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# Note on Tensorflow

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# Goals

- Basic concept of tensor flow
- Simple model of Neural Network

# Lazy approach of Tensor Flow

- Build a computational graph
- Initialise variables
- Create session
- Run graph in sessionClose session
- placeholder, feed_dict (similar to arguments)

# Activation Functions

- The activation ops provide different types of nonlinearities for use in neural networks. These include smooth nonlinearities (sigmoid, tanh, elu, selu, softplus, and softsign), continuous but not everywhere differentiable functions (relu, relu6, crelu and relu_x), and random regularization (dropout). [Only within tensor flow scope]

- Ref: https://www.tensorflow.org/api_guides/python/nn

# Activation Functions

- tf.nn.relu: max(features, 0)
- tf.sigmoid: y = 1 / (1 + exp(-x))
- tf.nn.tanh: hyperbolic tangent of x element-wise

# Loss Function

- tf.nn.softmax_cross_entropy_with_logits: softmax cross entropy between logits and labels
- tf.nn.log_softmax: logsoftmax = logits - log(reduce_sum(exp(logits), dim)) (af)
- tf.nn.sigmoid_cross_entropy_with_logits: yln(sigmoid(z))+(1-y)ln(1-sigmoid(z)) (lf)
- tf.nn.softmax: softmax = tf.exp(logits) / tf.reduce_sum(tf.exp(logits), dim) (af)
- Ref: http://blog.csdn.net/u014313009/article/details/51045303
- https://stackoverflow.com/questions/34240703/whats-the-difference-between-softmax-and-softmax-cross-entropy-with-logits
- https://datascience.stackexchange.com/questions/18206/how-to-create-a-multi-dimensional-softmax-output-in-tensorflow

# Optimizer

- tf.train.GradientDescentOptimizer