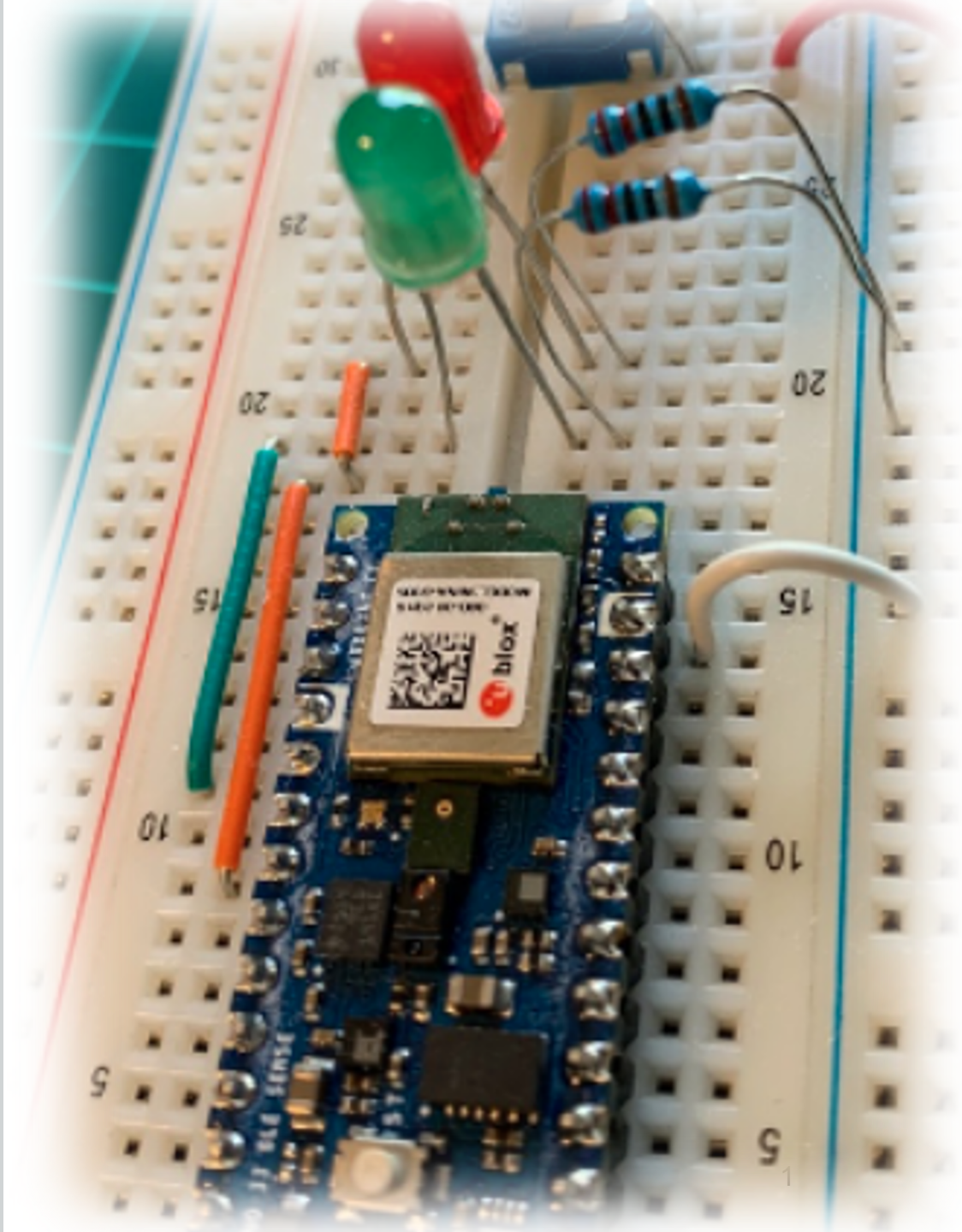
IESTI01 – TinyML

Embedded Machine Learning

11. Image Classification using Convolutions (CNN)



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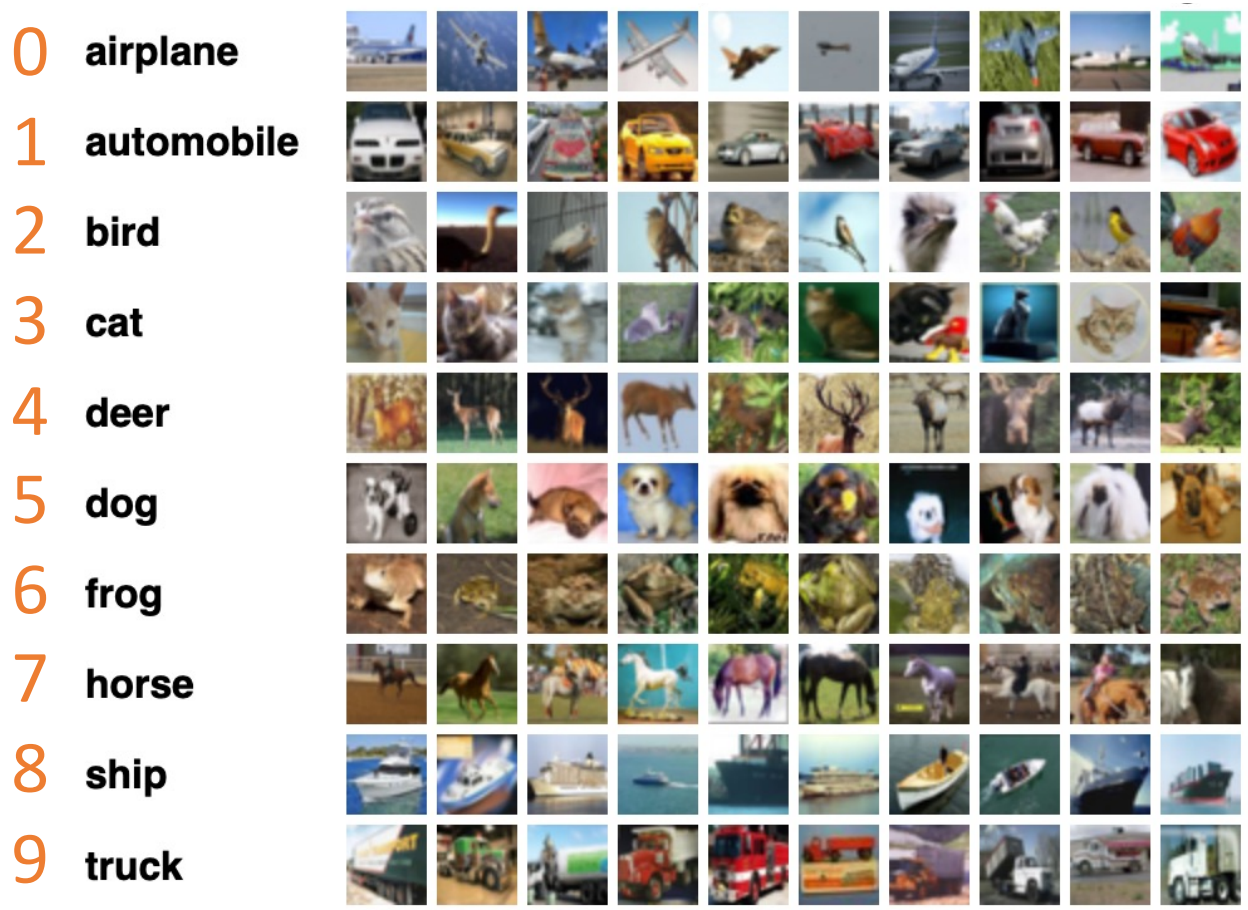
Convolutions

Cifar-10



https://www.tensorflow.org/datasets/catalog/cifar10

So far ...

We saw how to build Neural Networks (DNN and CNN) that classify images of digits (**MNIST**) or even fashion images (**Fashion-MNIST**).

Now,

We will instead, recognize the 10 classes of **CIFAR** ('airplane', 'automobile', 'bird', 'cat', 'deer', 'dog', 'frog', 'horse', 'ship' and 'truck').

There are some key differences between these image datasets that we need to take into account:

- While MNIST has 28x28 monochrome images (1 color channel), CIFAR is 32x32 color images (3 color channels).
- Besides, MNIST images are simple, containing just the object centered in the image, with no background. Conversely, CIFAR ones are not centered and can have the object with a background, such as airplanes that might have a cloudy sky behind them!

Those differences are the main reason to use a CNN instead of a DNN.

Image Classification using CNN

Code Time!

CNN_Cifar-10.ipynb

Reading Material

Main references

- Harvard School of Engineering and Applied Sciences - CS249r: Tiny Machine Learning
- Professional Certificate in Tiny Machine Learning (TinyML) – edX/Harvard
- Introduction to Embedded Machine Learning (Coursera)
- Text Book: "TinyML" by Pete Warden, Daniel Situnayake

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The IESTI01 course is part of the TinyML4D, an initiative to make TinyML education available to everyone globally.

Thanks

And stay safe!

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