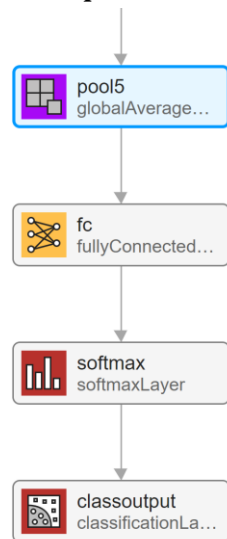# Relationship Between Layers in a Neural Network

D1262028 李皓鈞 Jimmy

Description of the Layers

The image shows a sequence of layers typically found in a neural network architecture for classification tasks.

Here is a detailed explanation of each layer and their relationship:

1. pool5 (Global Average Pooling Layer)

Function: Global Average Pooling (GAP) is a type of pooling operation that reduces each feature map to a single value by averaging all the values in the feature map.

Purpose: This layer helps in reducing the spatial dimensions of the

input tensor while preserving the most important information. It reduces the risk of overfitting as it significantly reduces the number of parameters in the network.

Output: If you have k feature maps, GAP will produce a 1 x 1 x k tensor.

2. fc (Fully Connected Layer)

Function: A fully connected layer, also known as a dense layer, connects every neuron in the current layer to every neuron in the subsequent layer.

Purpose: This layer combines the features extracted by the previous layers (convolutional and pooling layers) and makes final decisions about which features are most correlated with the specific classes.

Output: The output dimension is determined by the number of neurons in the fully connected layer. For example, if there are n neurons, the output will be a 1 x n vector.

3. softmax (Softmax Layer)

Function: The softmax layer applies the softmax function to the output of the fully connected layer.

Purpose: It converts the raw scores (logits) from the fully connected layer into probabilities that sum to 100%. Each probability corresponds to a class, representing the likelihood that the input belongs to that class.

Output: The output is a probability distribution across the classes. If there are c classes, the output will be a 1 x c vector where each element is between 0 and 1, and the sum of all elements is 1.

4. classoutput (Classification Layer)

Function: This layer is the final output layer that makes the actual prediction.

Purpose: It uses the probabilities from the softmax layer to make a classification decision. Typically, this layer will select the class with the highest probability as the predicted class.

Output: The output is the predicted class label. In some frameworks, this layer might also output the probability scores alongside the predicted class.