6COSC020W Applied AI

Tutorial Week 10: Deep Learning and CNNs

# Aim:

* Review key deep learning concepts.
* Calculate the results of a convolution.
* Calculate the result of max pooling and average pooling.
* Train and evaluate a CNN network
* Understand the performance of the network
* Improve the performance of the network

**1.- Define** in your own words the following terms: deep learning, classification, features, filters, convolution, CNN, convolution layer, pooling layer, ReLu, computer vision.

**2.- Calculate** the result of the following convolution. The kernel is 3x3, stride is 1.

Shape

Description automatically generated with low confidence

**3.-** Given the following feature map, **calculate:**

Table

Description automatically generated

a) The result after applying a 2x2 **max pooling** with a stride of 2 pixels.

b) The result after applying a 2x2 **average pooling** with a stride of 2 pixels.

**4.- Practice: Tutorial\_Week10.ipynb. CNNs.**

1. Download the file *Tutorial\_Week10.ipynb* from Blackboard and save it in your H: drive (in a folder of your choice).
2. Open Anaconda and launch JupyterLab.
3. Open a Terminal.
4. If you have an environment called py37 (from tutorial week 8), activate it using Anaconda Navigator (see picture below):

Graphical user interface, text, application

Description automatically generated

1. If you do **not** have an environment called py37, follow tutorial from week 8 to create one and activate it.
2. In the terminal: go to the folder where you saved *Tutorial\_Week10* (use cd H:).
3. In the terminal. Run Jupyter lab from the folder where your *Tutorial\_Week10.ipynb* is:

jupyter lab

1. Open *Tutorial\_Week10.ipynb* and work through the Jupyter Notebook.