TensorFlow.JS Cheat Sheet

INFINITE RED

Tensors

Dimensions are given as ***height***, ***width***, and ***depth***, OR ***number of channels***. This format is used in many TFJS methods. These values are an example of the dimensions of a common desktop image size

```
const dims = [1080, 1920, 3]
```

Create a tensor with given dimensions.

```
tf.tensor(myArray, dimensions)
```

This example creates a 3-high, 2-wide, 1-deep tensor

```
tf.tensor([1, 2, 7, 49, 733, 29760], [3,
2, 1])
```

Special creator function for 2d tensors

```
tf.tensor2d([[4, 832, 22708], [312956,
2716096, 17117832]])
```

Create a tensor of ones, any dimensions

```
tf.ones(dims)
```

Create a tensor filled with a given value

```
tf.fill(dims, value)
```

Example - creates a 2-high, 4-wide tensor filled with 5s (but what about Rex?!)

```
tf.fill([2, 4], 5)
```

Create a tensor where each value is randomly assigned from a uniform distribution over the interval [minValue, maxValue]

```
tf.randomUniform(dims, minValue,
maxValue)
```

Created with randomUniform

```
tf.randomUniform([108, 192, 3], 0,1)
```

Join Tensors, stackinDimension 0=y, 1=x
You wouldn't typically stack on channels.

```
tf.concat([tensor1, tensor2],
stackingAxis)
```

***Note**:* This is a special case of concat that always stacks along the y axis

```
tf.stack( [tensor1, tensor2, tensor3, ...
])
```

Reverse the order of elements along a given axis

```
tf.reverse(myTensor, reversingAxis)
```

Introspection. Prints values of tensor in proper shape

```
myTensor.print()
```

Output the shape of a tensor (height, width, channels).

`myTensor.shape // => [ 3, 3, 1 ]` (*for example*)

Models: Training and Prediction

Create a sequential model

```
const model = tf.sequential()
```

Create and add a layer to the model. Can use other kinds of layers besides dense.

```
const layer = tf.layers.dense(
units: 10, inputShape: [2], activation:
'relu' ) model.add(layer)
```

Compile

```
model.compile({optimizer: "sgd",
loss: "meanSquaredError"})
```

Train

```
model.fit(xs, ys, { epochs: 500 })
```

Load and predict

```
const model =
tf.loadLayersModel(modelURL)
const result = model.predict(input)
```

Convert image to tensor

```
const myTensor =
tf.browser.fromPixels(image,
numberOfChannels)
```

Convert tensor back to image

```
const printCanvas =
document.getElementByID("#dom-element")
const image = tf.browser.toPixels(tensor,
printCanvas)
```

Resize without interpolating data (***See fig. a***)

```
tf.image.resizeNearestNeighbor(image,
size, true)
```

fig. a

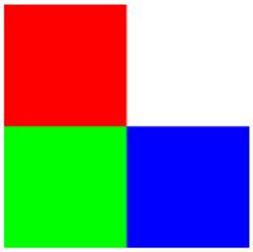
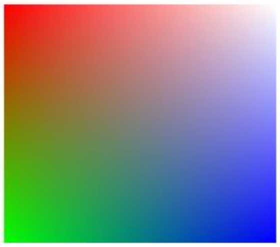


fig. b



Resize without interpolating data. `alignCorners` should usually be true (***See fig. b***)

```
tf.image.resizeBilinear(image, size,
alignCorners)
```

Use for tensors with values in 0-255

```
myTensor.asType('int32')
```

(Example)

```
const myTensor =
tf.randomUniform(dimensions, 0, 255))
```

Use for tensors with values in 0-1

```
myTensor.asType('float32')
```

(Example)

```
const myTensor =
tf.randomUniform(dimensions, 0, 1)
```

Coordinates

```
const startPosition = [y, x, z]
```

Note the order*: the variables are matched up with their respective dimension to keep the convention of dimension ordering*

Crop an image

```
const cropped =
myImageTensor.slice(startPosition, dims)
```