

# Deep Learning

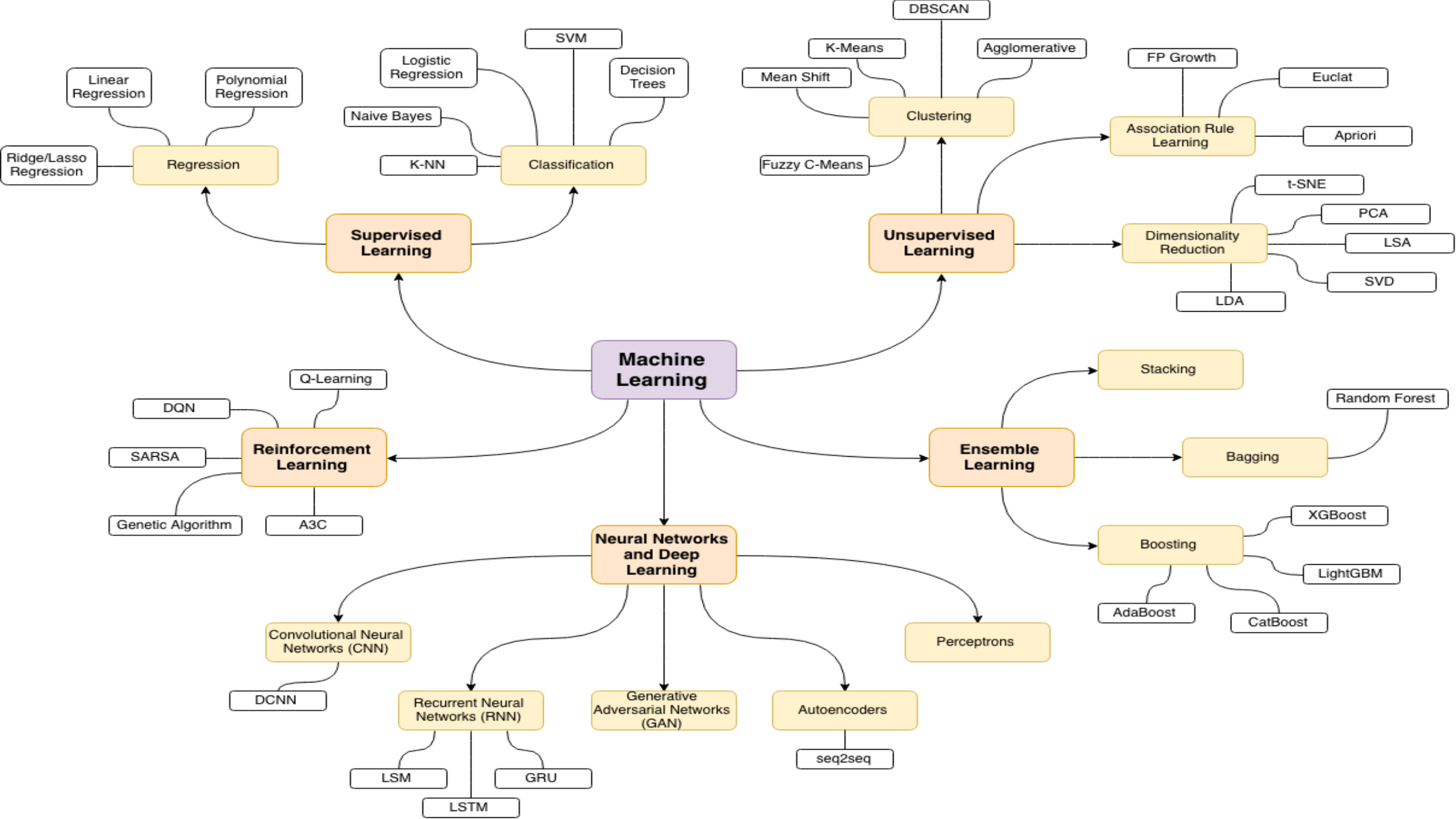
By MXK



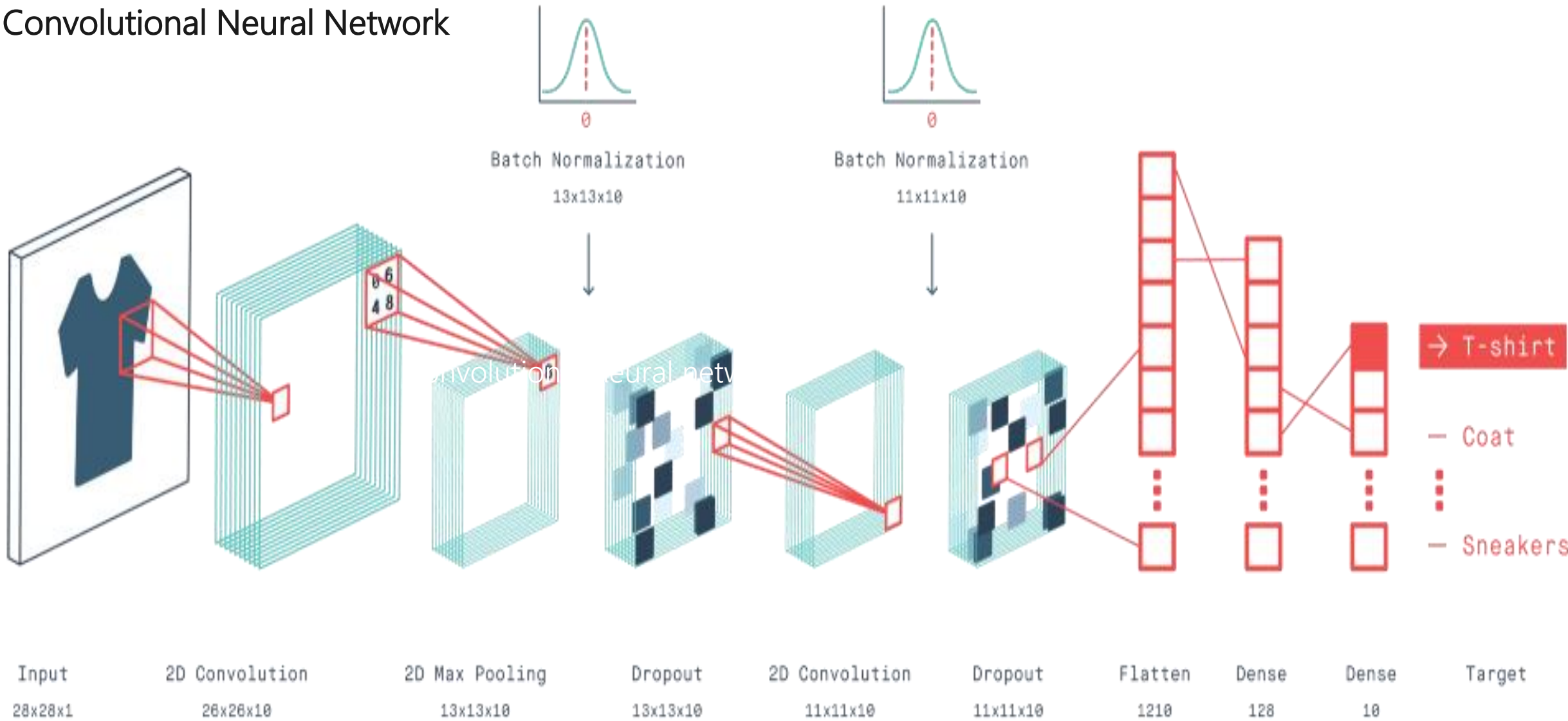
# Summary

- 1- Machine Learning Roadmap
- 2- Convolutional Neural Network
- 3- Microsoft Azure Example
- 4- Transfer Learning (VGG16)
- 6- gColab
- 7- Kahoot
- 8- Closing Thoughts





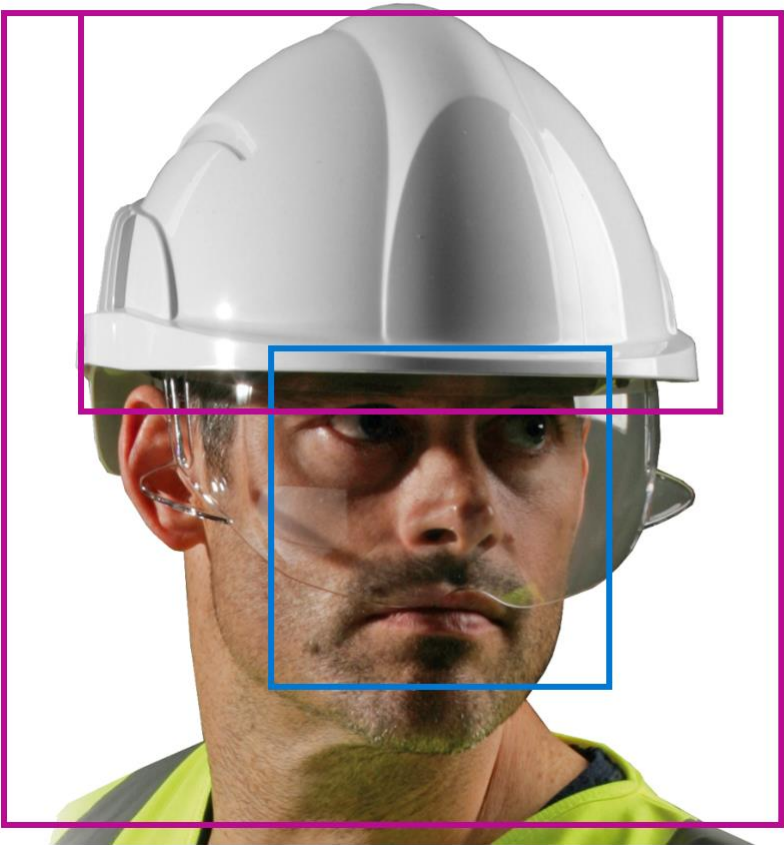
# Convolutional Neural Network



# Adapting Computer Vision models with your own data

Transfer learning with Azure Cognitive Services Custom Vision

# Cognitive Services Computer Vision



FEATURE NAME:	VALUE
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Tags	[ { "name": "man", "confidence": 0.999212 }, { "name": "headdress", "confidence": 0.99731946 }, { "name": "person", "confidence": 0.995057464 }, { "name": "clothing", "confidence": 0.991814733 }, { "name": "wearing", "confidence": 0.9827137 }, { "name": "hat", "confidence": 0.9691986 }, { "name": "helmet", "confidence": 0.9227209 }, { "name": "headgear", "confidence": 0.840476155 }, { "name": "personal protective equipment", "confidence": 0.8358513 }, { "name": "looking", "confidence": 0.832229853 }, { "name": "hard hat", "confidence": 0.8004248 }, { "name": "human face", "confidence": 0.785058737 }, { "name": "green", "confidence": 0.774040848 }, { "name": "fashion accessory", "confidence": 0.774040848 } ]

# Transfer Learning

Transfer learning is the reuse of a pre-trained model on a new problem. It's currently very popular in deep learning because it can train deep neural networks with comparatively little data.

This is very useful since most real-world problems typically do not have millions of labelled data points to train such complex models.

With transfer learning, we basically try to exploit what has been learned in one task to improve generalization in another. We transfer the weights that a network has learned at "task A" to a new "task B."

# Transfer Learning: VGG16

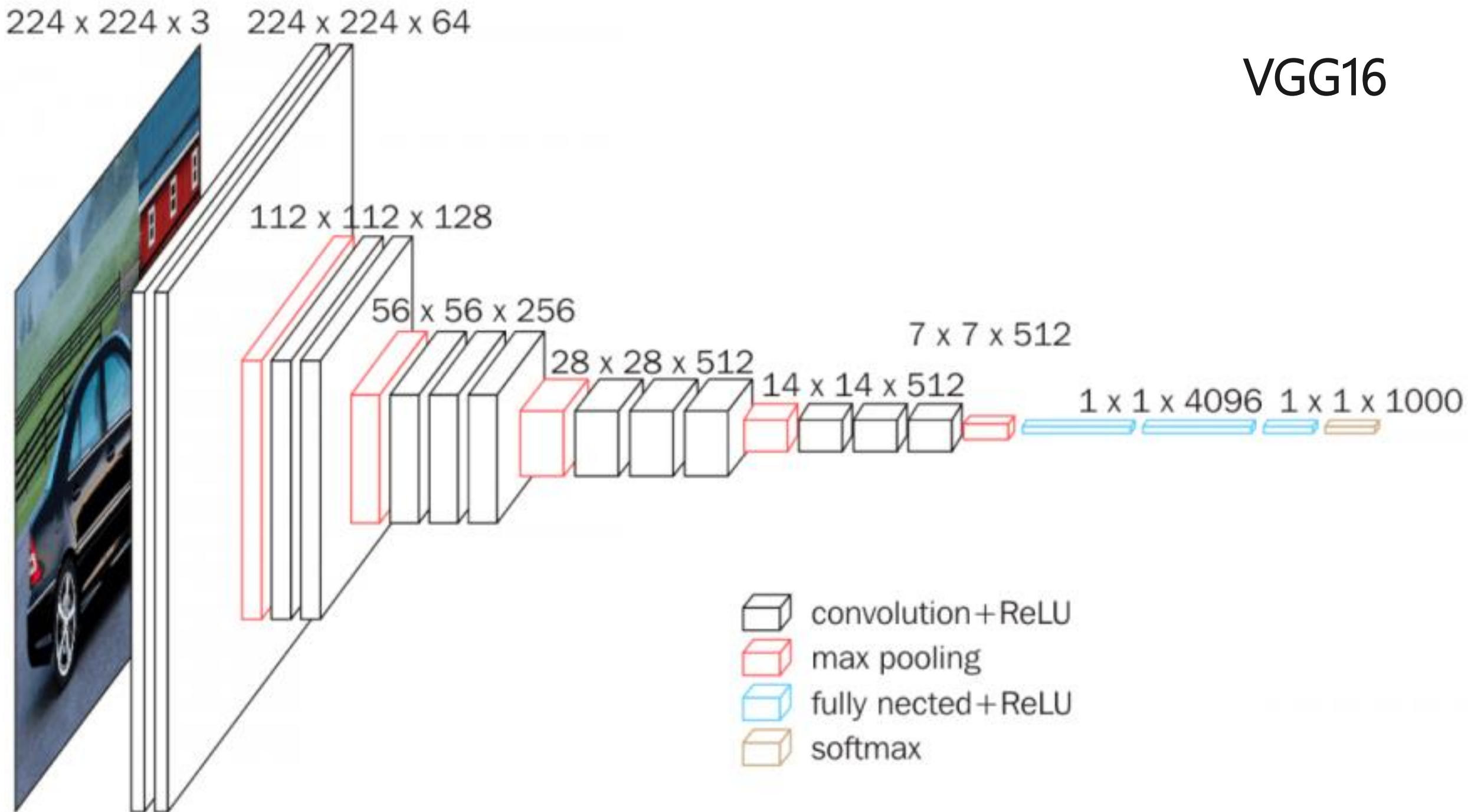
VGG16 is a convolutional neural network model proposed by K. Simonyan and A. Zisserman from the University of Oxford in the paper "Very Deep Convolutional Networks for Large-Scale Image Recognition".

The model achieves 92.7% top-5 test accuracy in ImageNet, which is a dataset of over 14 million images belonging to 1000 classes. It was one of the famous model submitted to ILSVRC-2014.

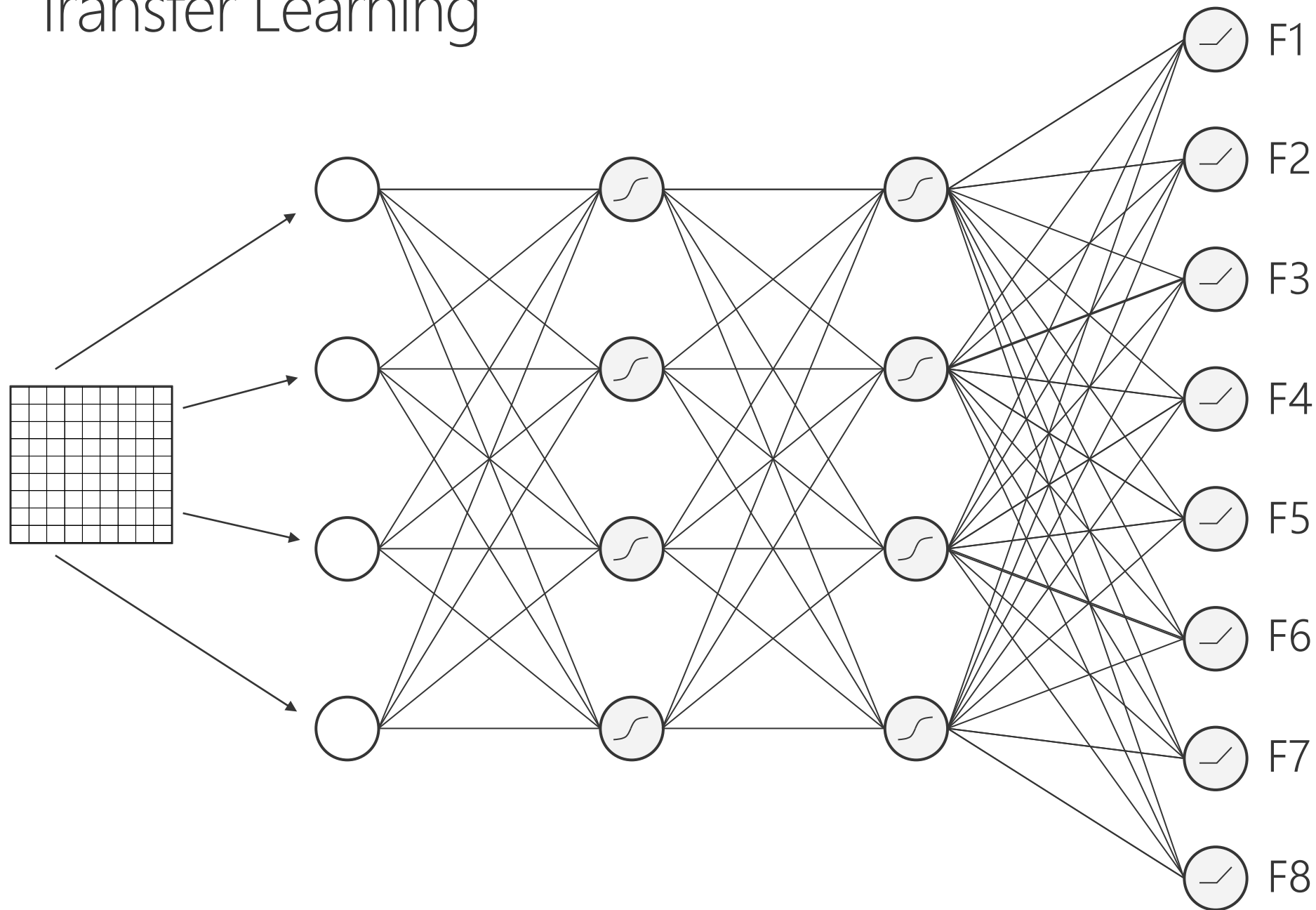
It makes the improvement over AlexNet by replacing large kernel-sized filters (11 and 5 in the first and second convolutional layer, respectively) with multiple  $3 \times 3$  kernel-sized filters one after another. VGG16 was trained for weeks and was using NVIDIA Titan Black GPU's.



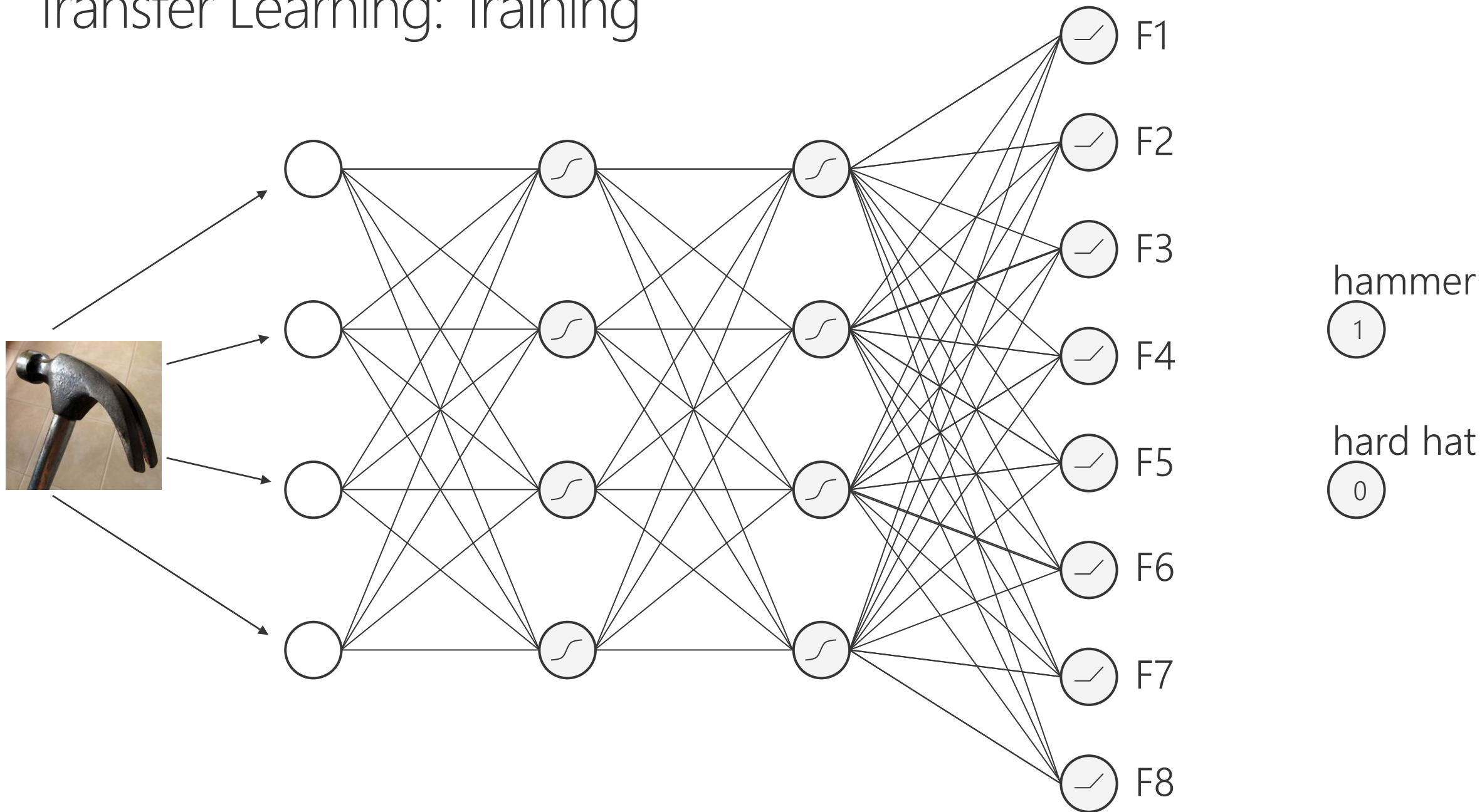
# VGG16



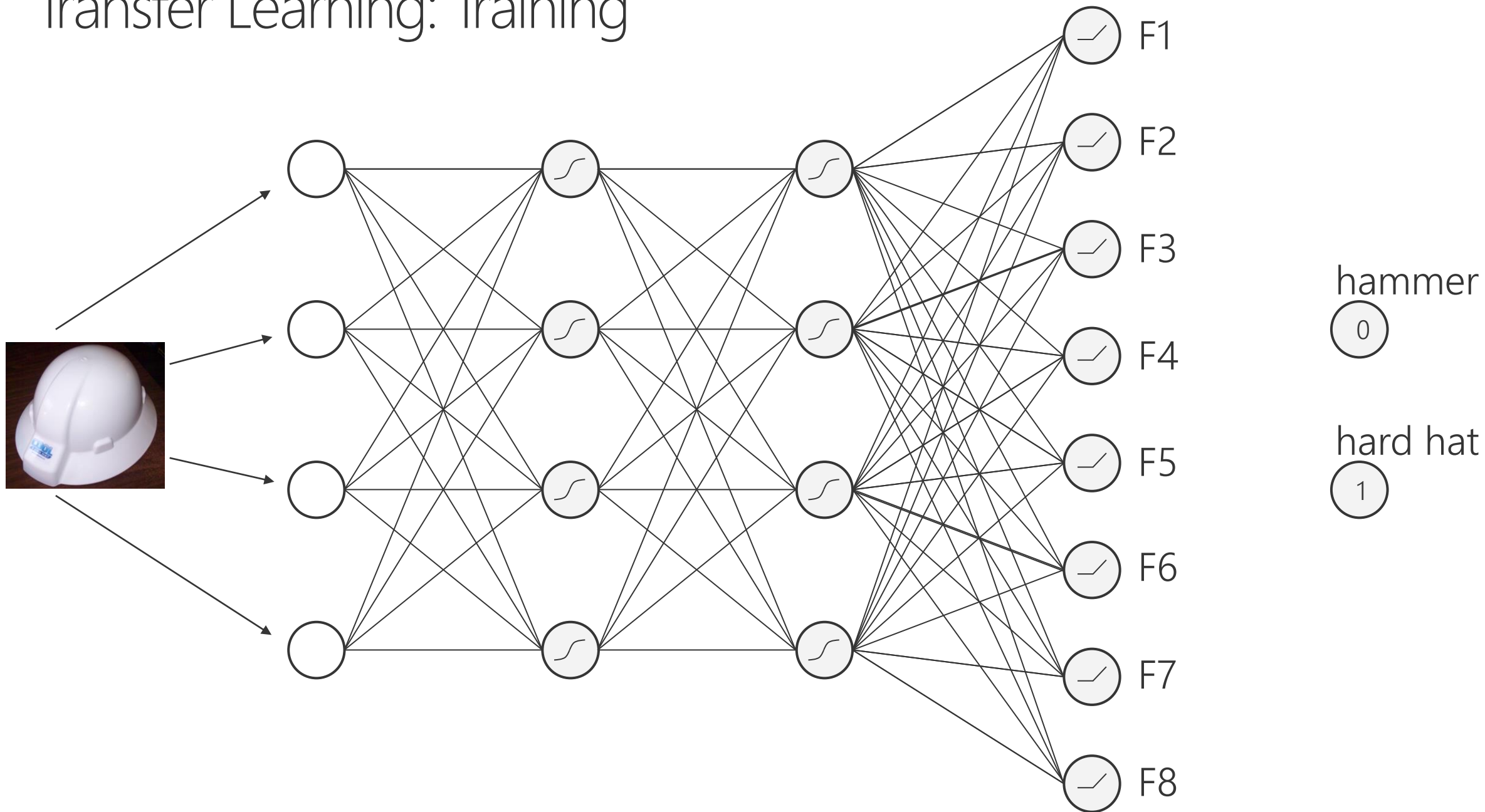
# Transfer Learning



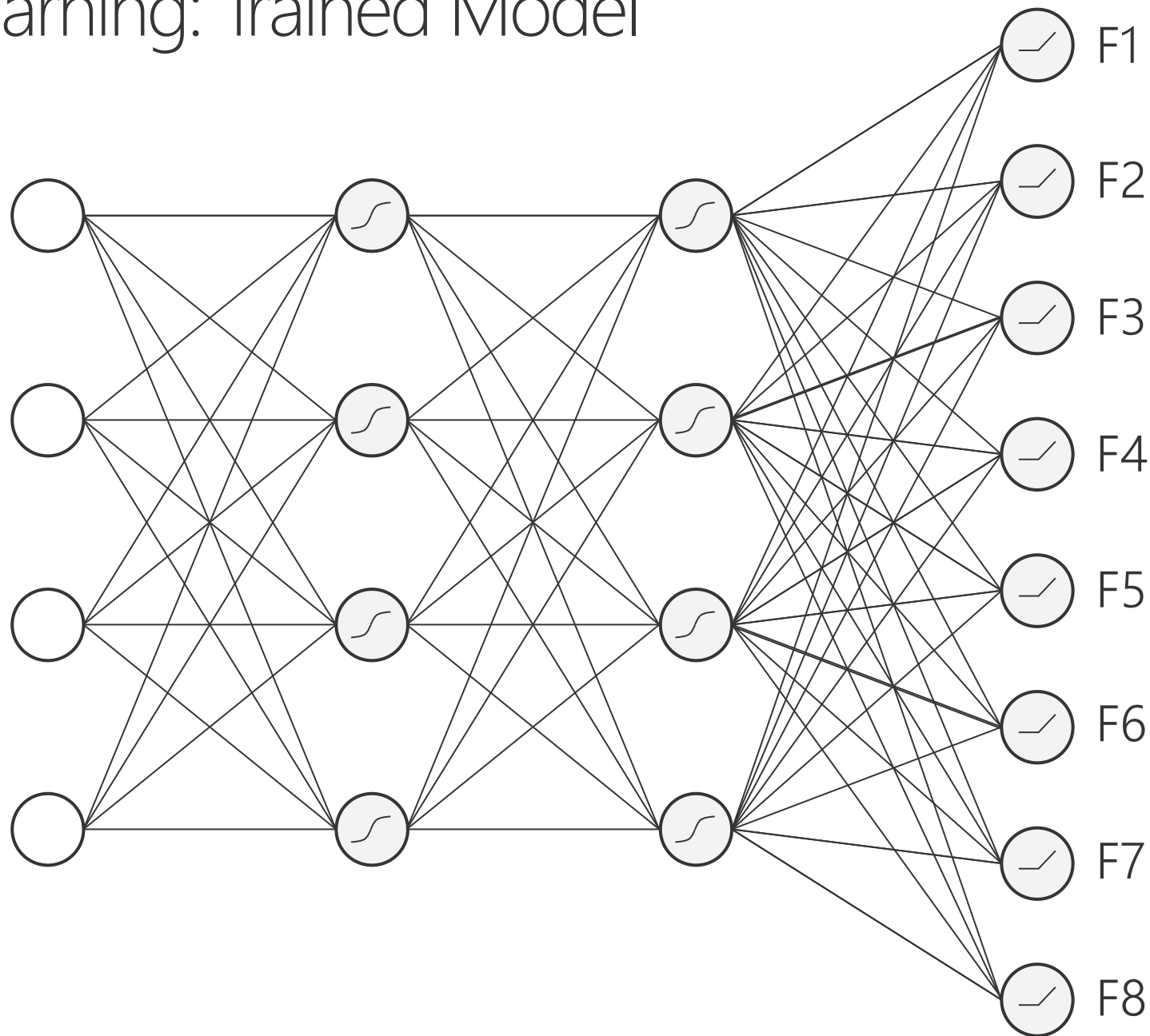
# Transfer Learning: Training



# Transfer Learning: Training



# Transfer Learning: Trained Model



hammer

0.10

**hard hat**

0.87





gColab Time ☺

The background is a complex, abstract network of interconnected nodes and lines. The nodes are represented by small circles in various shades of brown, tan, and grey. The lines connecting them are thin and light-colored, creating a dense, web-like pattern across the entire image. The overall aesthetic is modern and digital.

Kahoot Time 😊