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Graduate and Extended Studies

FA19: CMPE-297 Sec 01 - Special Topics

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You're working with your company's marketing department to develop neural network to represent marketing video of the company that is, for instance, a 60-second long with 144 × 256 video clip sampled at 4 frames per second .

Please develop Tensor size to represent video data?

- For the given scenario, we need 5D tensors. A video can be understood as a sequence of frames, each frame being a color image. Because each frame can be stored in a 3D tensor (height, width, color_depth), a sequence of frames can be stored in a 4D tensor (frames, height, width, color_ depth), and thus a batch of different videos can be stored in a 5D tensor of shape (samples, frames, height, width, color_depth).

- A 5D tensor can store video data. The video data is encoded as:
  Video—5D tensors of shape (samples, frames, height, width, channels) or (samples, frames, channels, height, width)

- In this case, there is a 60-second, 144 × 256 video clip sampled at 4 frames per second. This is a one minute video at 4 sampled frames per second (which gives us 60 seconds x 4 = 240 frames) and 144 pixels × 256 pixels, with a color depth of 3, we would store that in a 4D tensor that looks like this:
  (240, 144, 256, 3)

- The marketing video of company would be stored in a 5D tensor of shape:
  (1, 240, 144, 256, 3)

- Thus the neural network to represent marketing video of the company would have tensor size (1, 240, 144, 256, 3).

- Python execution to print the shape of the tensor for the marketing video. The dataframe is initialized with value 0 since only shape is needed.

In [5]:
```
import tensorflow as tf
import numpy as np

x = 1
y = 240
z = 144
w = 256
v = 3

df=[ [ [ [ [ 0 ] * v ] * w ] * z ] * y ] * x

nparr = np.array(df)
sess = tf.Session()
tensor = tf.convert_to_tensor(nparr, dtype=tf.int8)
sess.run(tensor)
tensor_shape = tensor.get_shape()
tensor_shape
print('Array Dimension = %sD' % nparr.ndim)
print('Tensor Shape =', tensor_shape)
```

```
Array Dimension = 5D
Tensor Shape = (1, 240, 144, 256, 3)
```