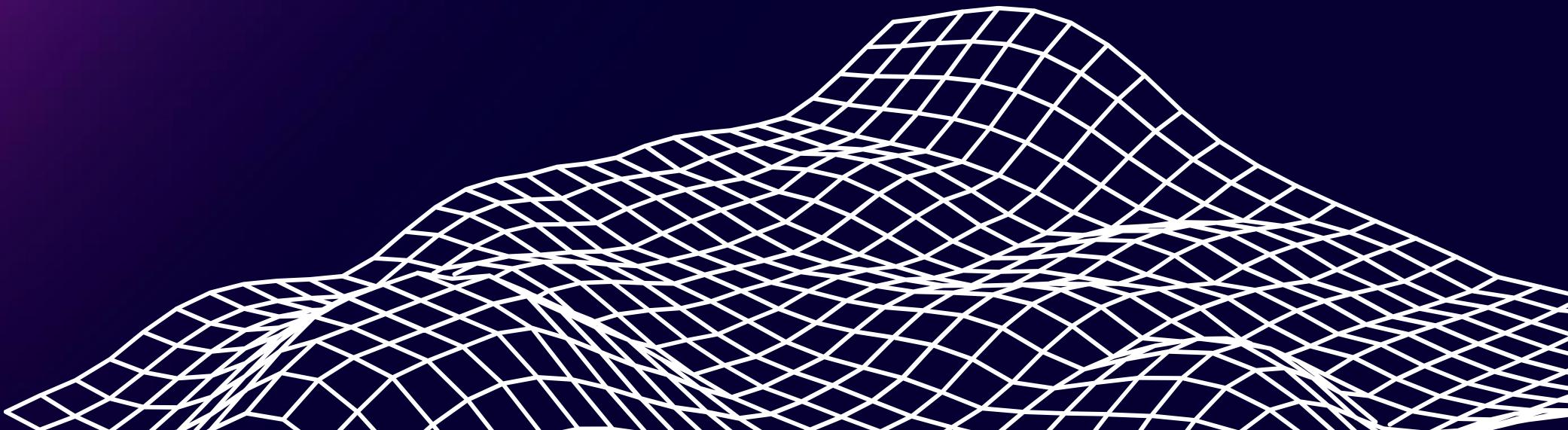


# Dataset instances

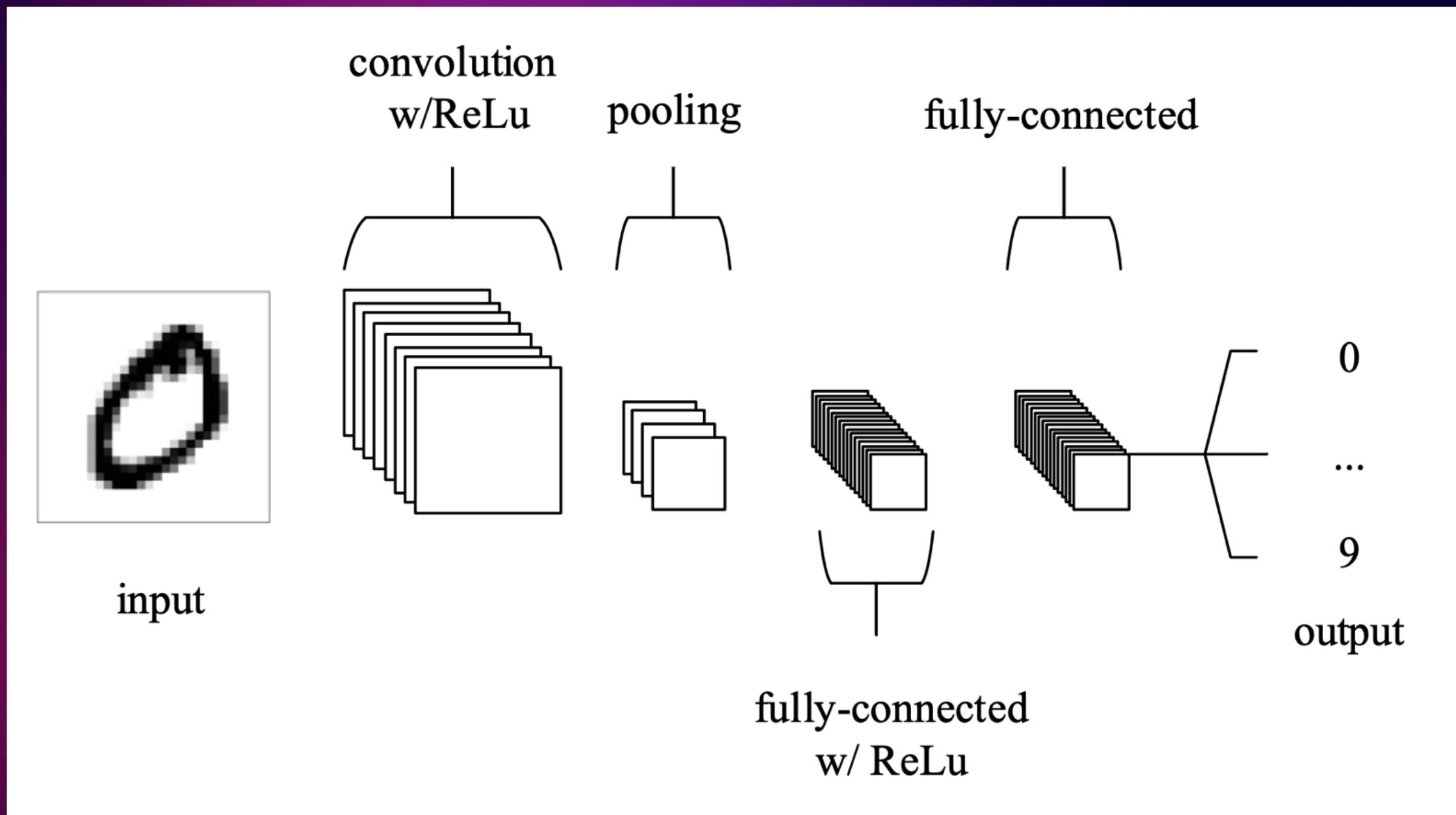


2

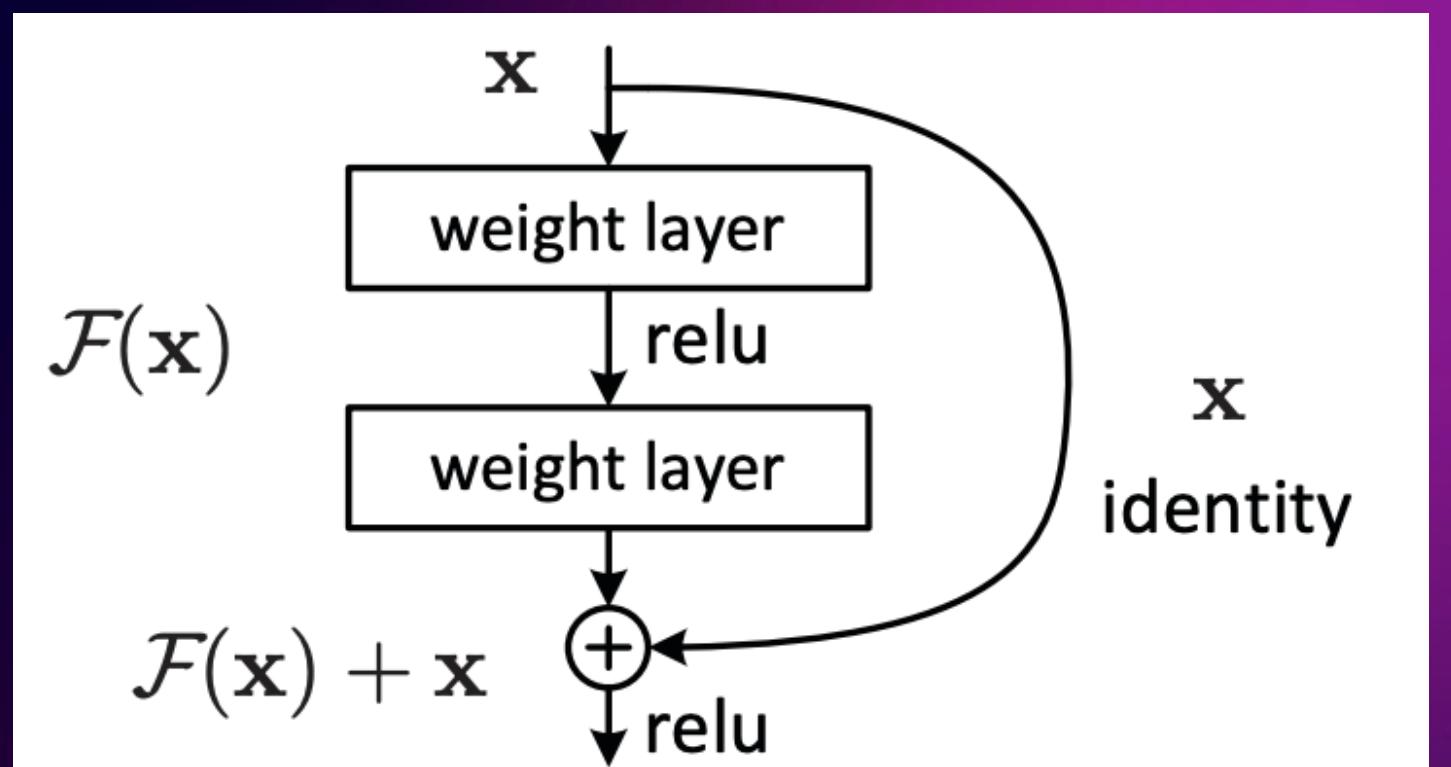
## Methods



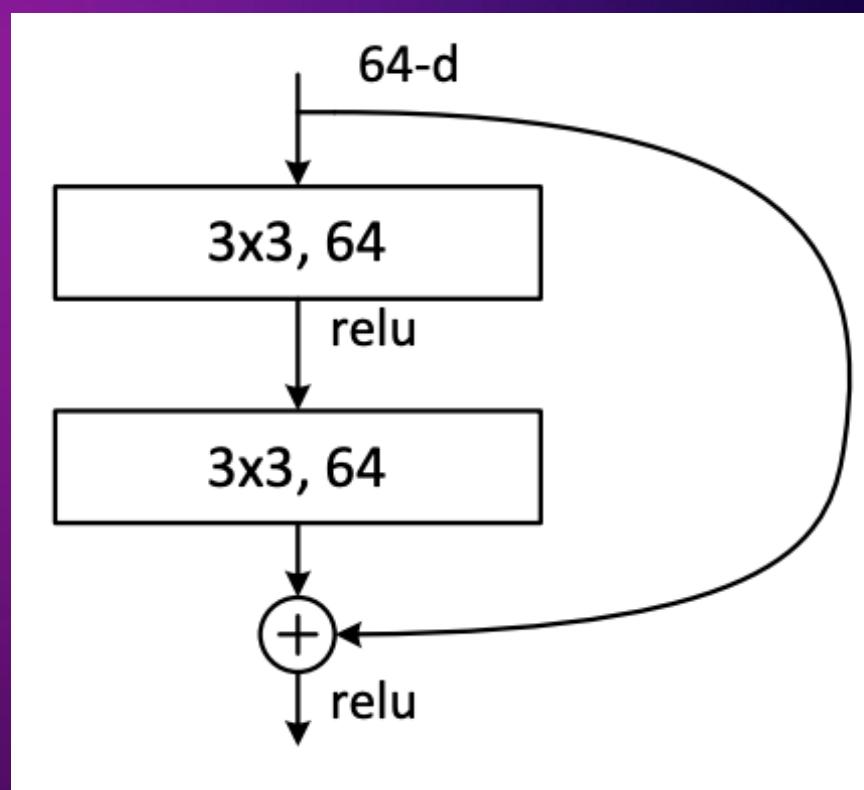
# Convolutional Neuronal Networks



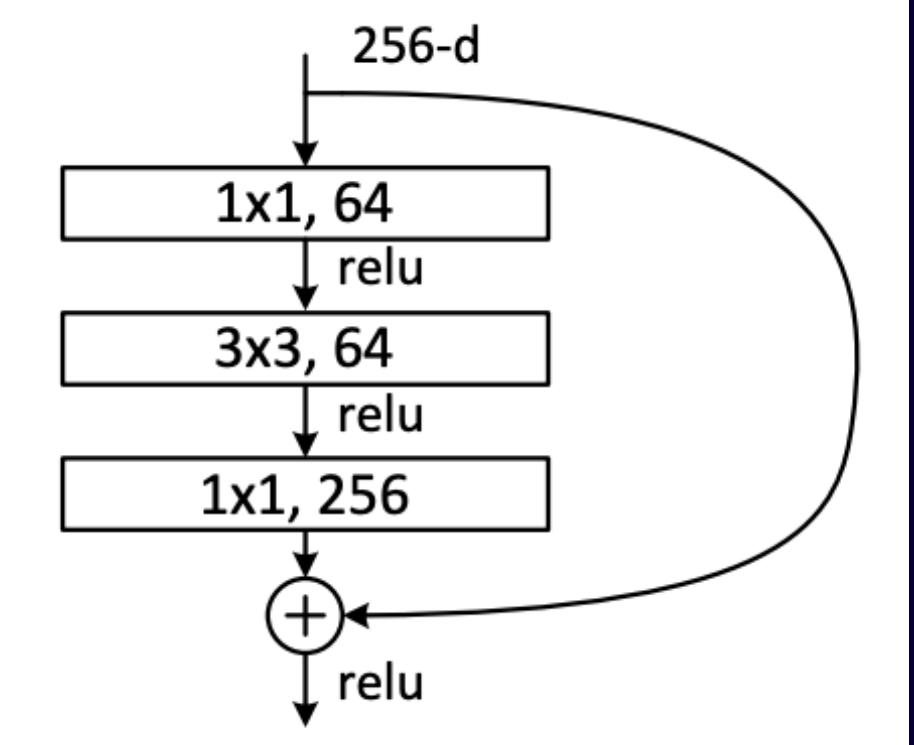
# Deep Residual Networks



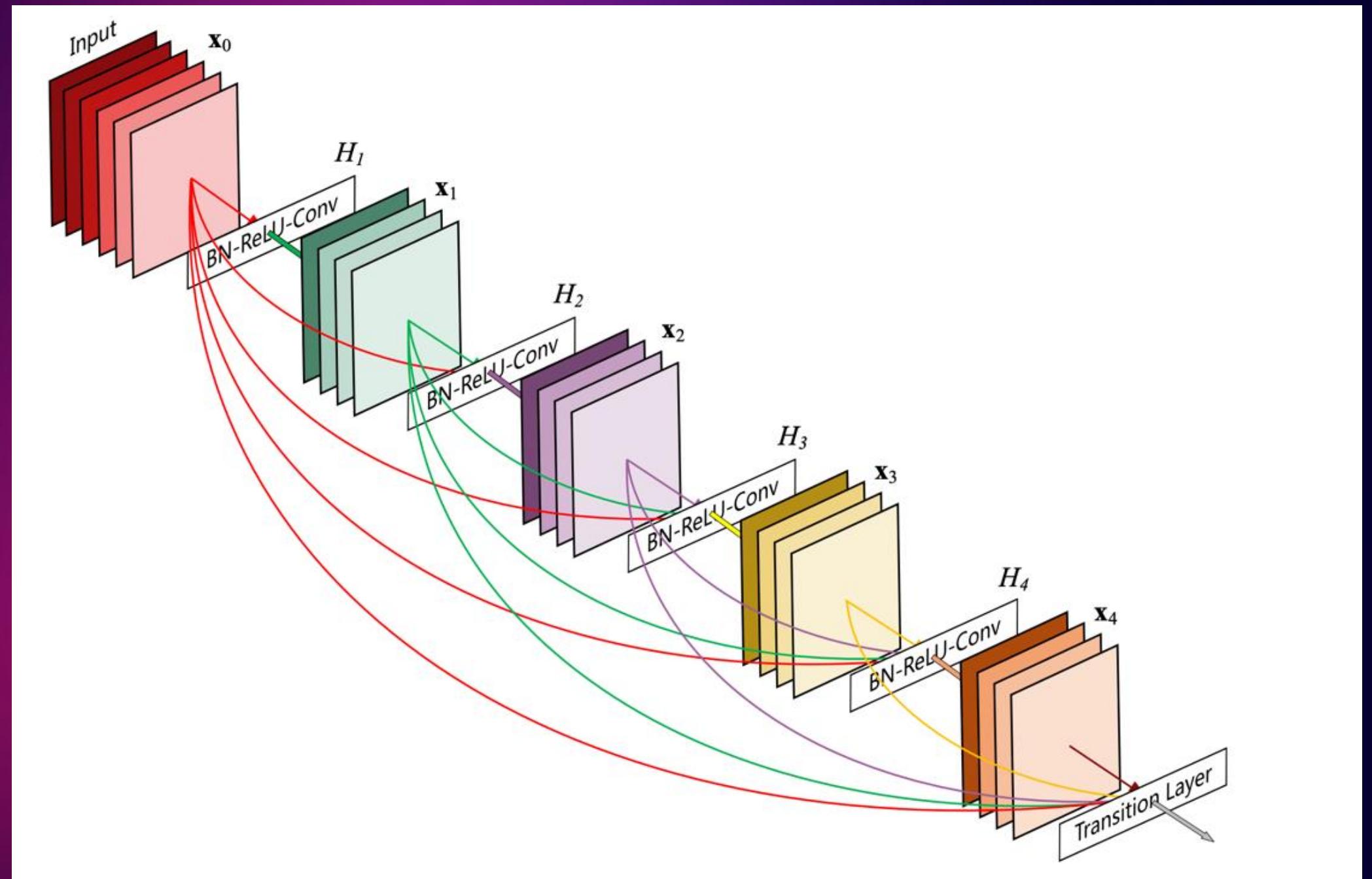
Building Block



Residual vs Bottleneck Blocks

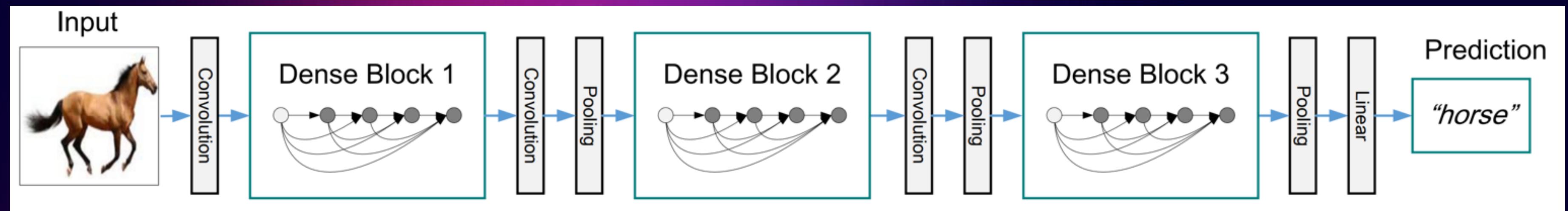


# Densely Connected Convolutional Networks



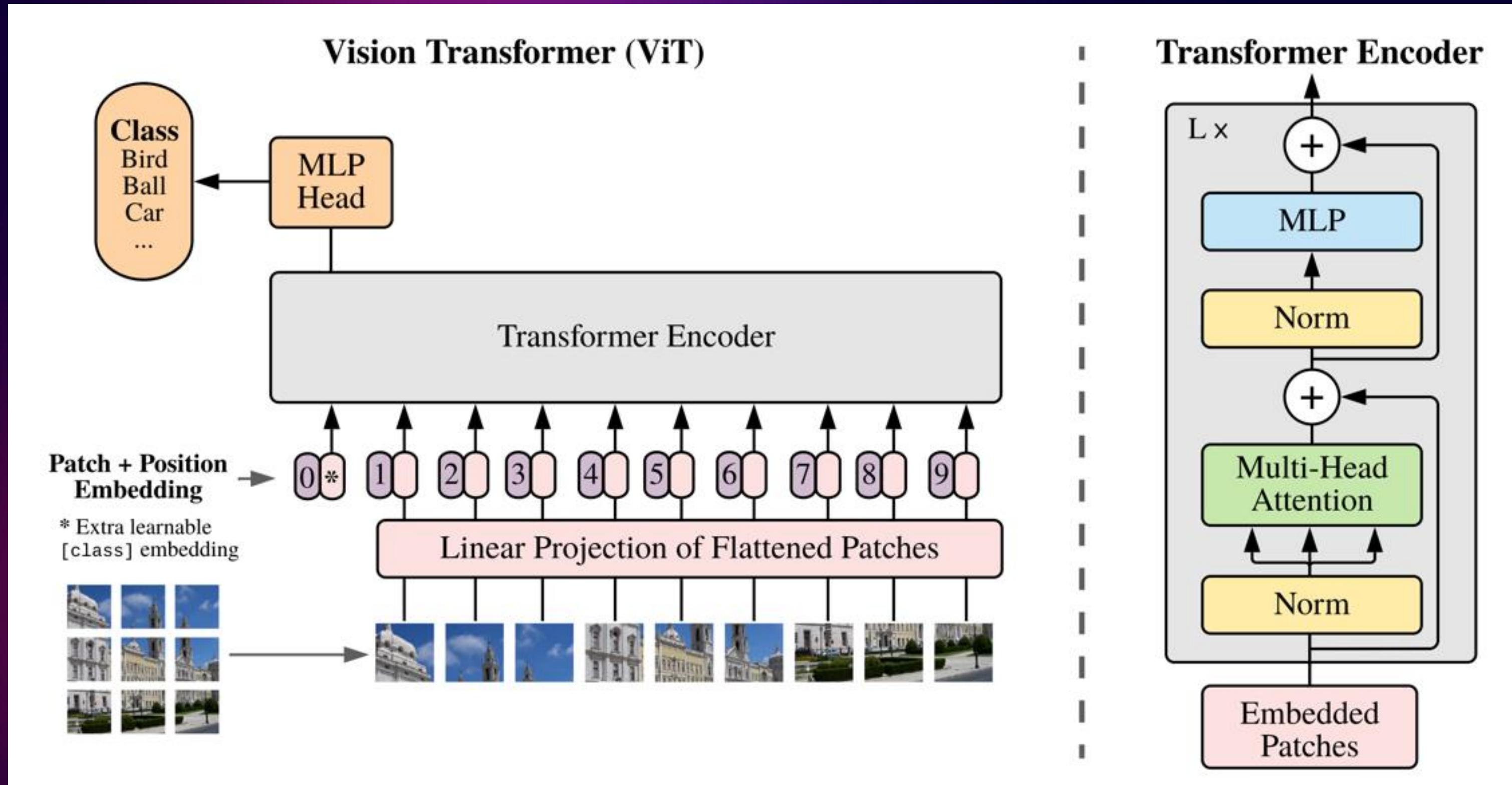
Dense Block

# Densely Connected Convolutional Networks

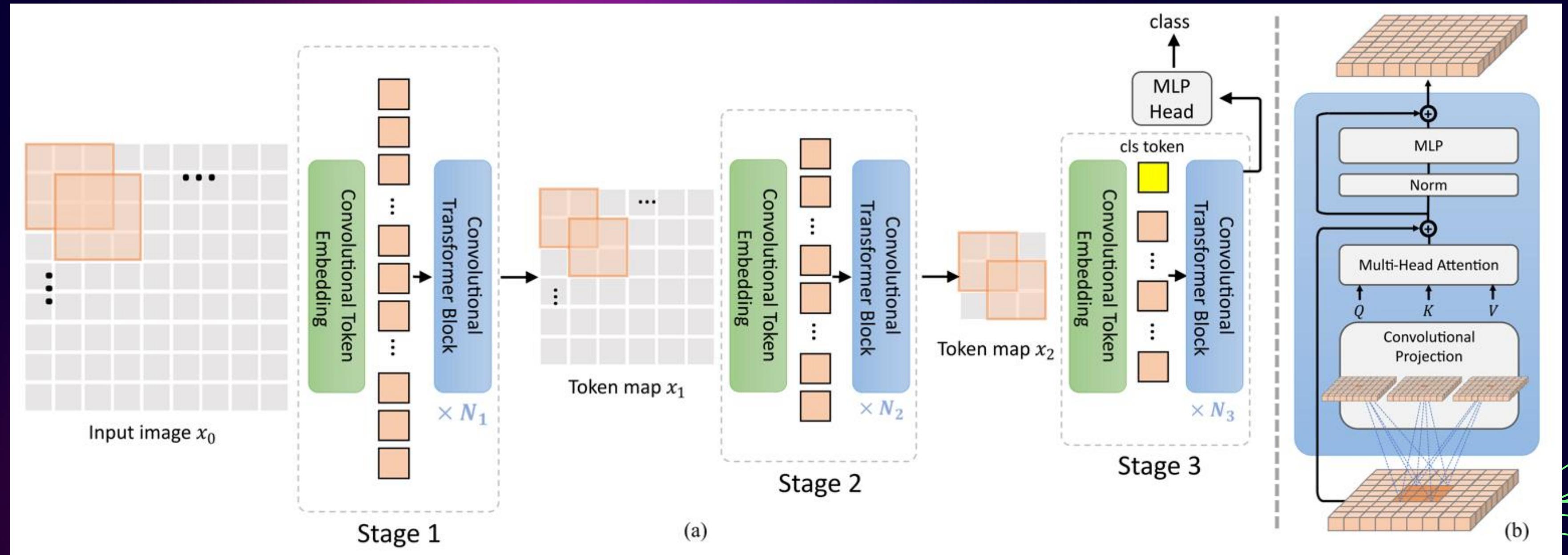


**DenseNet Architecture**

# Vision Transformers

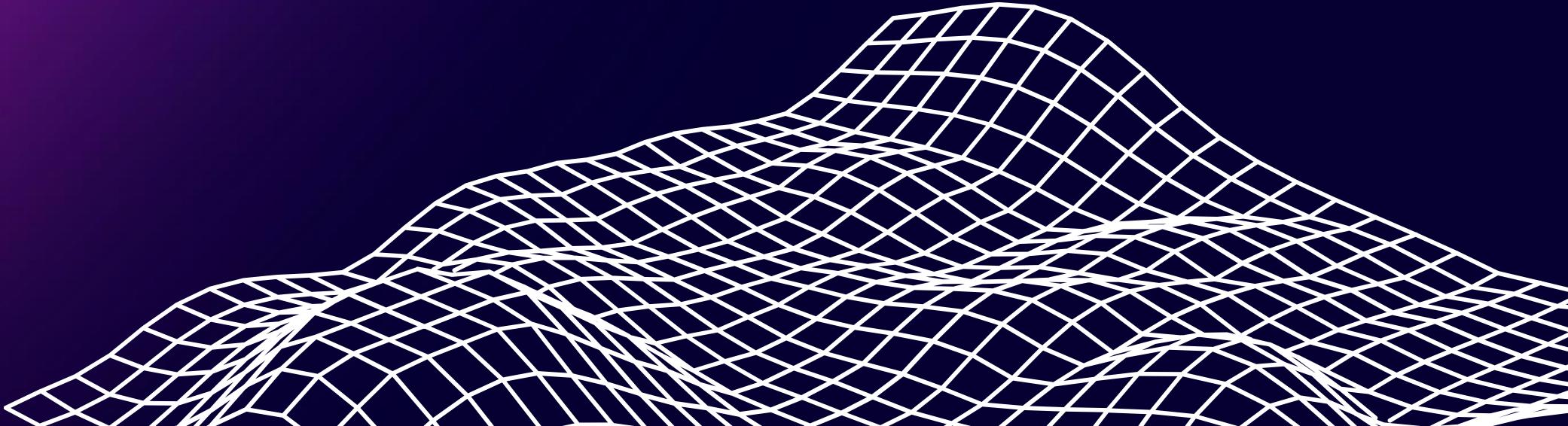


# Convolutional Vision Transformers

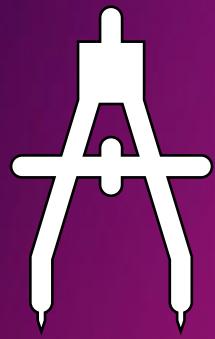


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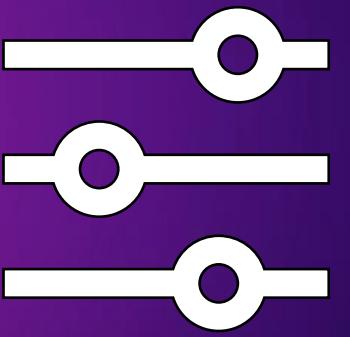
# Experiments



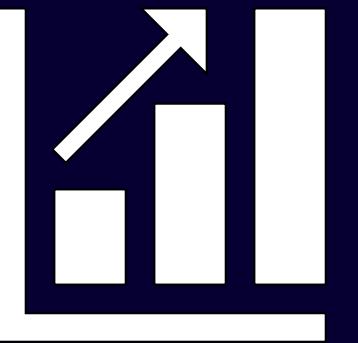
# Setup



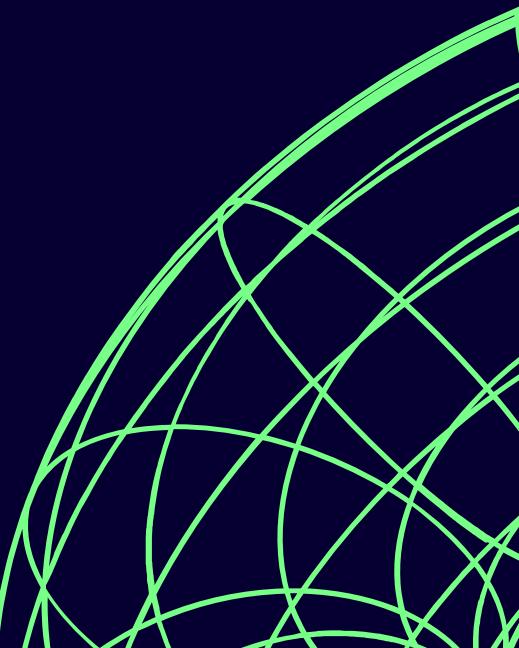
Models



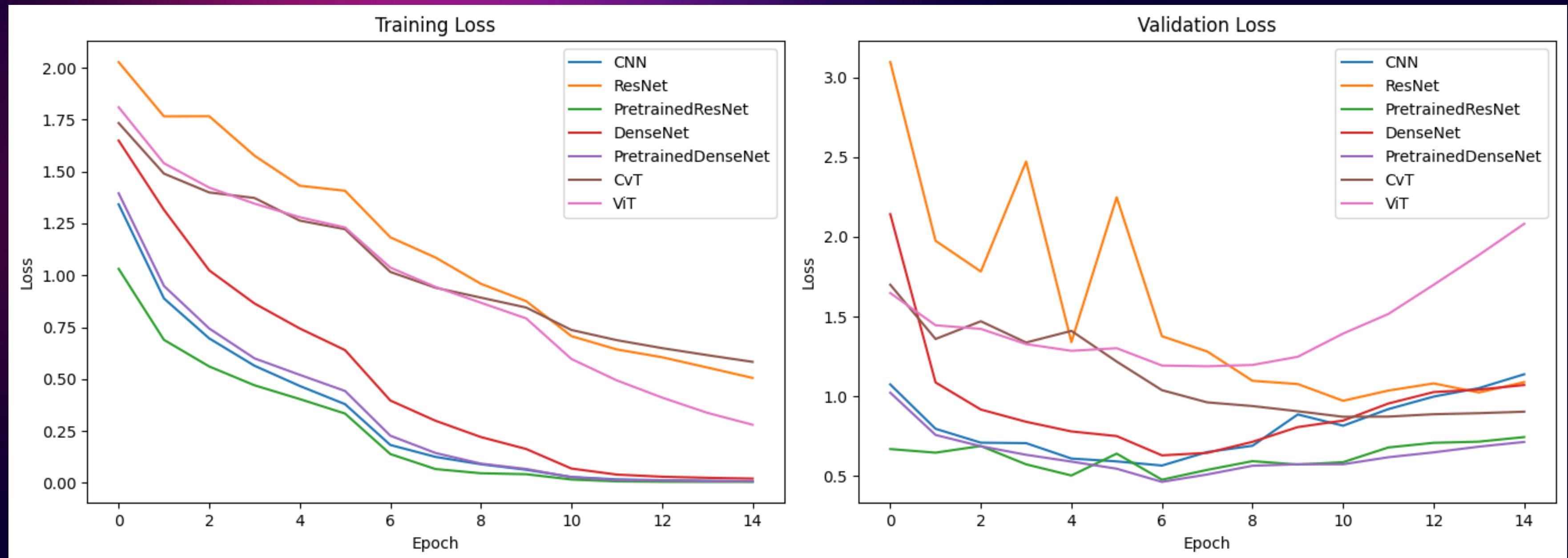
Functions



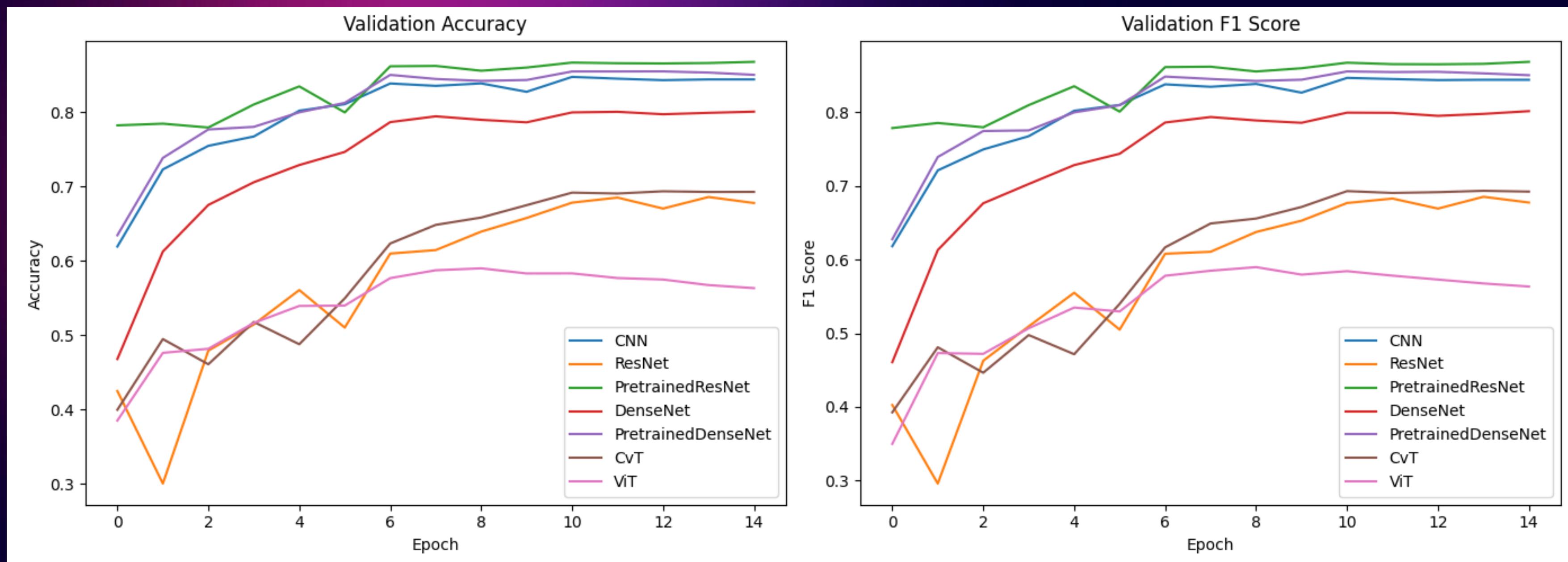
Metrics



# Losses



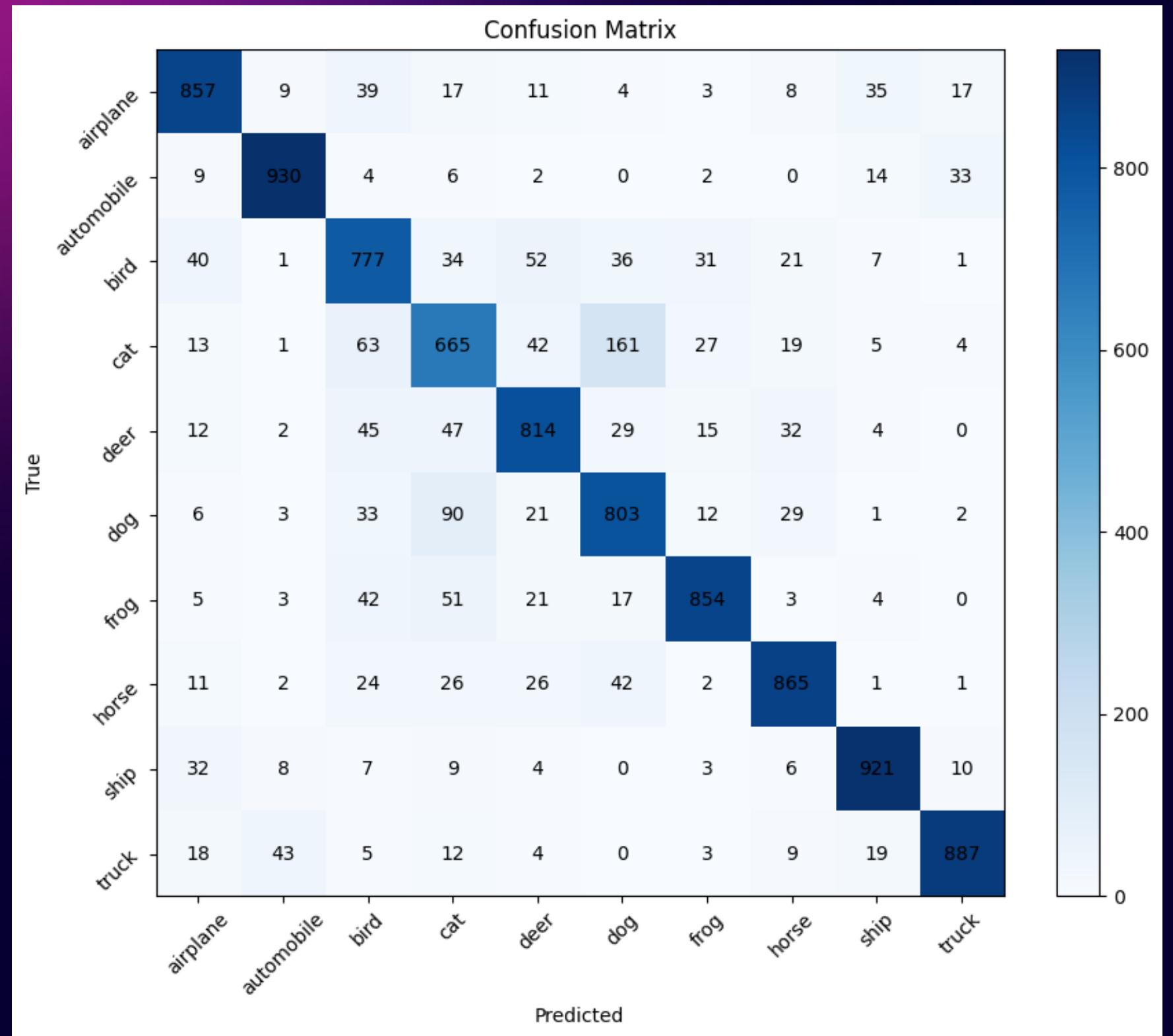
# Validation metrics



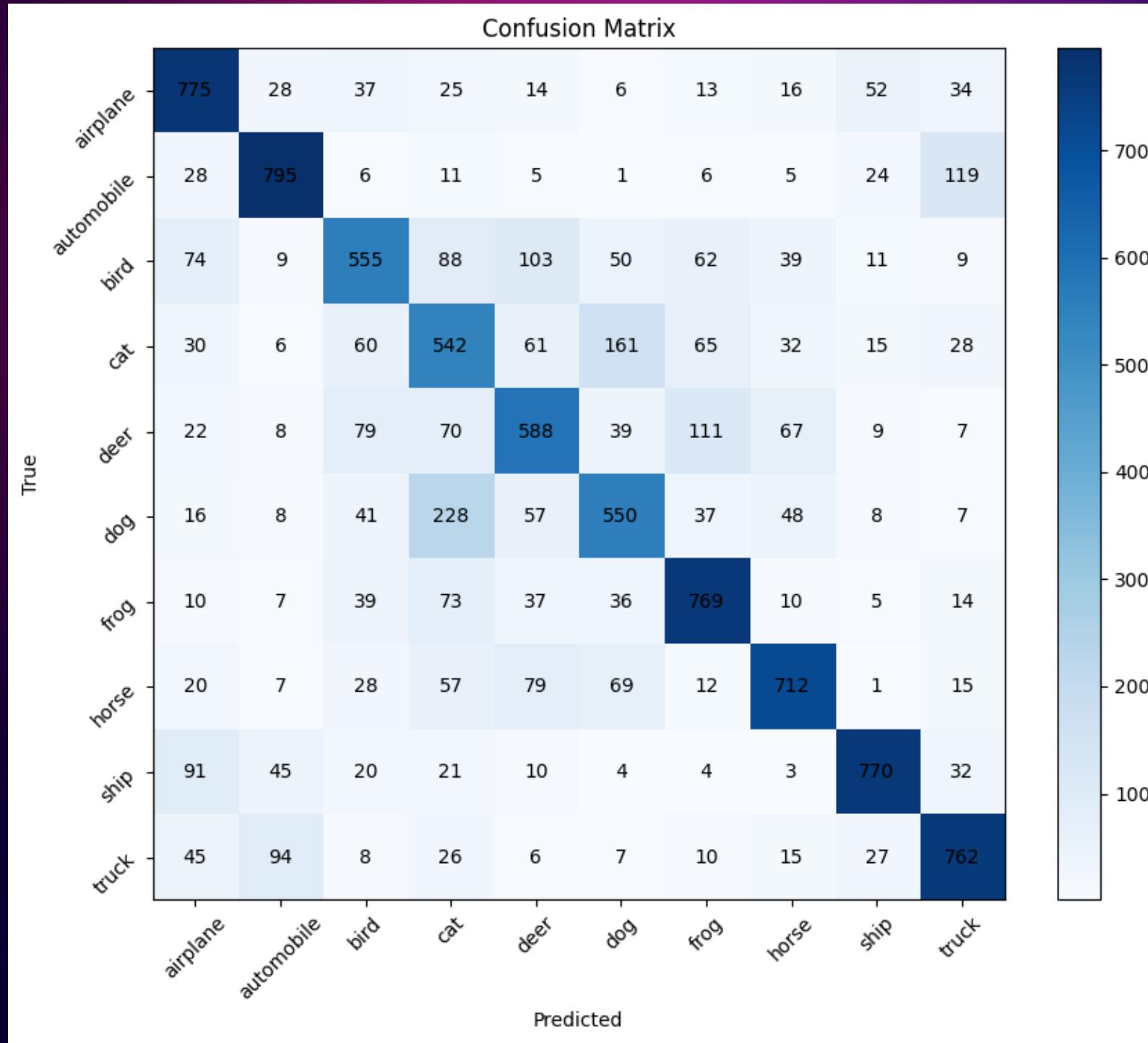
# Results

Dataset	Accuracy	F1-Score	ROC-AUC Score
CNN	83.71%	0.8372	0.95
ResNet50	68.18%	0.6797	0.9151
<b>Pretrained ResNet50</b>	<b>86.17%</b>	<b>0.8618</b>	<b>0.9551</b>
DenseNet161	79.12%	0.7921	0.9434
<b>Pretrained DenseNet161</b>	<b>84.87%</b>	<b>0.8484</b>	<b>0.9541</b>
<u>CvT</u>	68.70%	0.6859	0.9213
<b>ViT-B-32</b>	<b>56.59%</b>	<b>0.5648</b>	<b>0.8741</b>

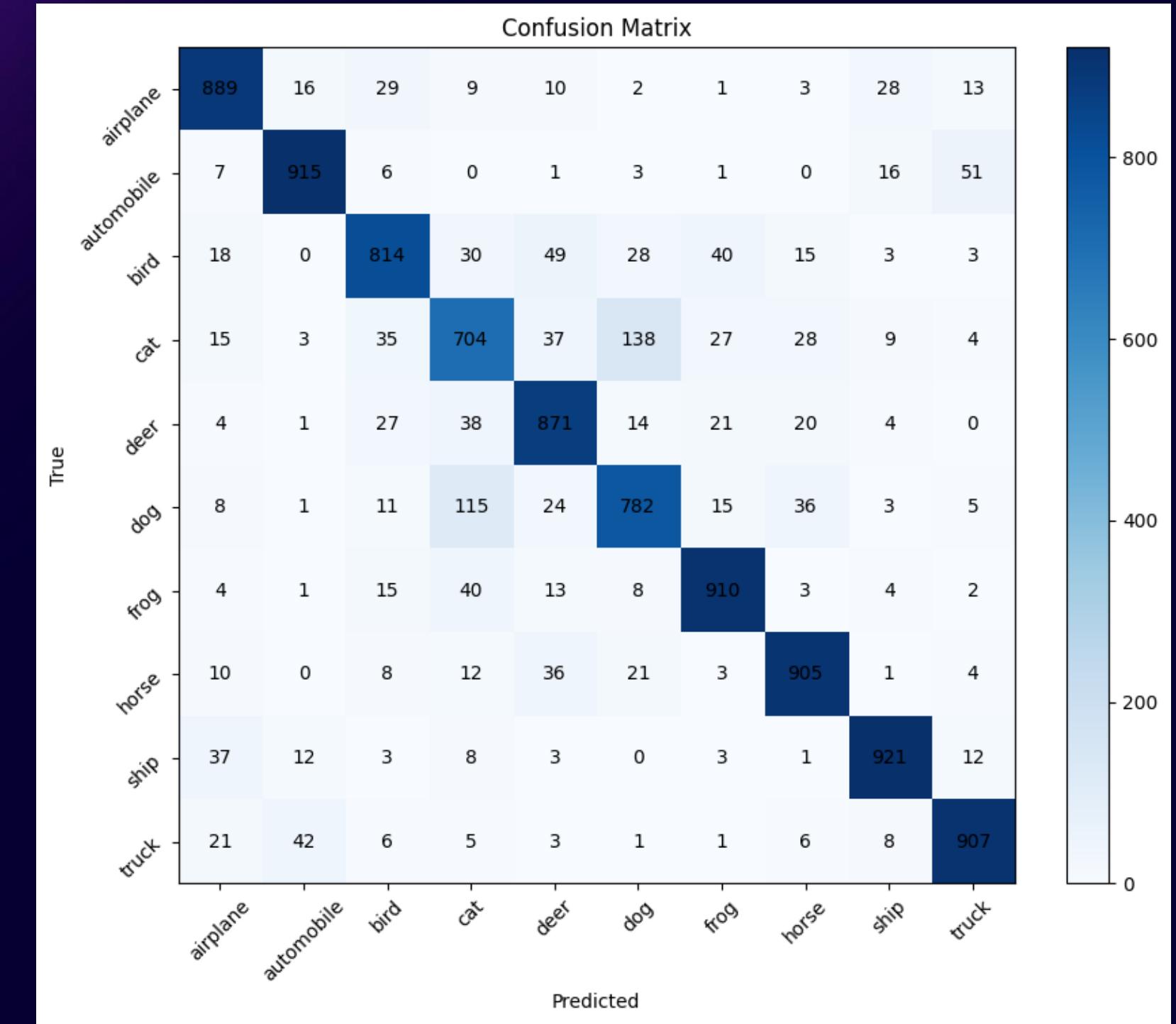
# Confusion Matrix – CNN



# Confusion Matrix – ResNet

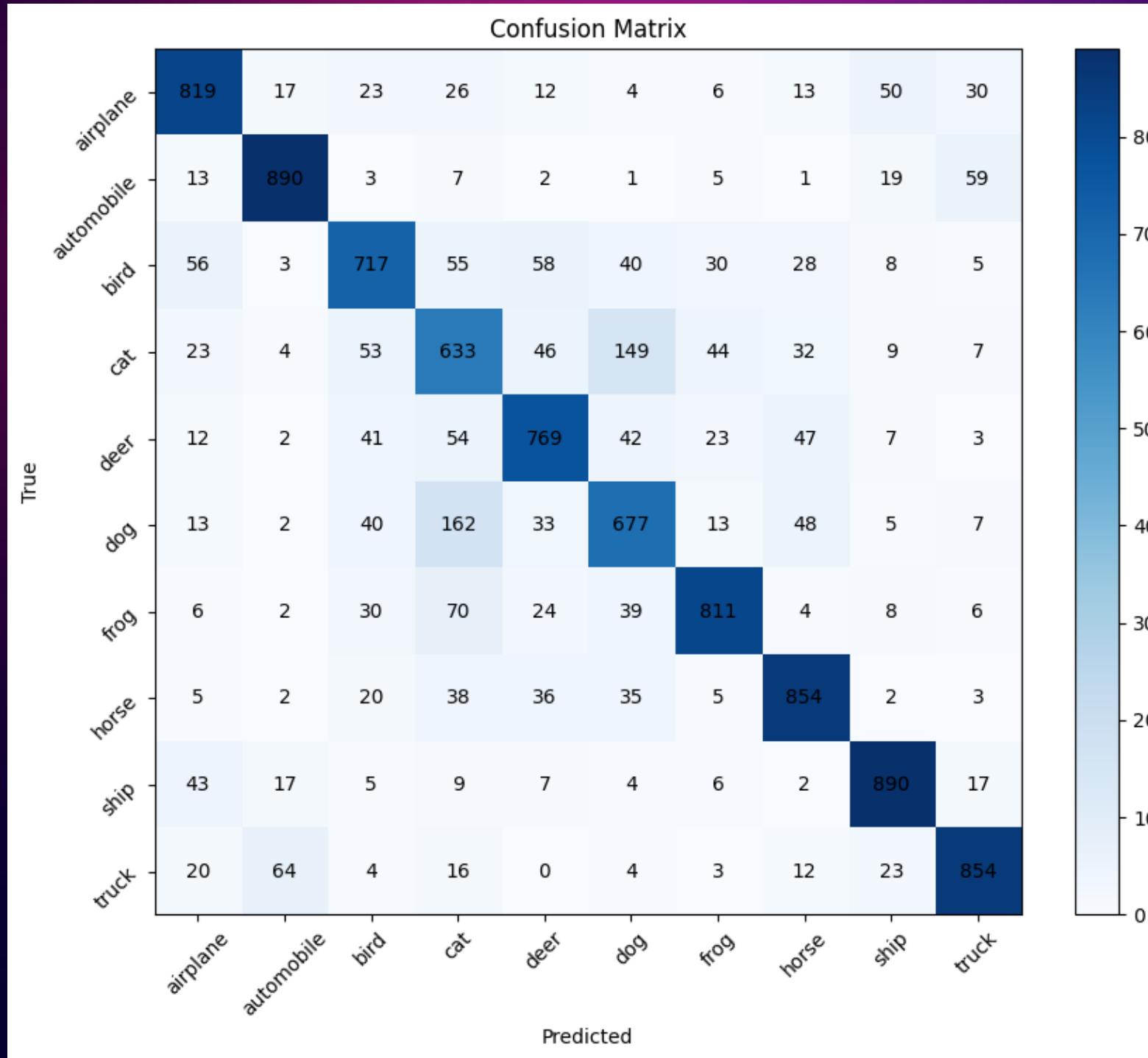


scratch

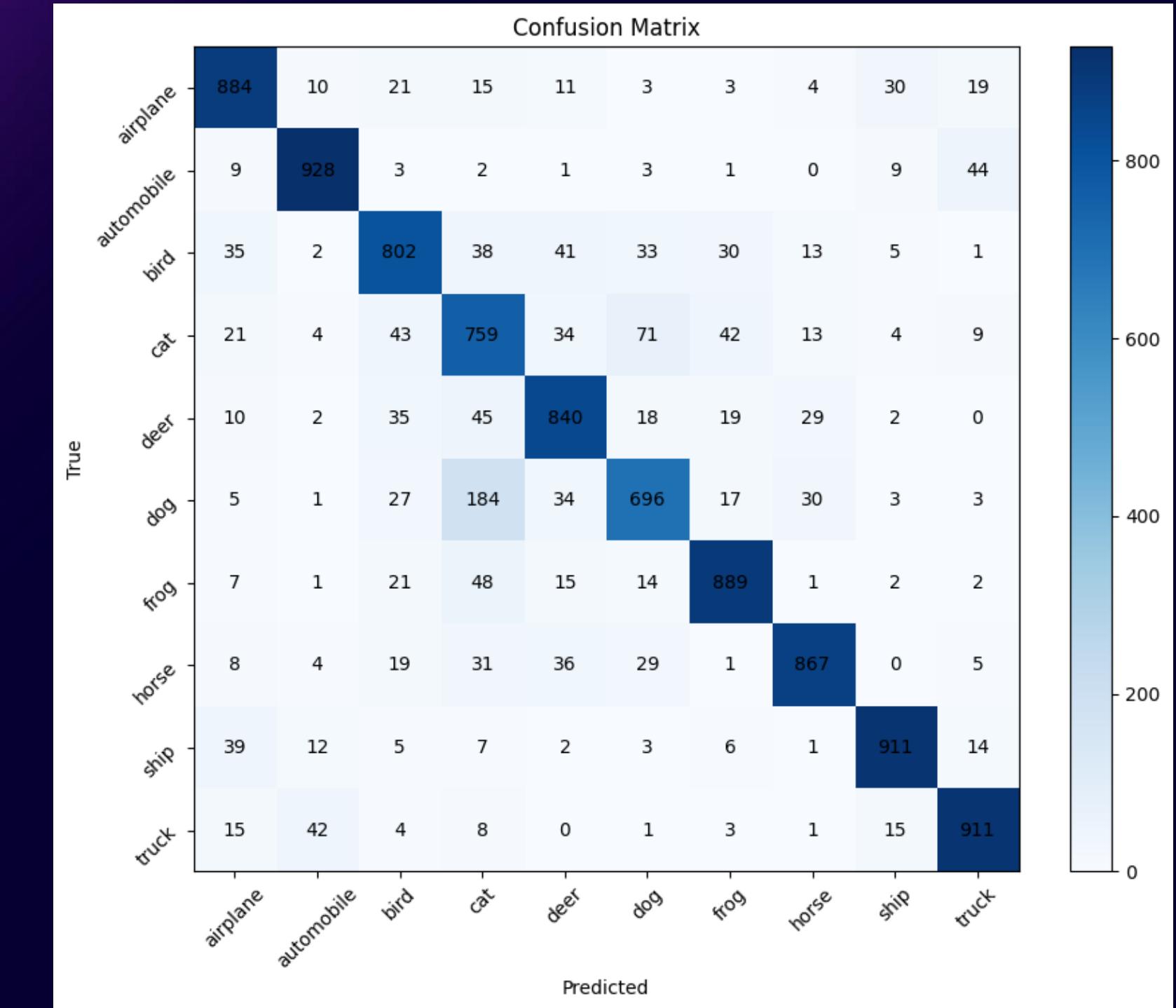


pretrained

# Confusion Matrix – DenseNet

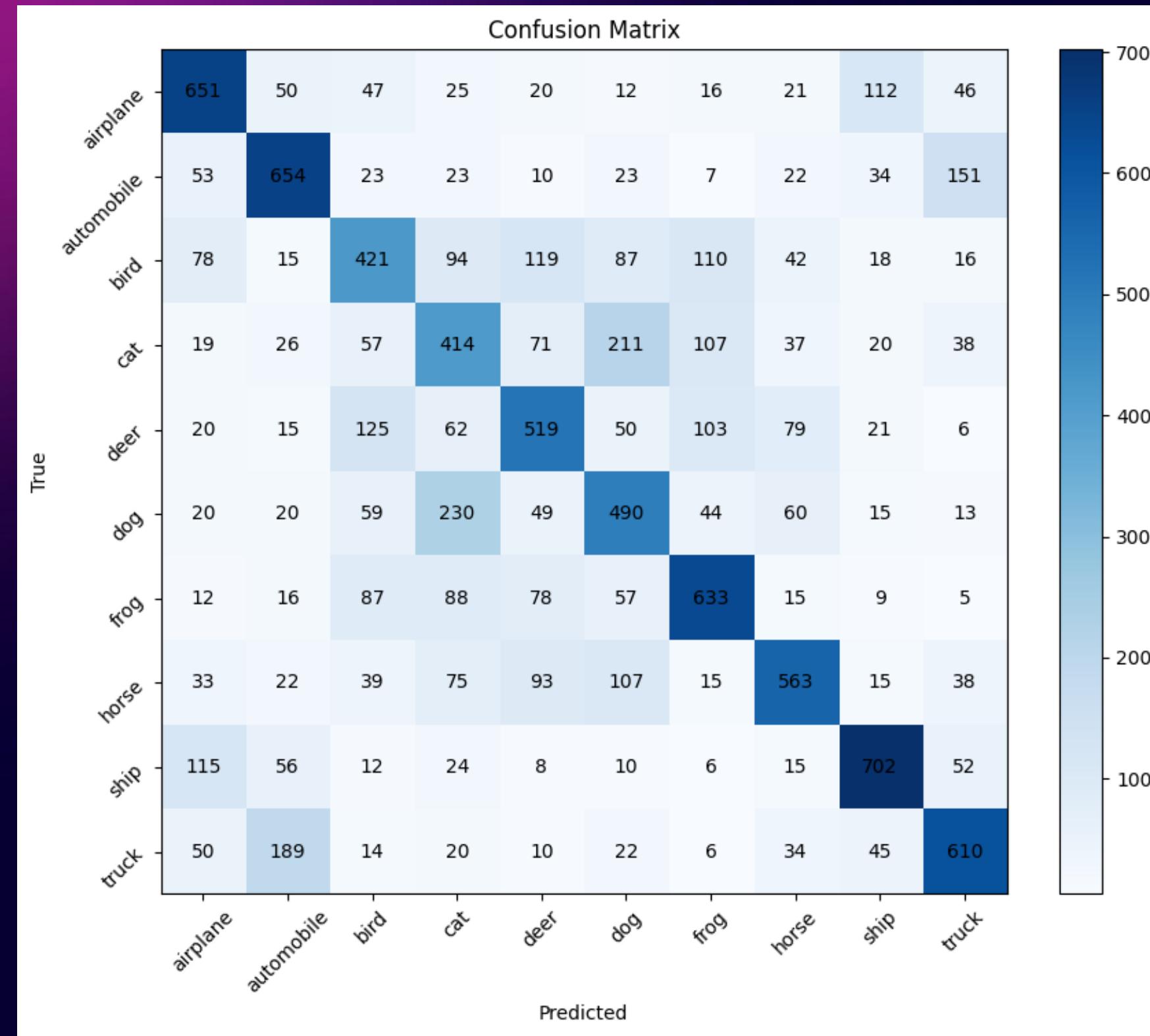


scratch

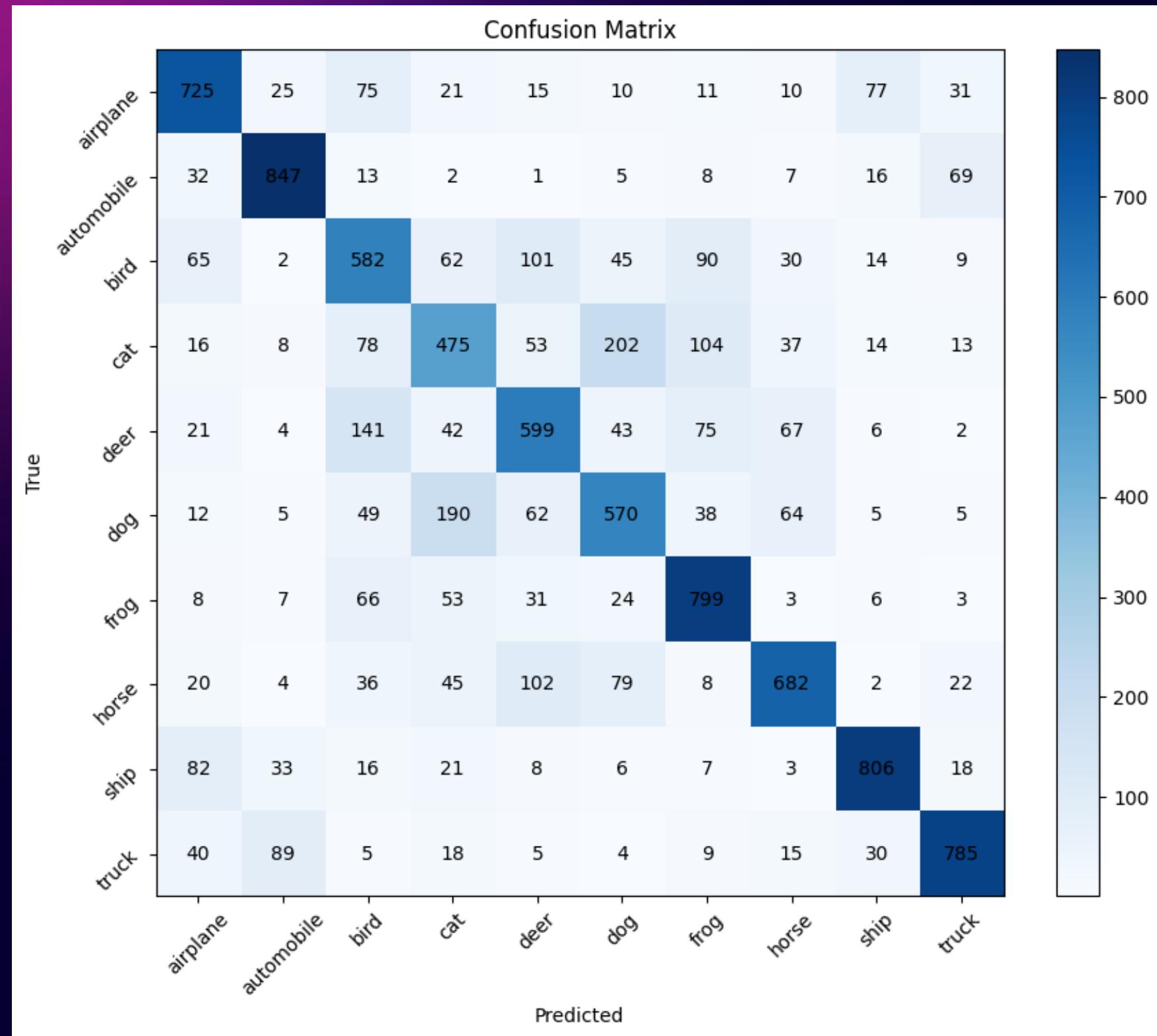


pretrained

# Confusion Matrix – ViT

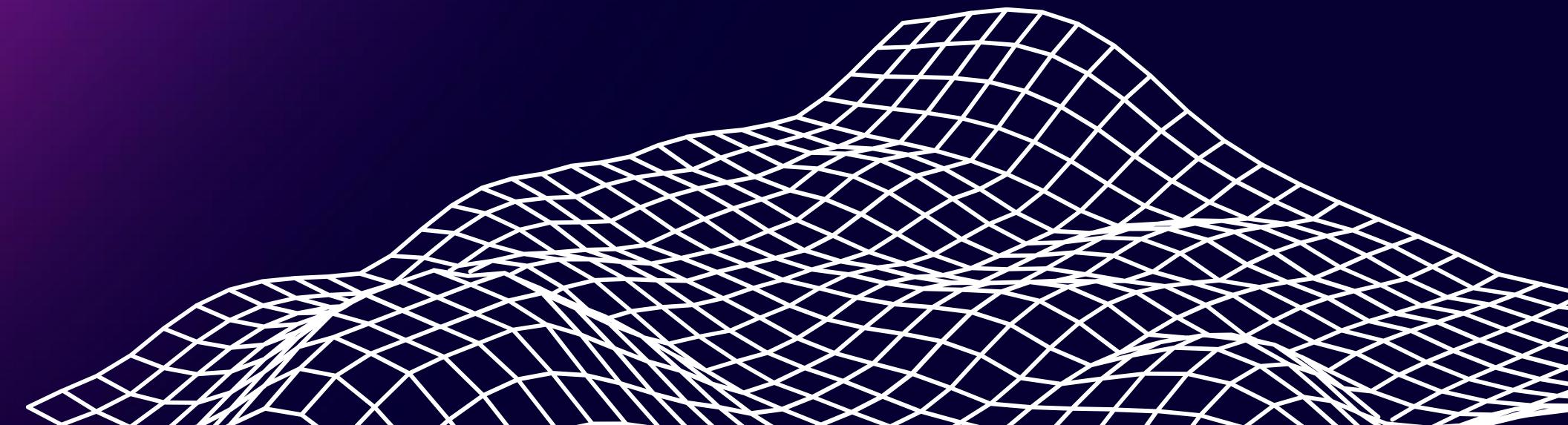


# Confusion Matrix – CvT



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## Conclusions



# THANK YOU!

