Evgeni Dyulgerov

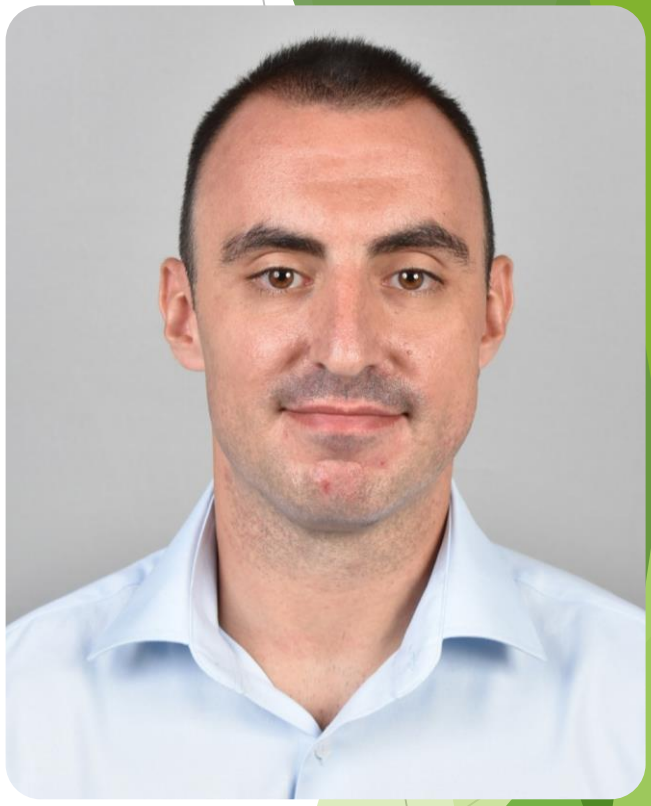
Senior .NET Developer at Digitall

Deep Learning with Tensorflow 2 and Keras

Deep Learning, Neural Network, use cases and more...

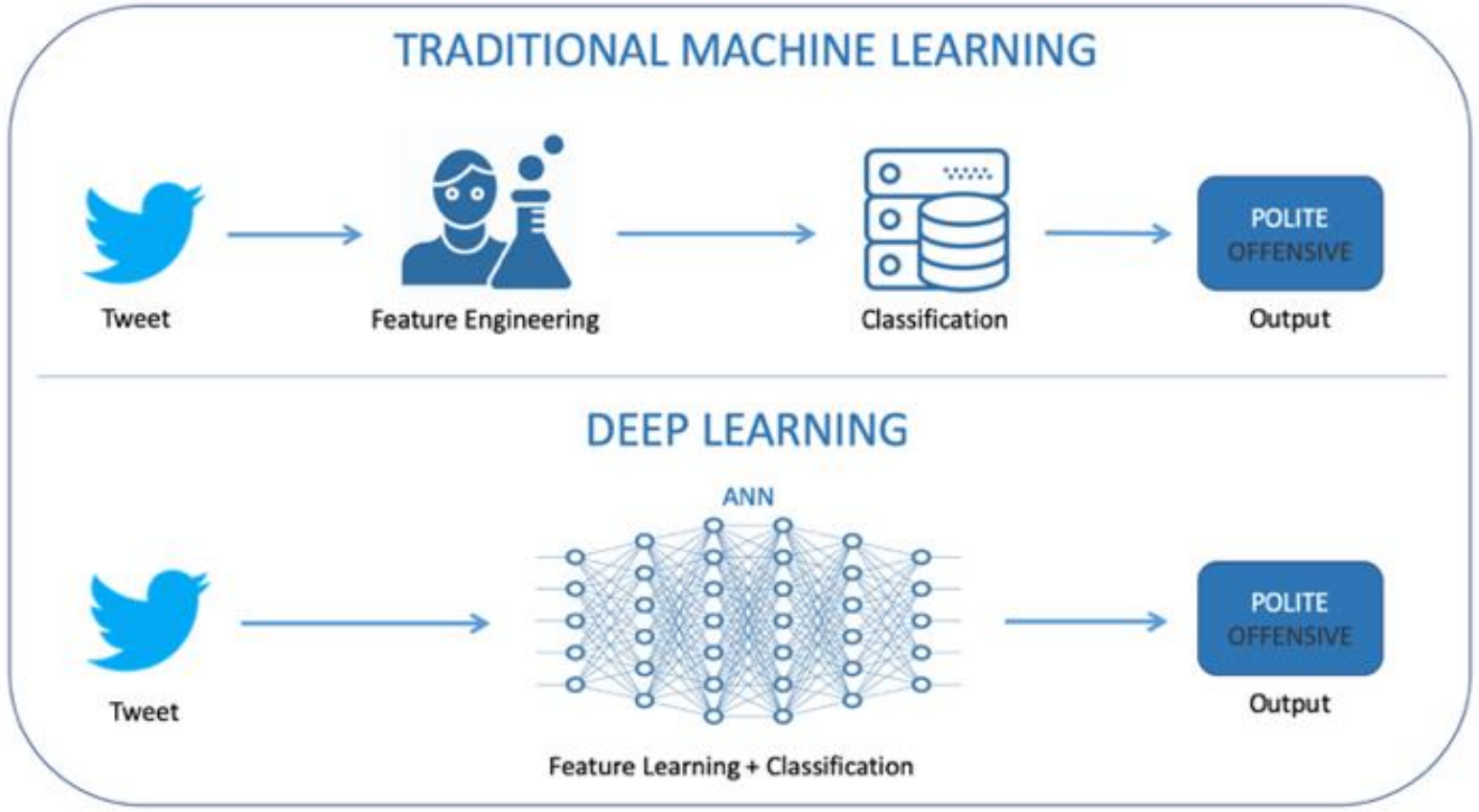
About Me

- ✓ .NET and Cloud enthusiast
- ✓ Developer and IT Consultant with 8+ years of experience
- ✓ Worked on 25+ projects
- ✓ Working as a Senior .NET Developer at Digitall
- ✓ Assistant at Technical University of Sofia
- ✓ Ph.D. candidate in Artificial Intelligence
- ✓ https://www.linkedin.com/in/evgeni-dyulgerov/

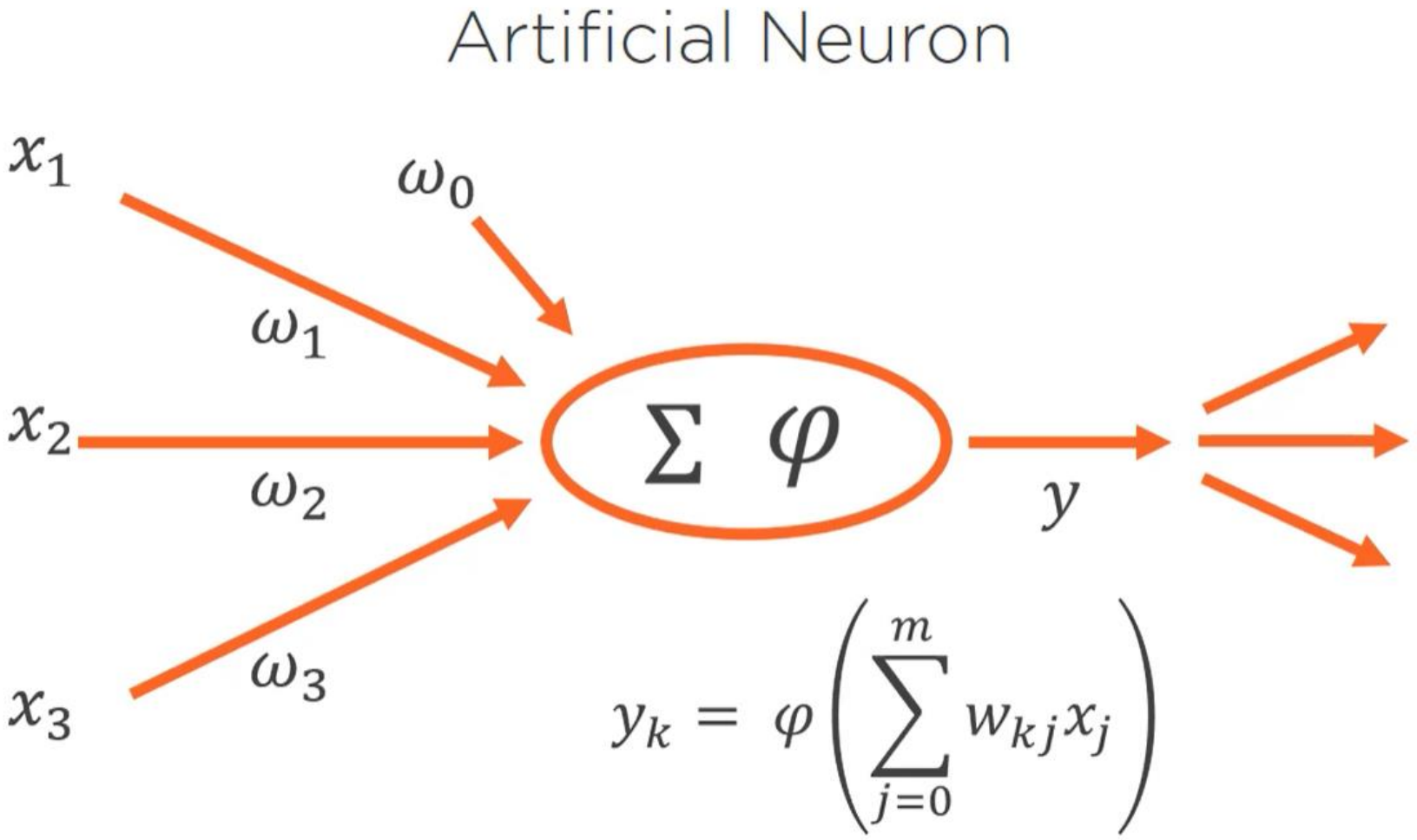


What is Deep Learning?

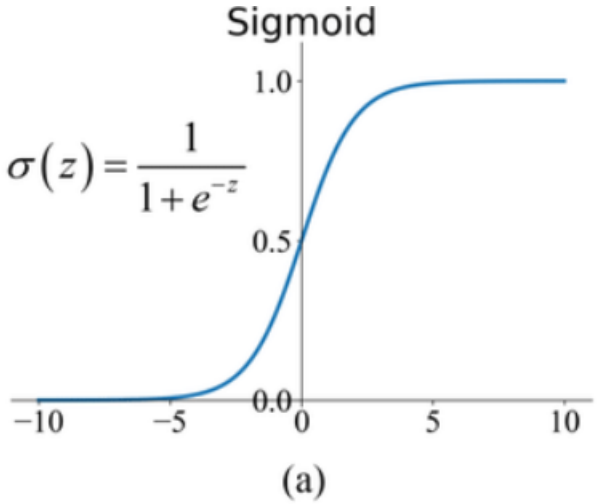
“A form of Artificial Intelligence that uses a type of Machine Learning Algorithm called Artificial Neural Network with Multiple Hidden Layers in attempt to learn a hierarchical representation of the underlying data in order to make predictions given new data.”



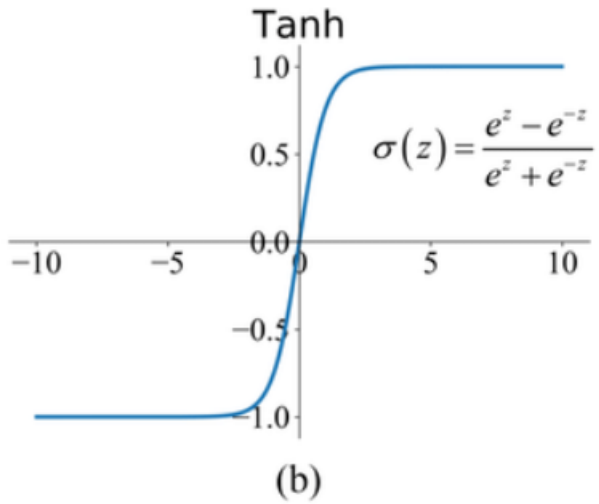
Artificial Neuron (1) – Some math



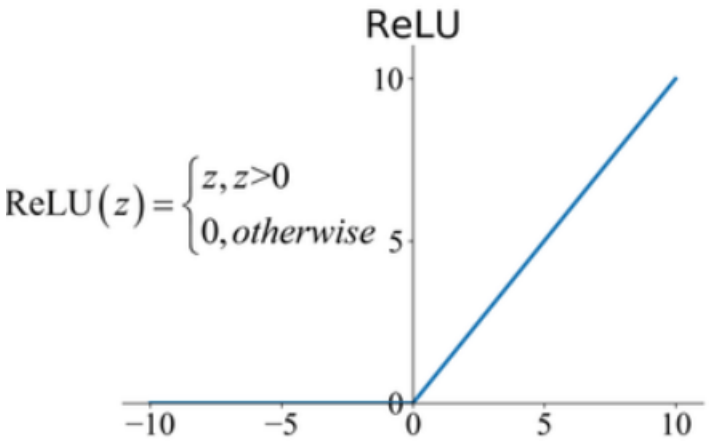
Artificial Neuron (2) – Activation functions



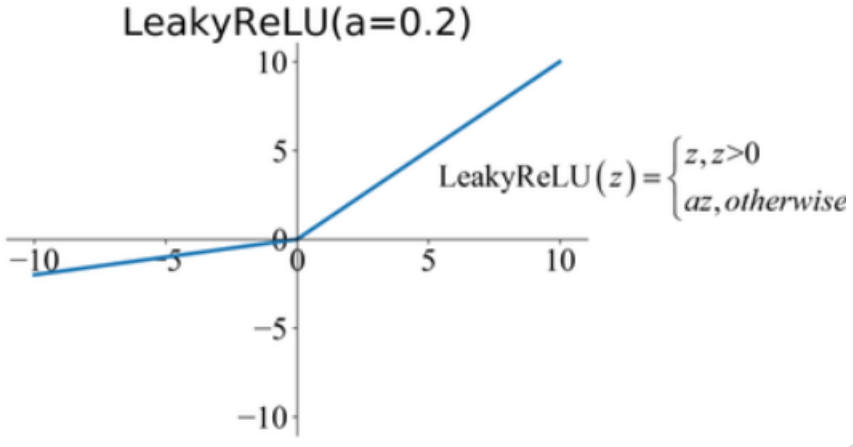
(a)



(b)

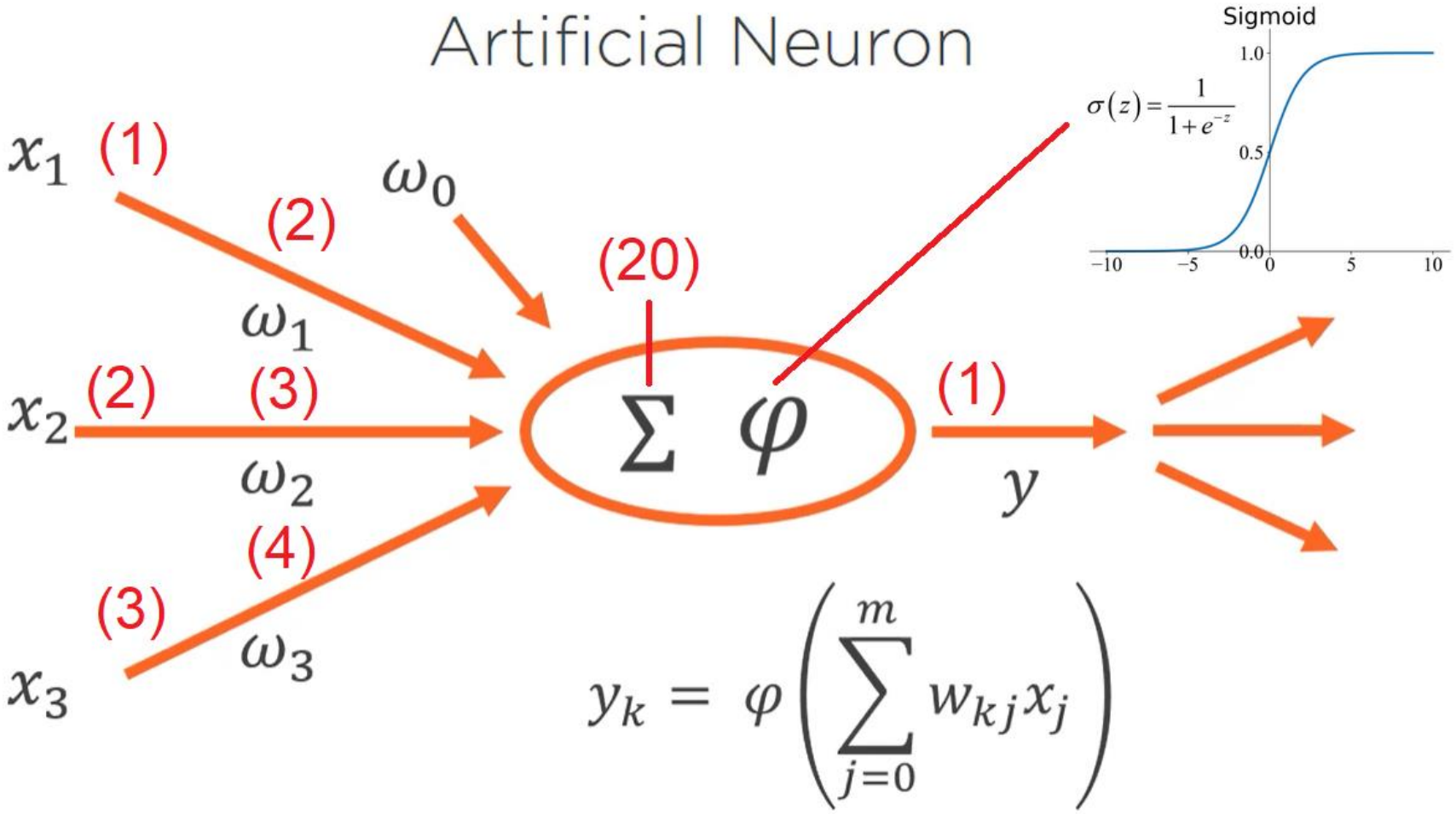


(c)



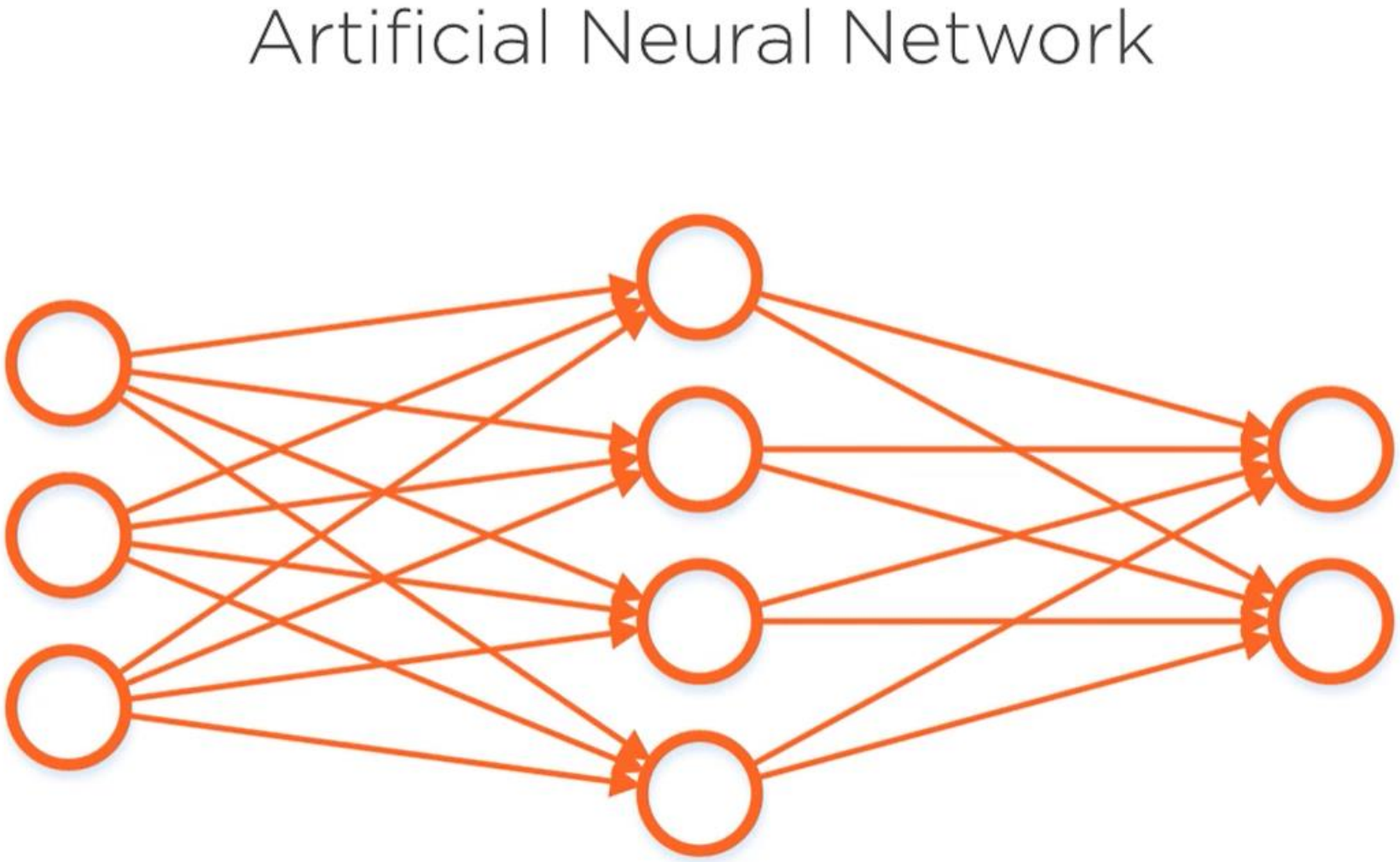
(d)

Artificial Neuron (3) – An example

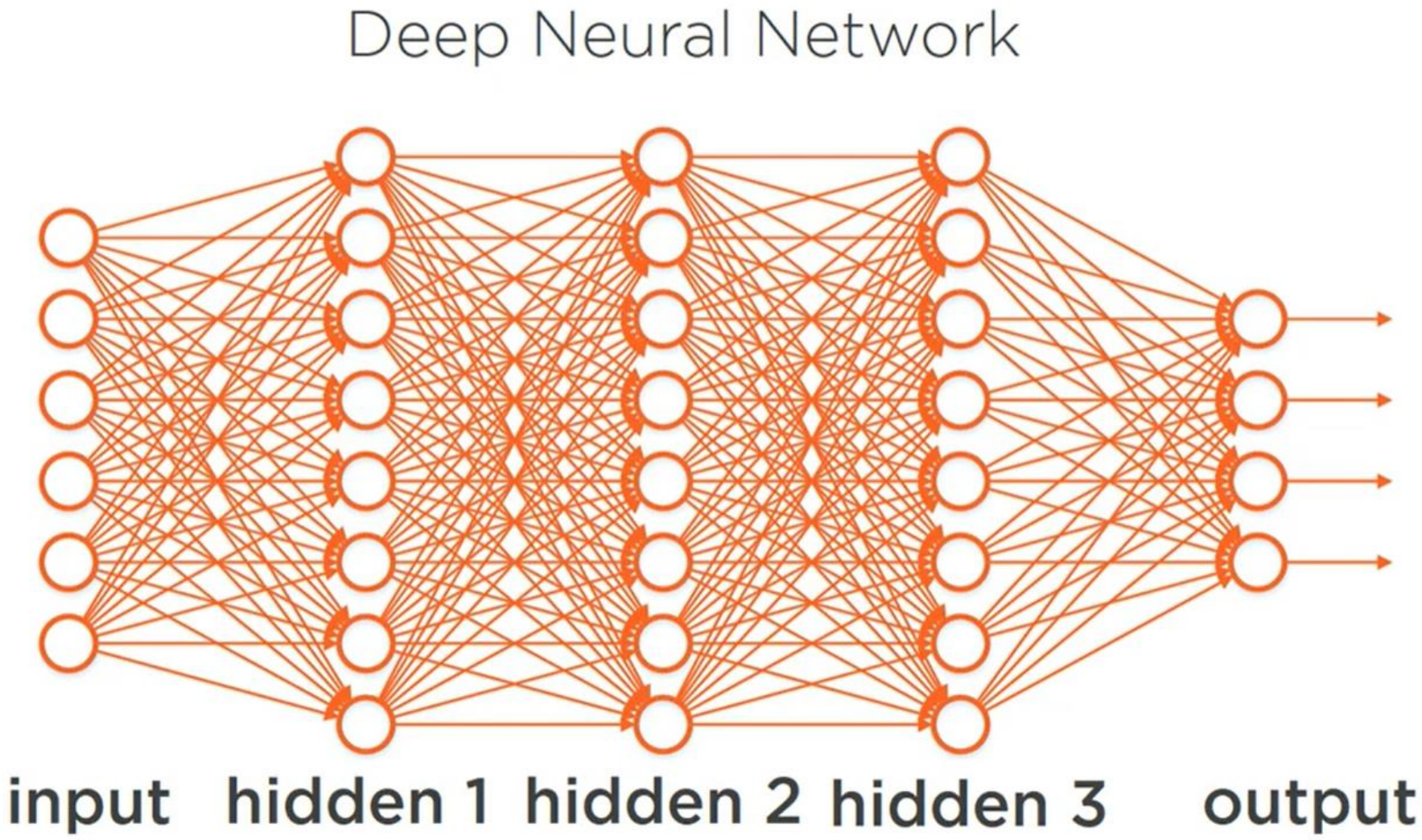


$$y_k = \varphi\left(\sum_{j=0}^{m} w_{kj} x_j\right)$$

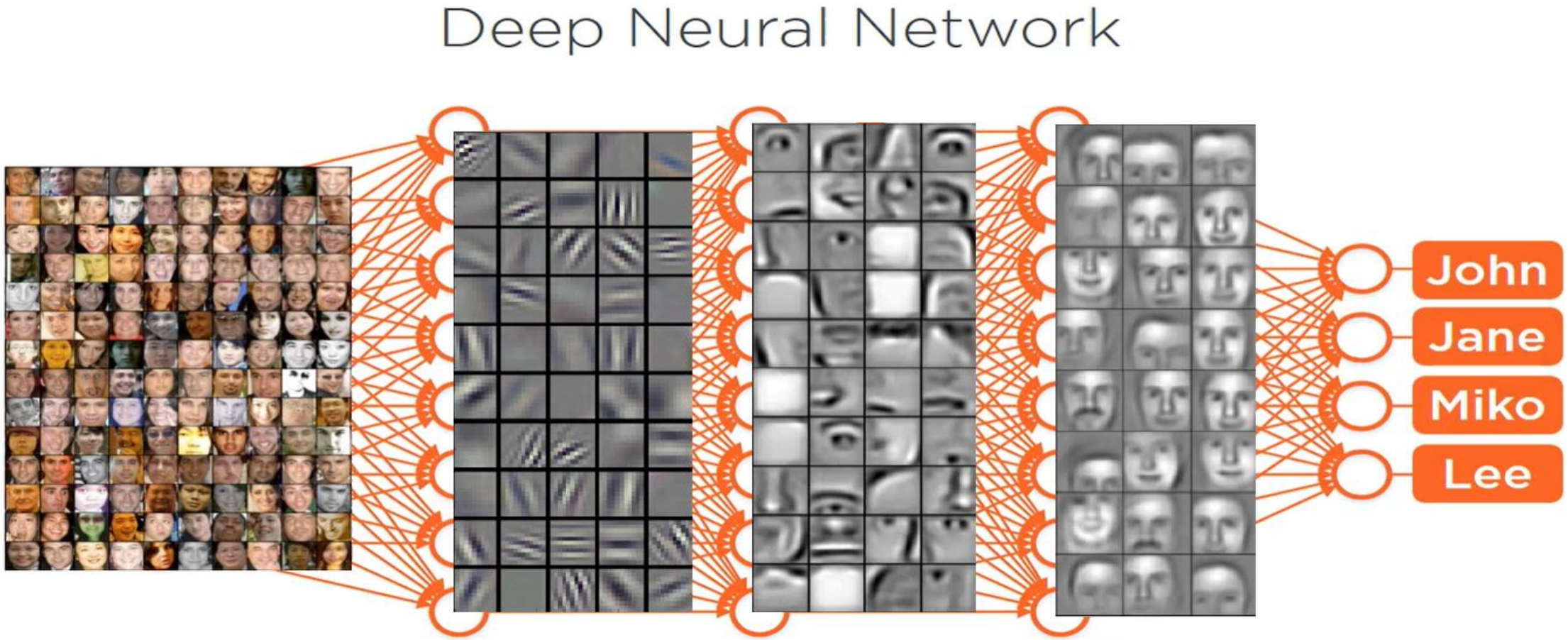
Introduction to Artificial Neural Networks



Introduction to Deep Neural Networks



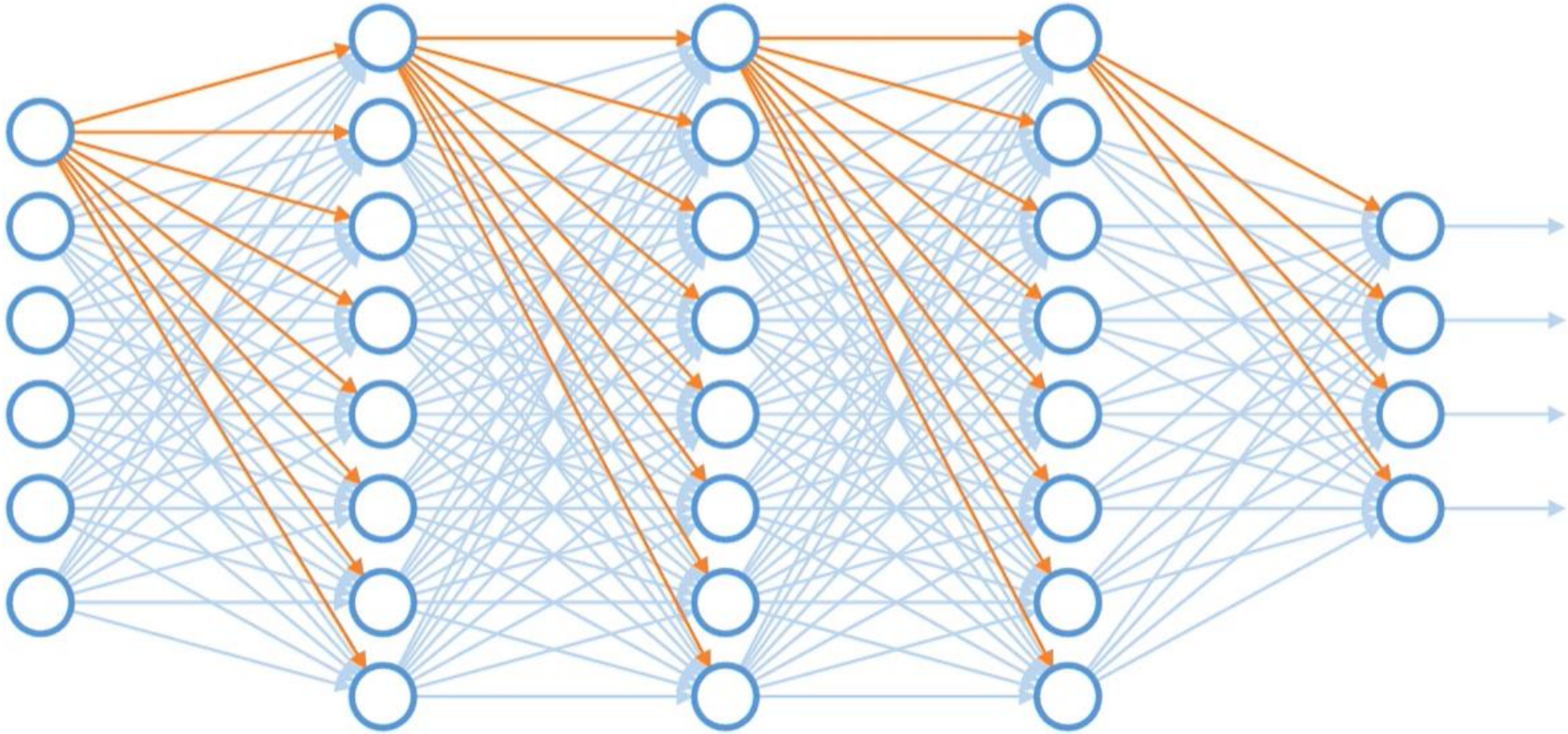
Deep Neural Networks – An example



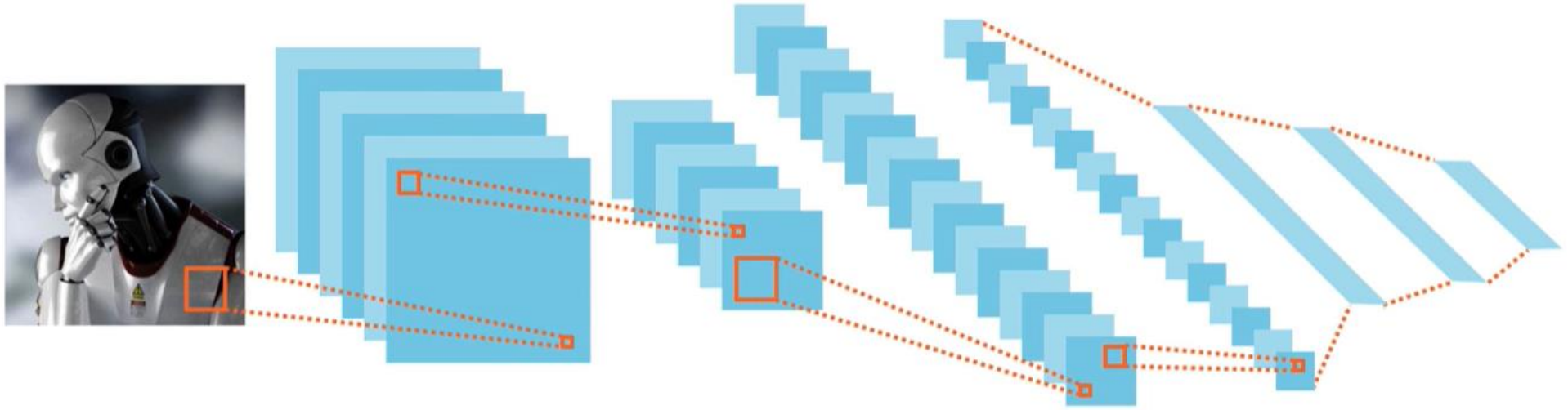
Examples would include:

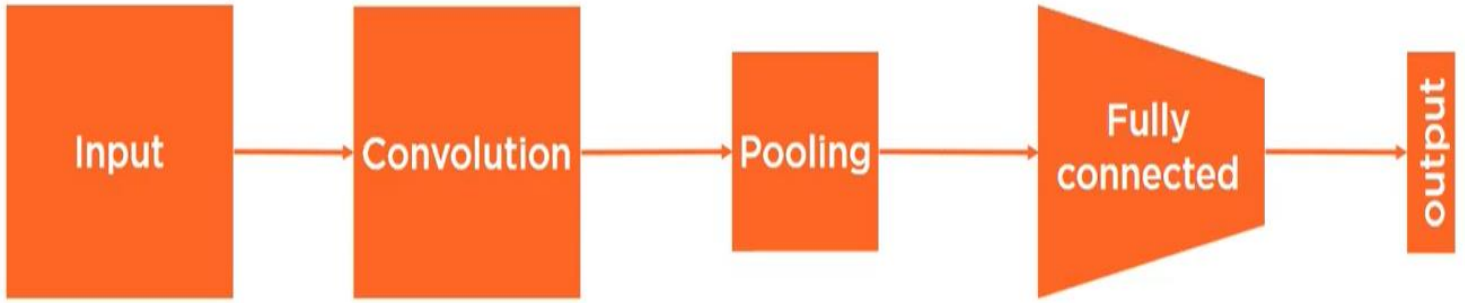
- Fully Connected Networks
- Convolutional Networks

Fully Connected Feed-forward Neural Networks

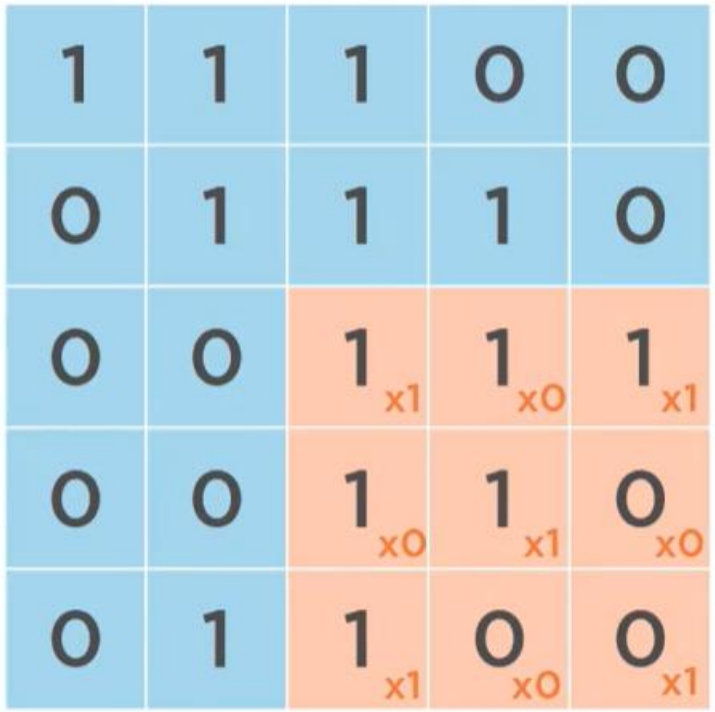


Convolutional Neural Networks (1) - Introduction





Convolutional Neural Networks (2) - Convolution



Image

Convolved feature

Convolutional Neural Networks (3) - Filters

$$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Identity

$$\frac{1}{16}\begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix}$$

Blur

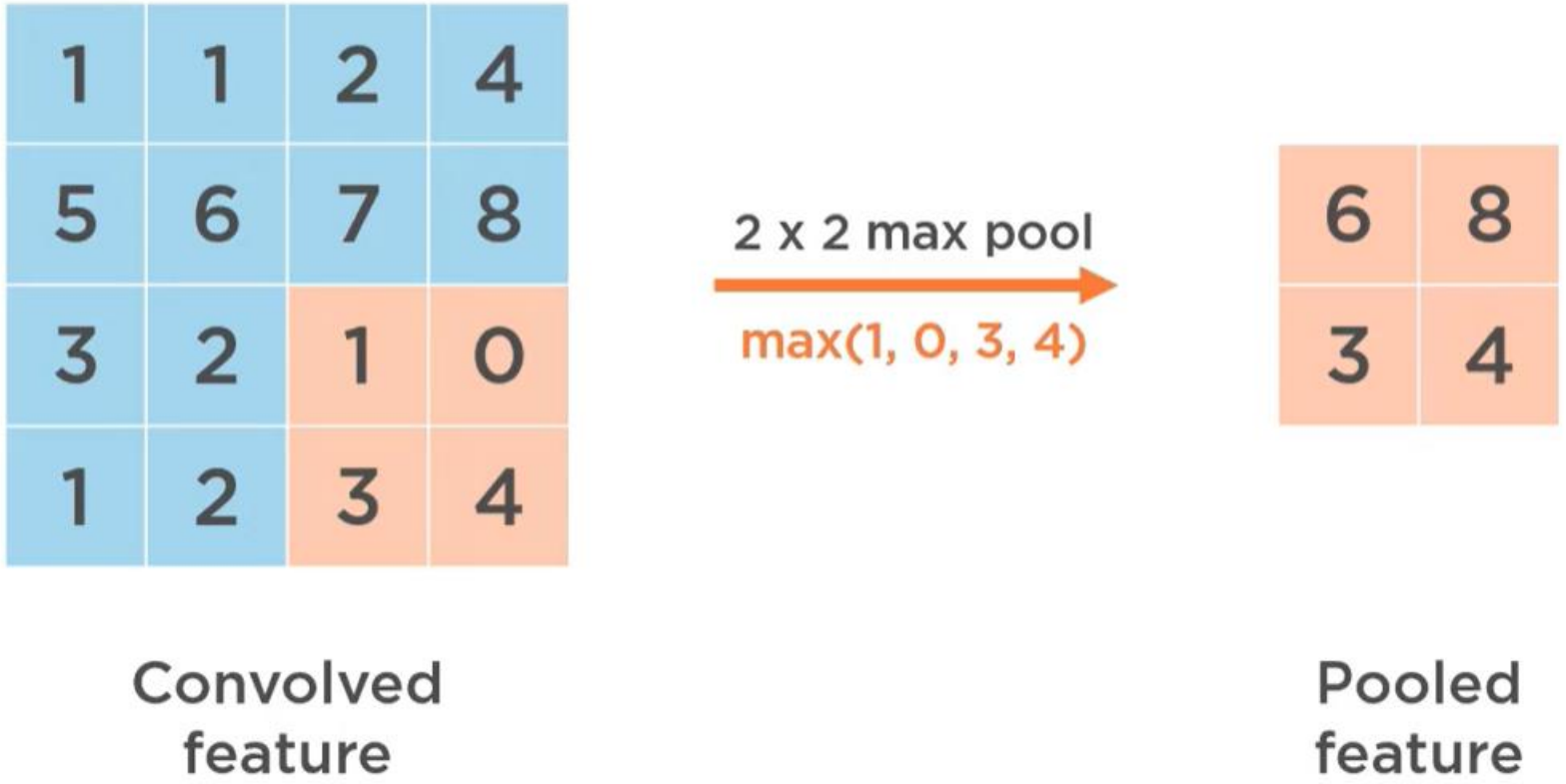
$$\begin{bmatrix} 0 & -1 & 0 \\ -1 & 5 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

Sharpen

$$\begin{bmatrix} -1 & -1 & -1 \\ -1 & 8 & -1 \\ -1 & -1 & -1 \end{bmatrix}$$

Edge

Convolutional Neural Networks (4) - Pooling



Deep Learning Workshop

So lets begin...

Additional Resources

- Practical Deep Learning with Tensorflow and Keras
- Sentiment analysis through Deep Learning with Keras

Thank you for your attention! ☺ Questions?