Deep Learning

By MXK

Summary

1- Machine Learning Roadmap

2- Convolutional Neural Network

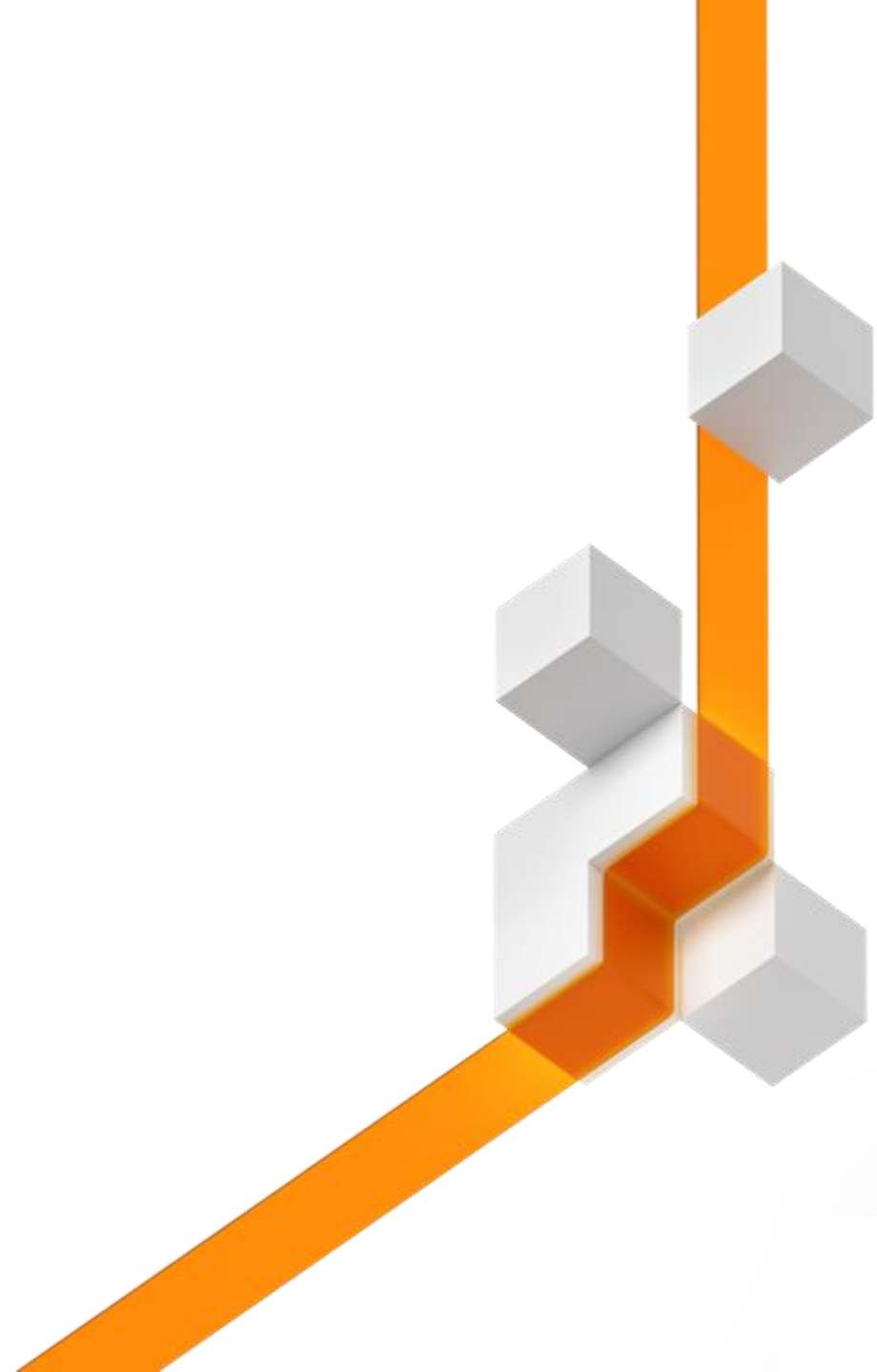
3- Microsoft Azure Example

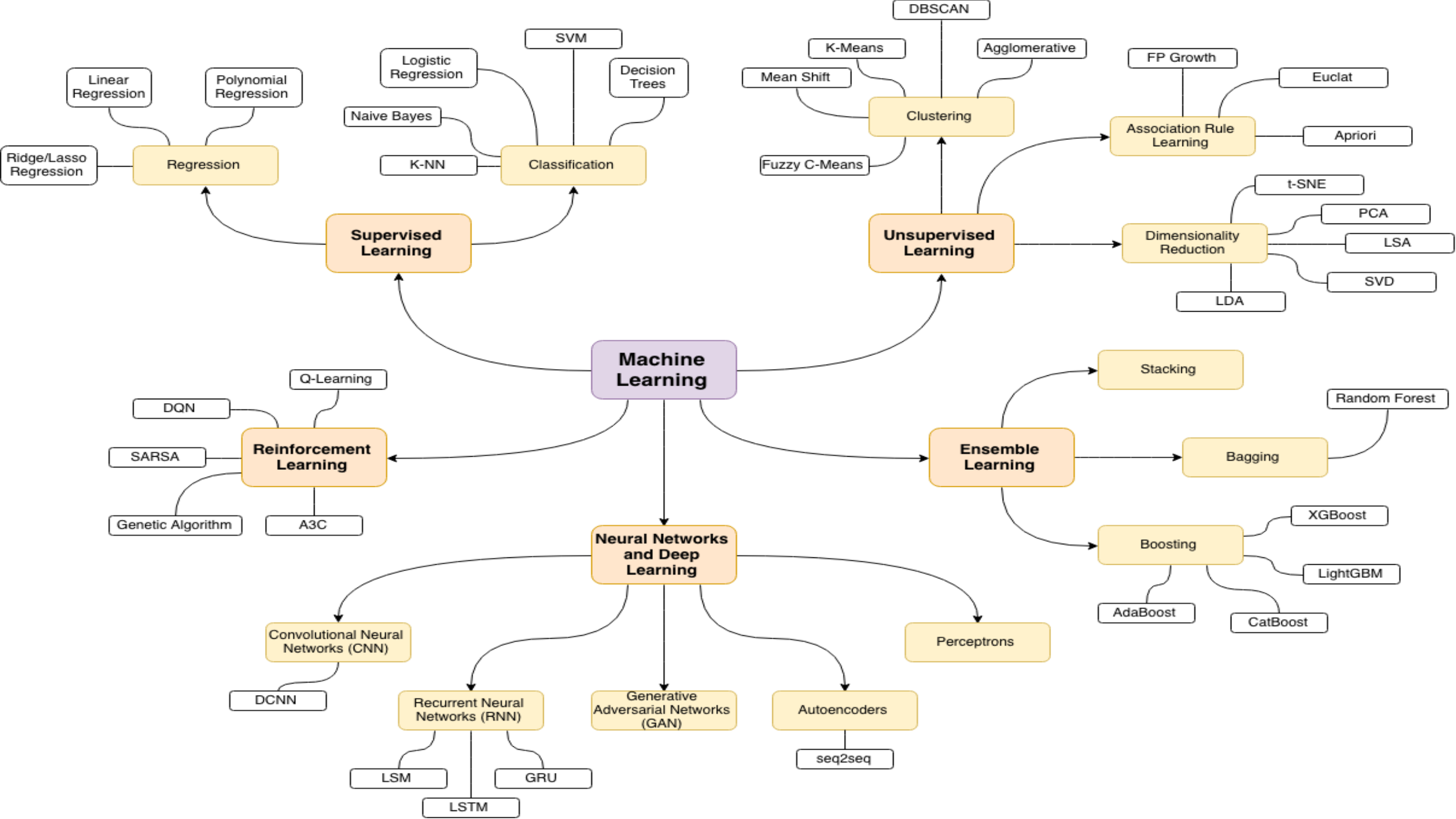
4- Transfer Learning (VGG16)

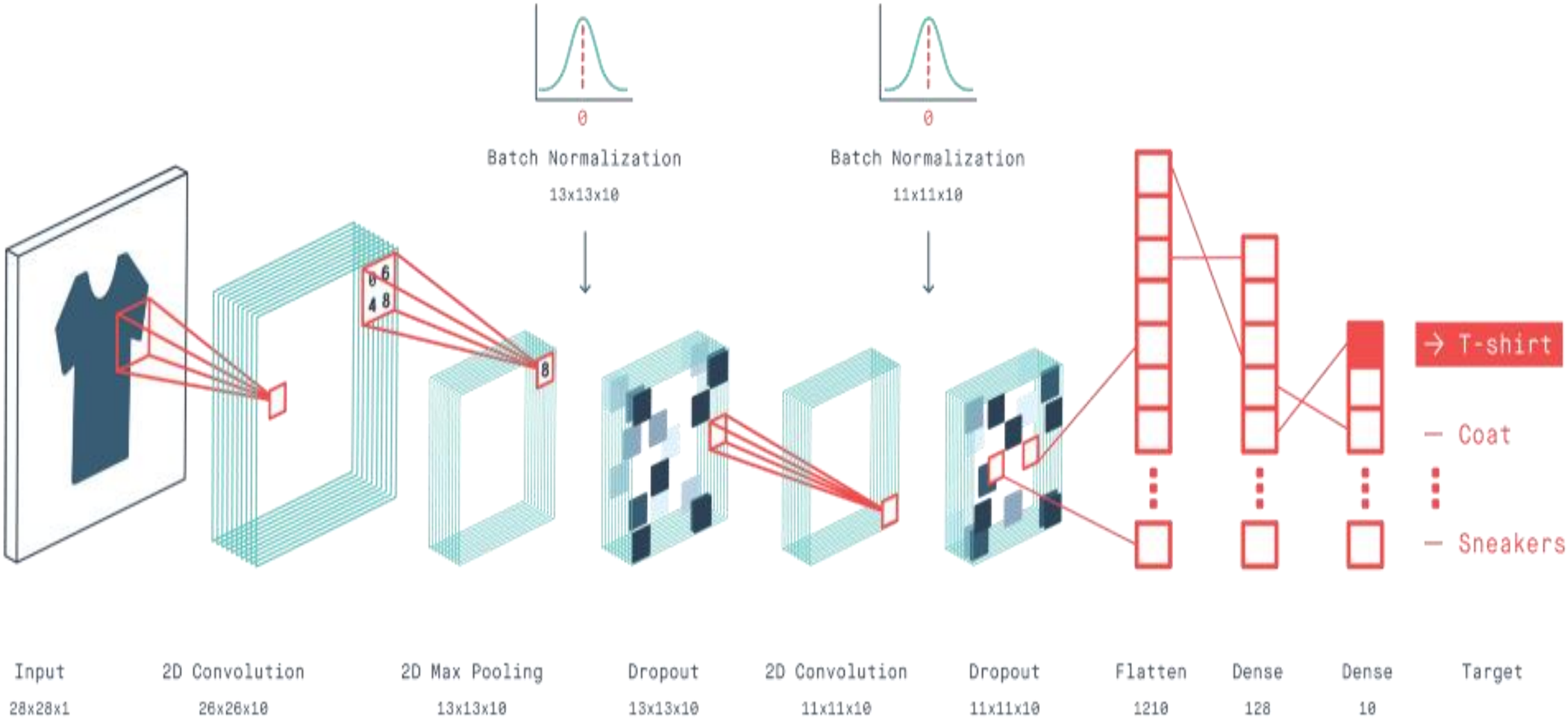
6- gColab

7- Kahoot

8- Closing Thoughts



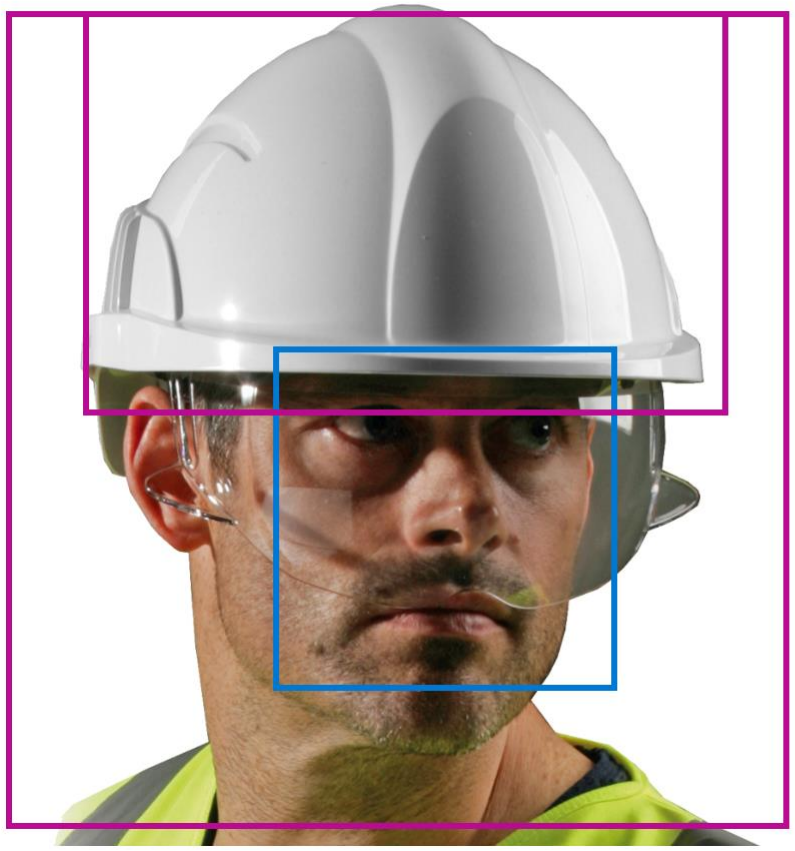

Machine Learning
Supervised Learning
Regression
Linear Regression
Polynomial Regression
Ridge/Lasso Regression
Classification
SVM
Logistic Regression
Decision Trees
Naive Bayes
K-NN
Unsupervised Learning
Clustering
DBSCAN
K-Means
Agglomerative
Mean Shift
Fuzzy C-Means
Association Rule Learning
FP Growth
Euclat
Apriori
Dimensionality Reduction
t-SNE
PCA
LSA
SVD
LDA
Reinforcement Learning
Q-Learning
DQN
SARSA
Genetic Algorithm
A3C
Ensemble Learning
Stacking
Bagging
Random Forest
Boosting
XGBoost
LightGBM
AdaBoost
CatBoost
Neural Networks and Deep Learning
Convolutional Neural Networks (CNN)
DCNN
Recurrent Neural Networks (RNN)
LSM
GRU
LSTM
Generative Adversarial Networks (GAN)
Autoencoders
seq2seq
Perceptrons


0
Batch Normalization
13x13x10
0
Batch Normalization
11x11x10
→ T-shirt
— Coat
— Sneakers
Input
28x28x1
2D Convolution
26x26x10
2D Max Pooling
13x13x10
Dropout
13x13x10
2D Convolution
11x11x10
Dropout
11x11x10
Flatten
1210
Dense
128
Dense
10
Target

Adapting Computer Vision models with your own data

Transfer learning with Azure Cognitive Services Custom Vision

Cognitive Services Computer Vision



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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."

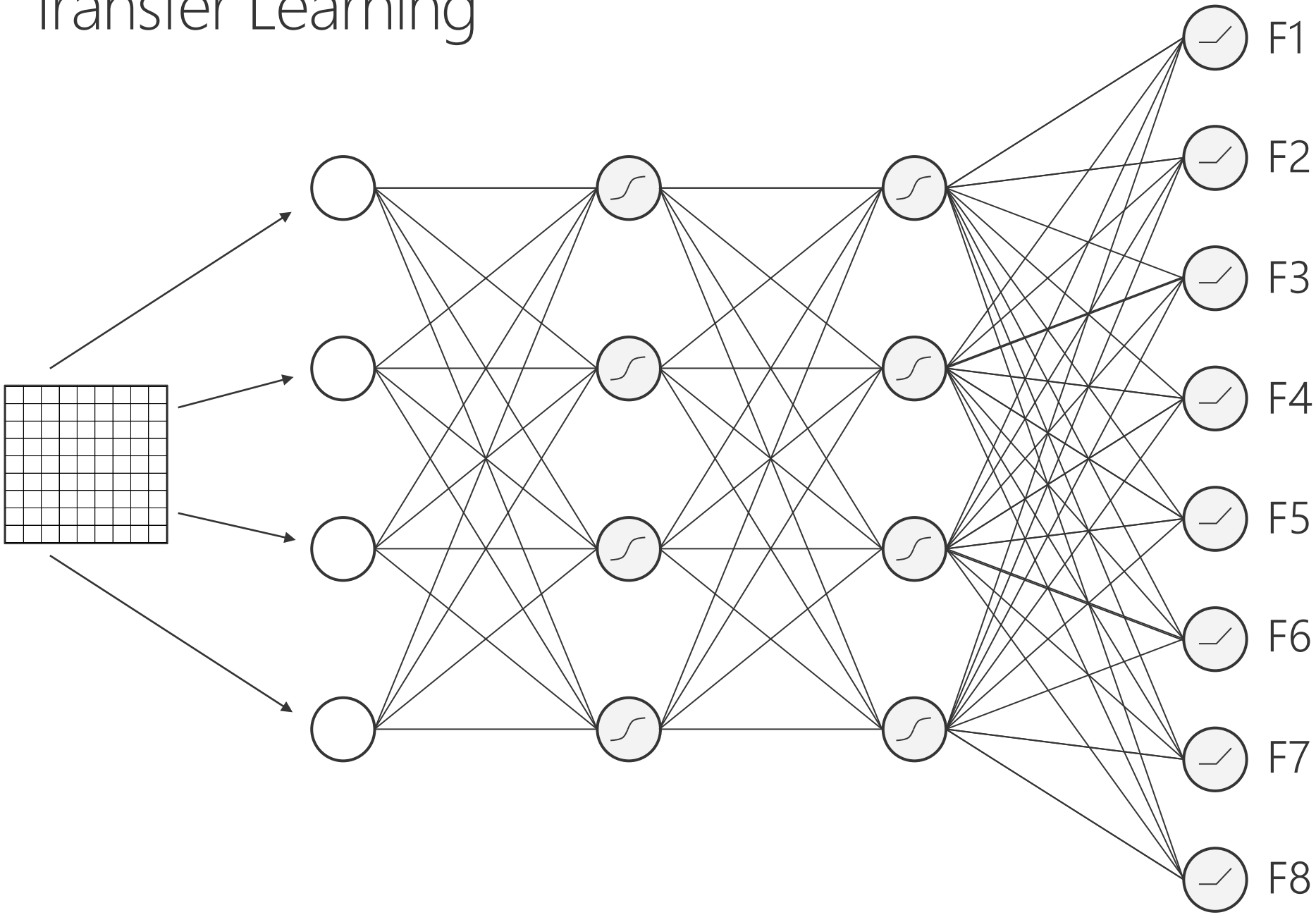
Transfer Learning: VGG16

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 3×3 kernel-sized filters one after another. VGG16 was trained for weeks and was using NVIDIA Titan Black GPU’s.

Transfer Learning



Transfer Learning: Training

F1
F2
F3
F4
F5
F6
F7
F8

hammer
1

hard hat
0

Transfer Learning: Training

F1
F2
F3
F4
F5
F6
F7
F8

hammer
0

hard hat
1

Transfer Learning: Trained Model

F1
F2
F3
F4
F5
F6
F7
F8

hammer
0.10

hard hat
0.87


gColab Time ☺

Kahoot Time ☺