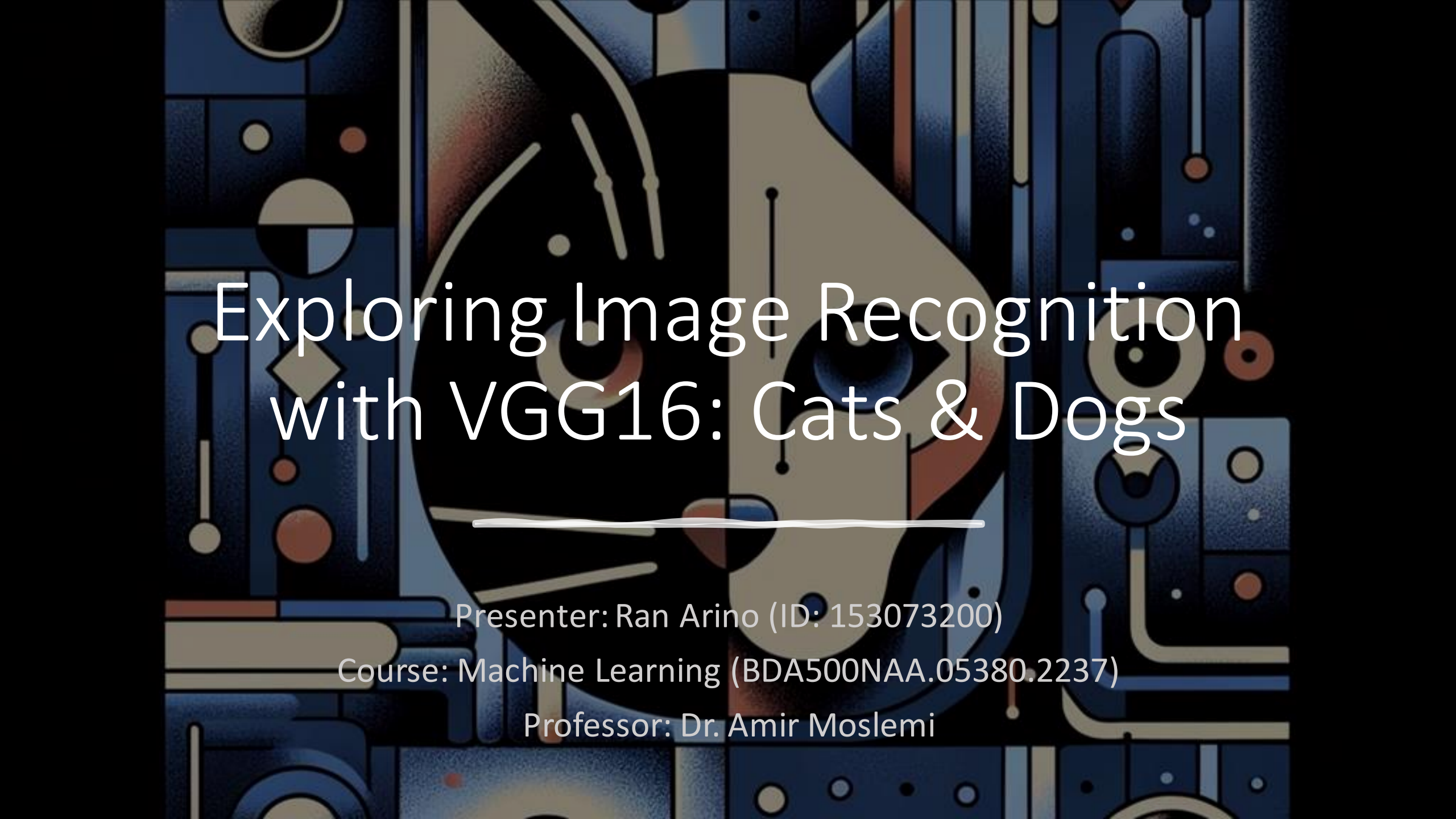


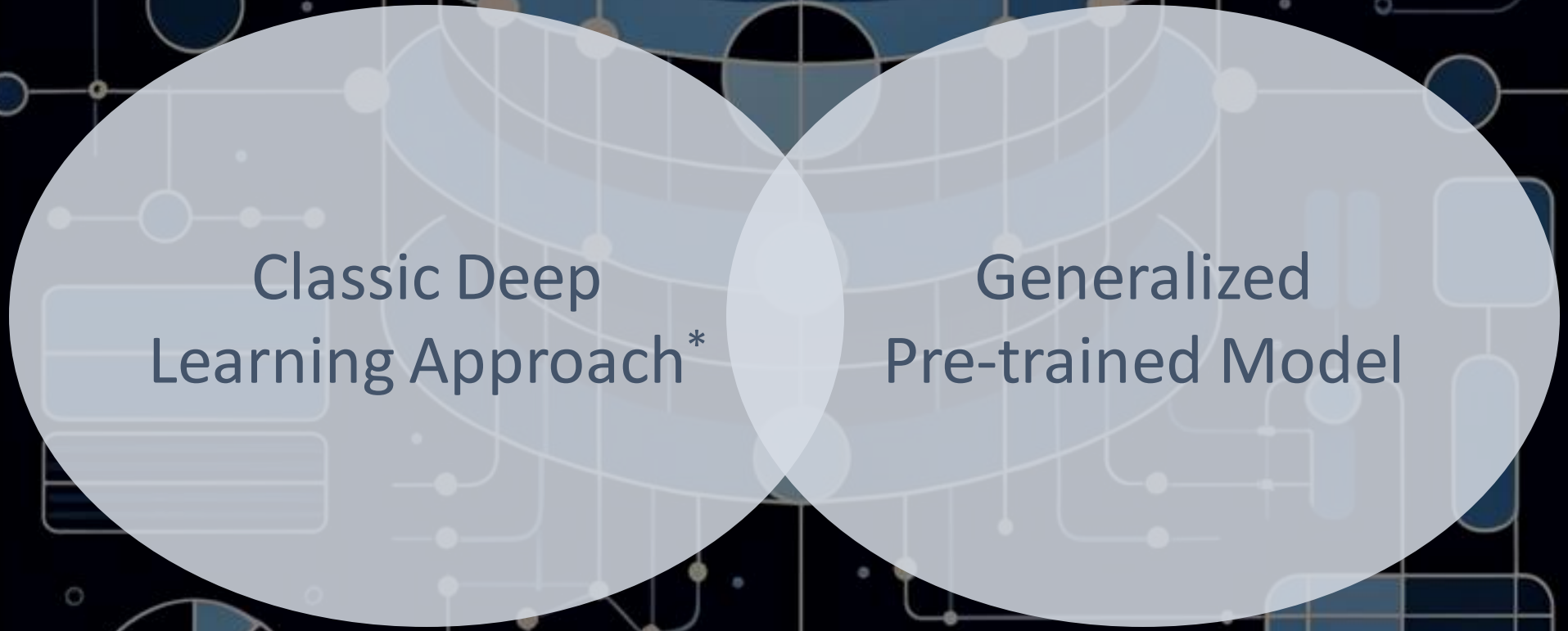
Exploring Image Recognition with VGG16: Cats & Dogs

Presenter: Ran Arino (ID: 153073200)

Course: Machine Learning (BDA500NAA.05380.2237)

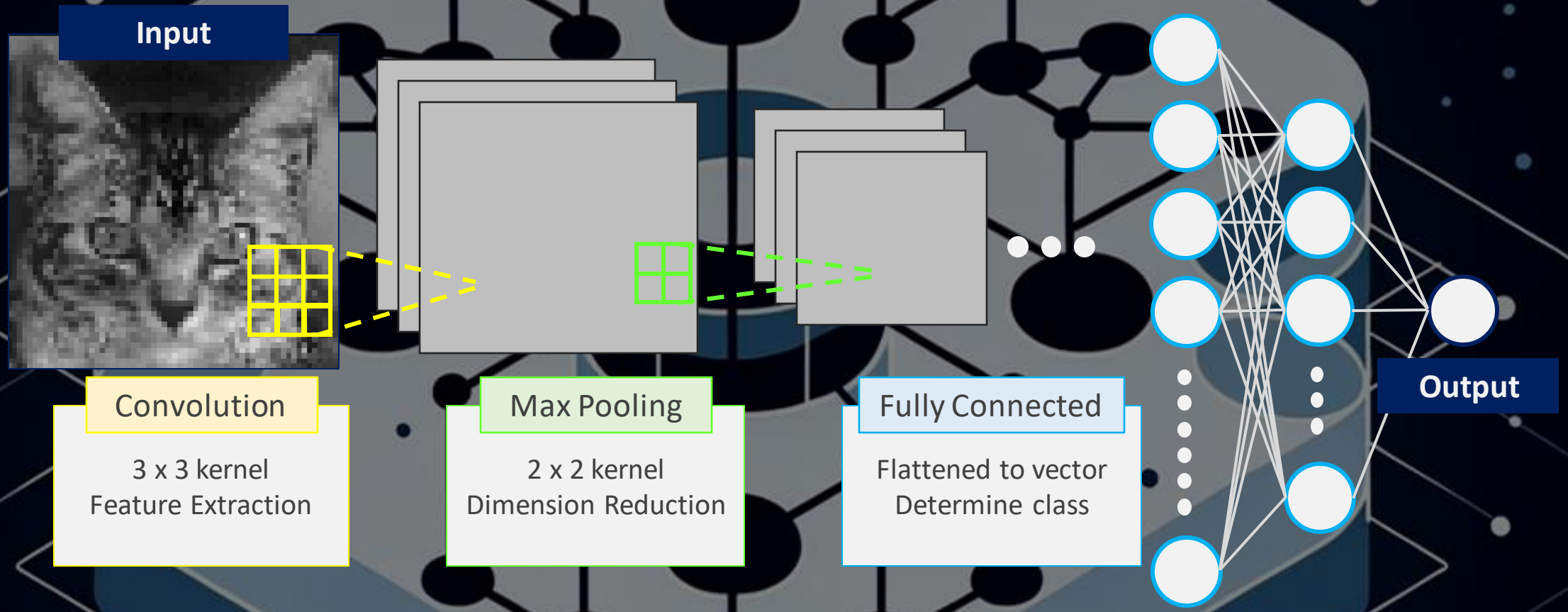
Professor: Dr. Amir Moslemi

VGG16 Overview



* Gu et al., 2021

Convolutional Neural Networks (CNNs)



Convolution

3 x 3 kernel
Feature Extraction

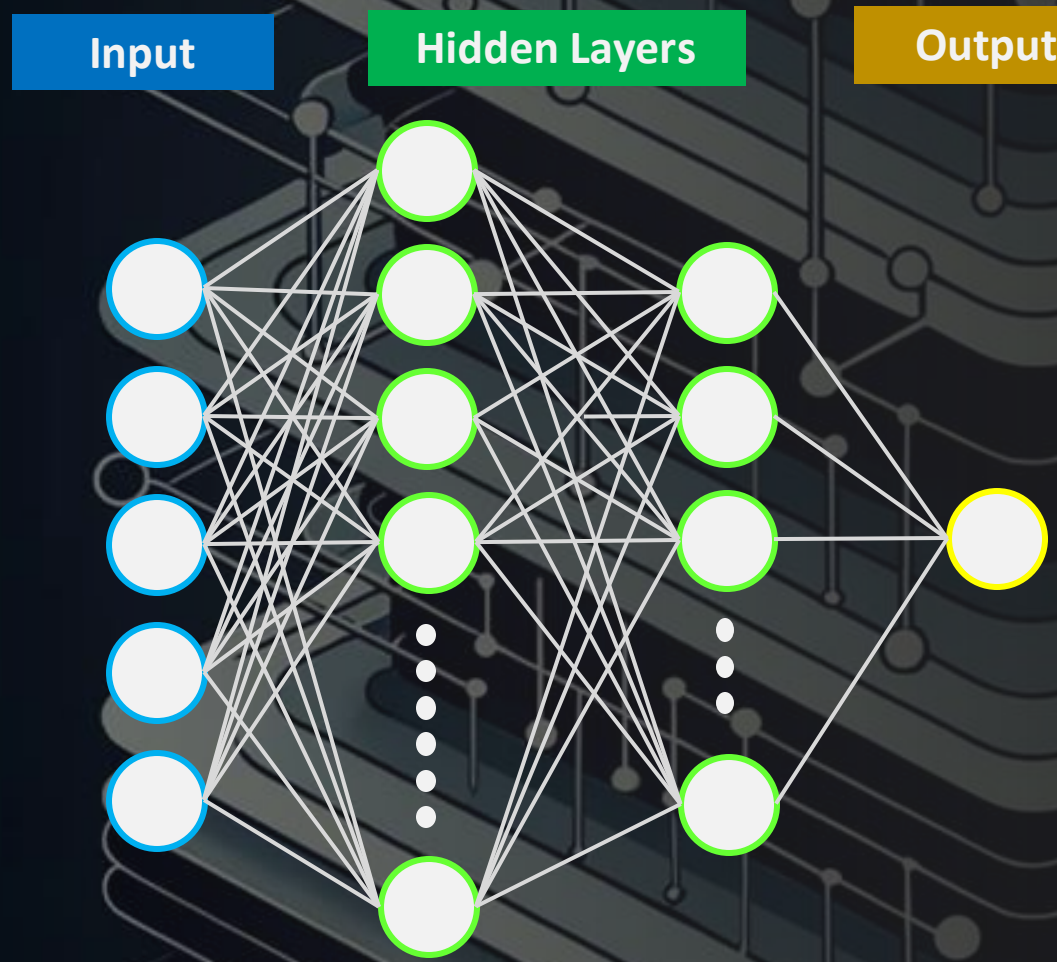
Max Pooling

2 x 2 kernel
Dimension Reduction

Fully Connected

Flattened to vector
Determine class

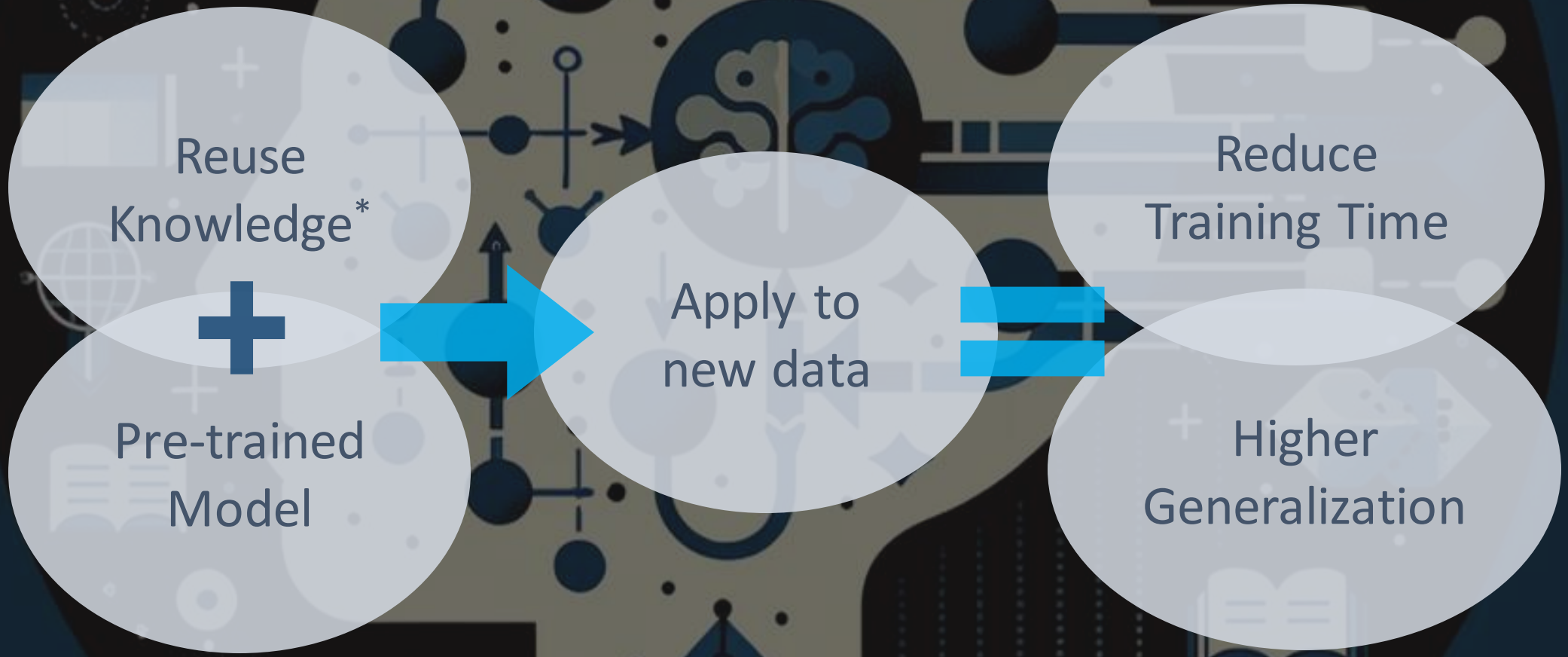
Multiple Layer Perceptron (MLP)



- One or more hidden layers between an input and output layer.*
- Non-linear transportations due to activation functions; sigmoid, tanh, relu, etc.*

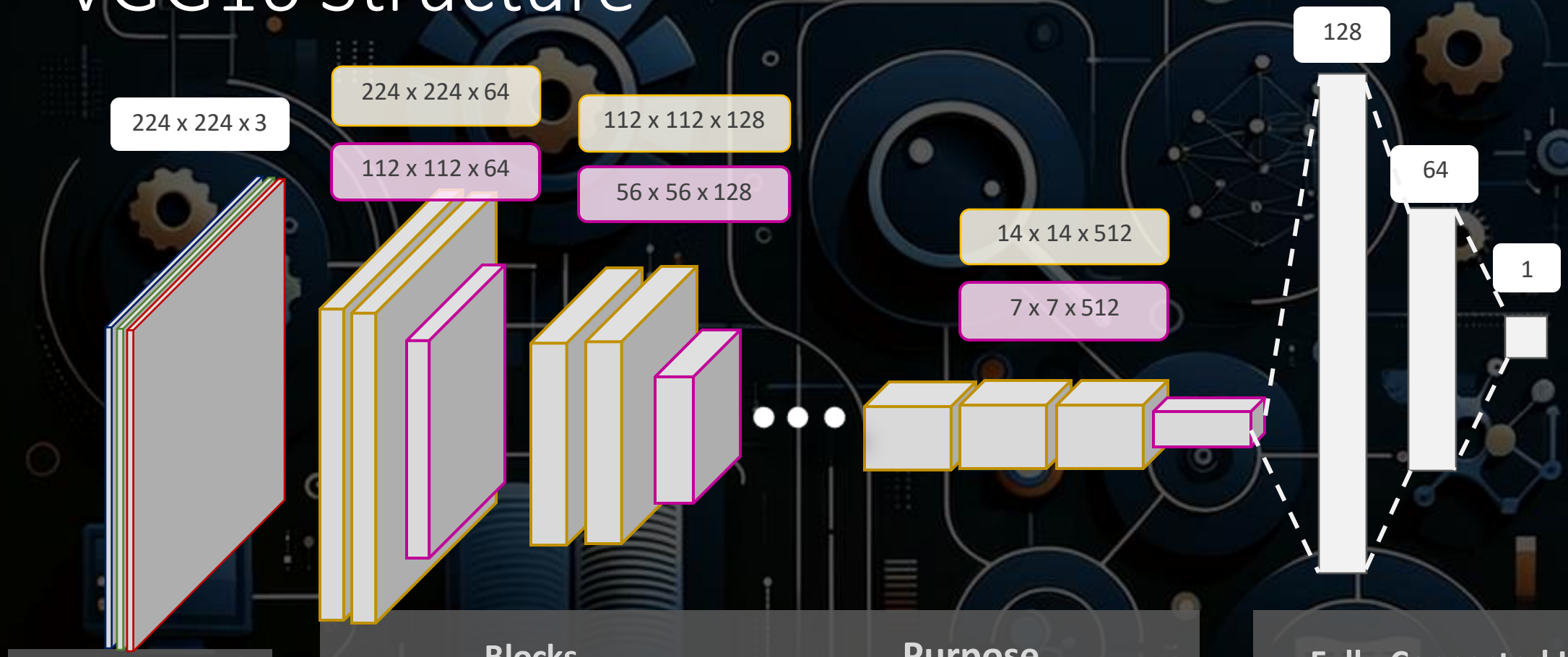
* Valls et al., 2021

Transfer Learning (TL)



* Hermana et al., 2021

VGG16 Structure



Input

RGB Images

Blocks

2 or 3 Convolutional Layers

1 Max-Pooling Layer

Purpose

Feature Extraction

Dimension Reduction

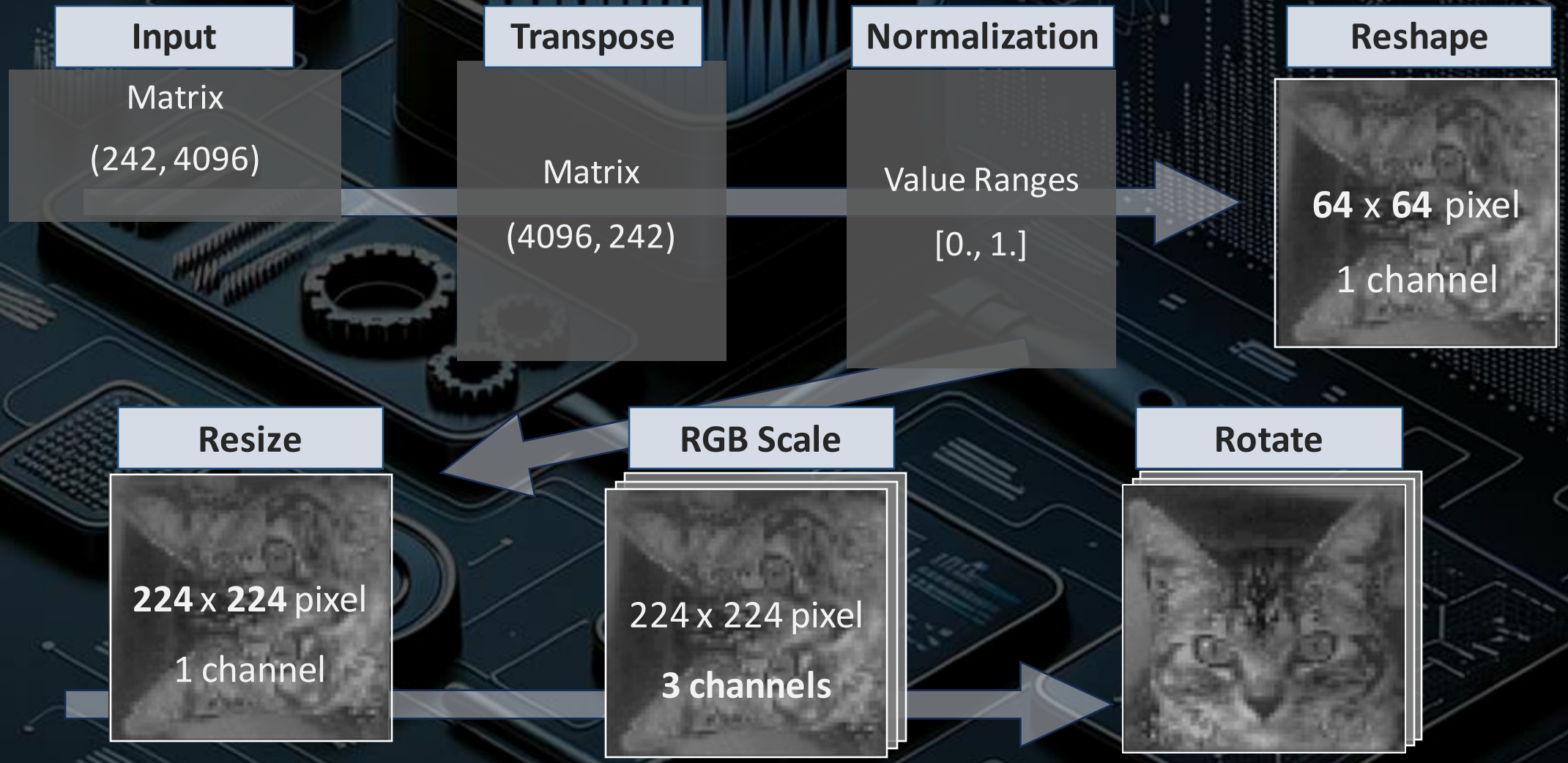
Fully Connected Layers

2 dense layers with ReLU

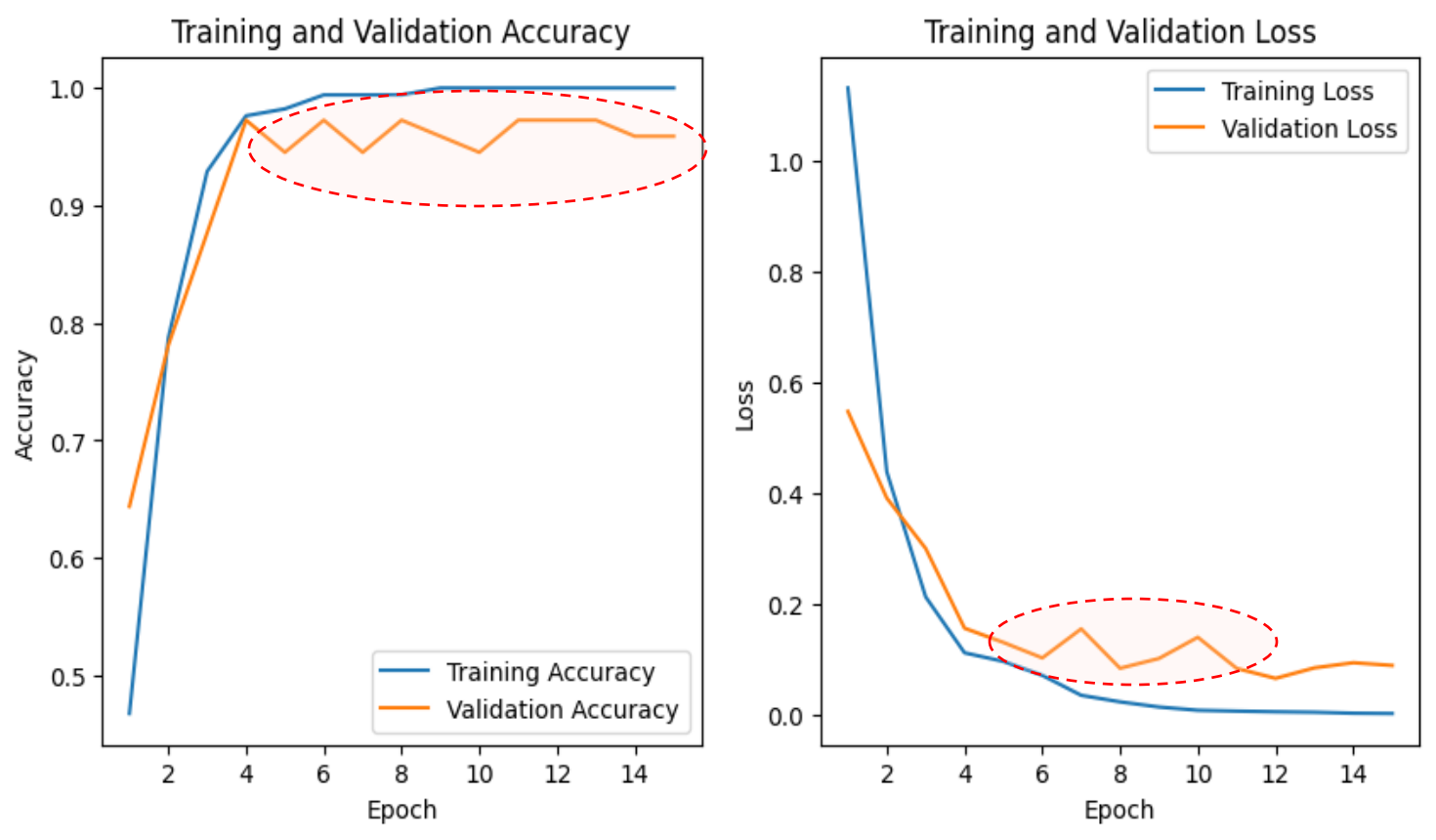
Finalize Label by Sigmoid

Simonyan & Zisserman (2015)

Data Preprocessing



Results – Each Training

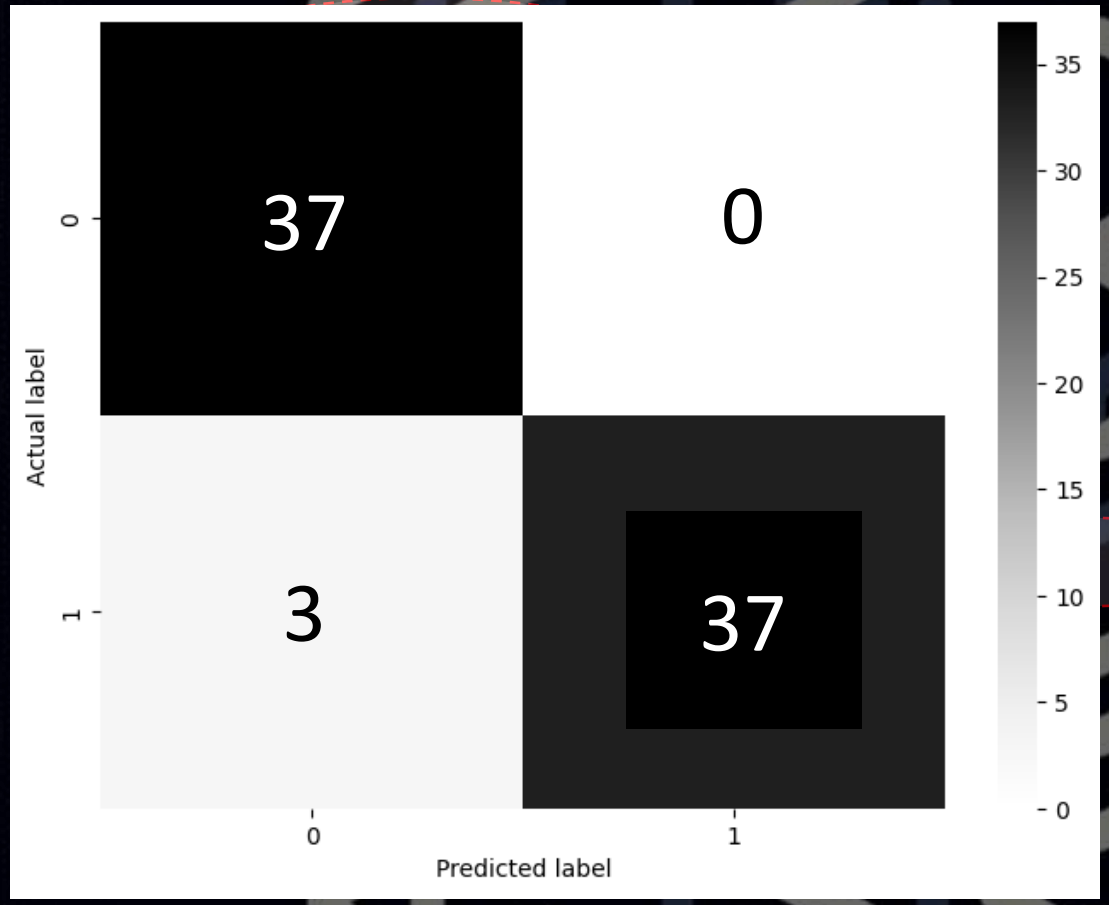


Parameters:
- 15 epochs
- 32 batch sizes

Higher accuracy for training and validation data.

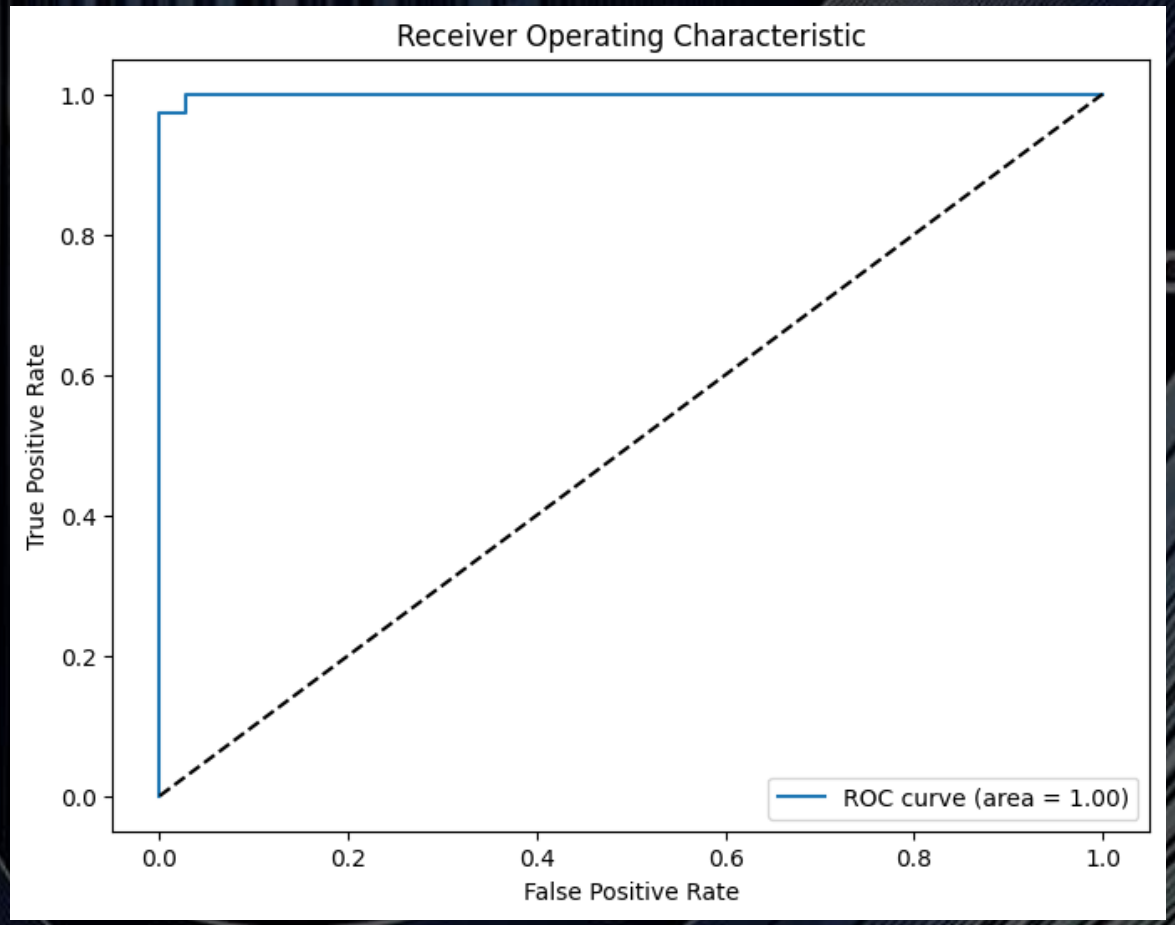
Model may overfit the data due to fluctuations.

Results – Confusion Matrix



- High level of accuracy in the classification tasks.
- Misclassify when predicted cats but dogs actually

Result – ROC curve



- Ideal shape of the ROC curve; perpendicular
- Nearly perfect scores in area under ROC curve

Conclusions

- All metrics showed high performance in this classification tasks.
- Implying how robust and generalized the VGG16 network is.
- Challenge of overfitting on the training data
- Next approach; regularizations, dropout rate, and early stopping.

References

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