Image related layers

Several layers are specifically designed for image input. They work by sliding a window across the image and producing one value for each slide of the window. The slide is controlled by the **strides** parameter.

The input is typically a tensor of 4 dimensions: [**batch, height, width, channels**].

batch: number of images. Value -1 means this value is currently unspecified.

height: height of each image.

width: width of each image.

channels: number of "colors" of each image. (gray 1, rgb 3, etc.)

Important arguments

strides. strides=(1,1) - move 1 in each dimension (width, hight) while sliding, strides=(2,2) - move 2 in each dimension while sliding, etc.

padding. Either 'valid' or 'same'. Valid means no padding. Same means output size same as input size.

tf.keras.layers.MaxPool2D

This reduces the image size by taking max value over a neighborhood.

Arguments: pool_size,strides,padding,data_format.

Examples: pool_size=(2). (Same as MaxPool2D(2)). pool_size=(2,2). (Same as MaxPool2D(2,2)).

tf.keras.layers.Conv2D

Arguments: filters, kernel_size, strides=(1, 1), padding='valid', data_format=None, dilation_rate=(1, 1), activation=None, use_bias=True, kernel_initializer='glorot_uniform', bias_initializer='zeros', kernel_regularizer=None, bias_regularizer=None, activity_regularizer=None, kernel_constraint=None, bias_constraint=None.

Important arguments: filters, kernel_size, strides=(1, 1), padding='valid', activation=None, use_bias=True, kernel_regularizer=None, bias_regularizer=None.

filters: how many "outputs". An output is generated from one each filter.

kernel_size: the size of the convolution kernel.

activation: we can specify activation here (eg "relu") or as a separate layer.

use_bias adds a bias value to each kernel.

kernel_regularizer: specify regularizer for kernel values.

bias_regularizer: specify regularizer for bias values (less common).

input_shape. Shoud be specified for the first layer. For example, if input is gray images of size 28x28 specify: input_shape=(28,28). if input is color (RGB) images of size 28x28 specify: input_shape=(28,28,3).