Midterm exam review

1. Introduction to machine learning
   1. Supervised learning – you know what your predicting
   2. Unsupervised learning – you don’t know your wanted outcome
2. Neural Predictions
   1. Forward propagation – feeding input in to produce a prediction.
      * 1. 0 is null
        2. 1 is directly related to input
        3. Greater than 1 exponential importance
        4. Negative means input negatively correlates with output
      1. Not doing the second bullet point
   2. Dot product, weighted sum
   3. Linear algebra
   4. Input [2, 4, 6] weights [.1, .3, .5] = 2\*.1 + 4 \*.3 + 6\*.5 = .2 + 1.2 + 3 = 4.4
3. Neural Learning
   1. Gradient descent
   2. Error = pred – goal, MSE = (pred – goal)\*\*2
   3. Makes big errors more important, small errors less. Its not negative due to the squaring so its easier to know exactly what it means
   4. Inefficient, exploding with error terms, set step sizes means we might not ever reach the expected goal, will eventually start flip flopping around it
   5. Weight delta = (Input \* Delta = (pred – goal))
   6. Direction
   7. Scaling, negative reversal, and stopping
   8. Alpha scales down the weight delta
   9. Parabola
4. Learning Multiple Weights at a Time
   1. No
   2. No, changes at different rates
   3. No
5. Deep Neural Networks and the Training Cycle
   1. Generalization
   2. Cross correlation
   3. Back propagation
   4. Rectified learning unit, gives 0 if its not positive, and returns the positive input otherwise