Lecture 6 Quiz

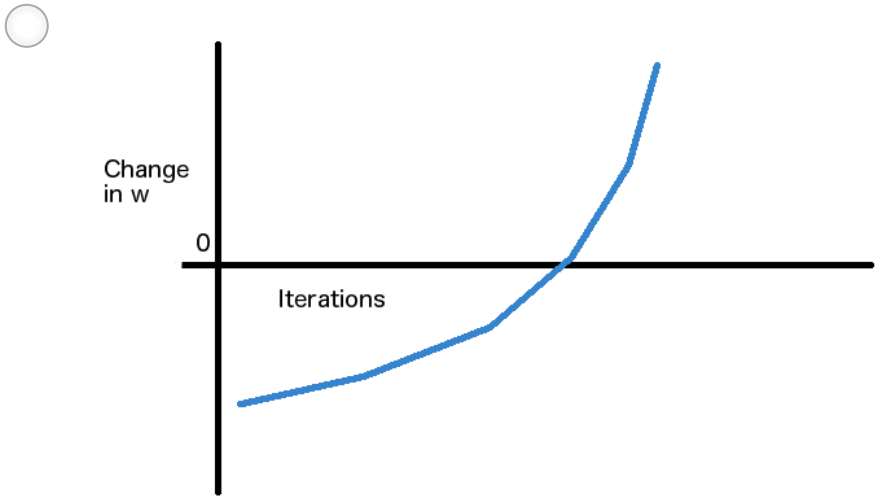
Quiz, 5 questions

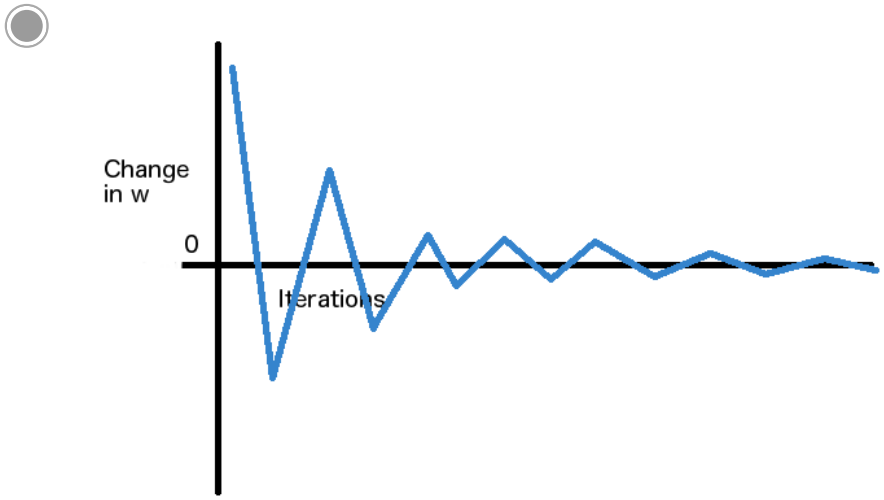
1 point

1.

Suppose w is the weight on some connection in a neural network. The network is trained using gradient descent until the learning *converges*. We plot the change of w as training progresses. Which of the following scenarios shows that convergence has occurred? **Notice that we're plotting the change in w, as opposed to w itself.**

Note that in the plots below, each *iteration* refers to a single *step* of steepest descent on a *single minibatch*.





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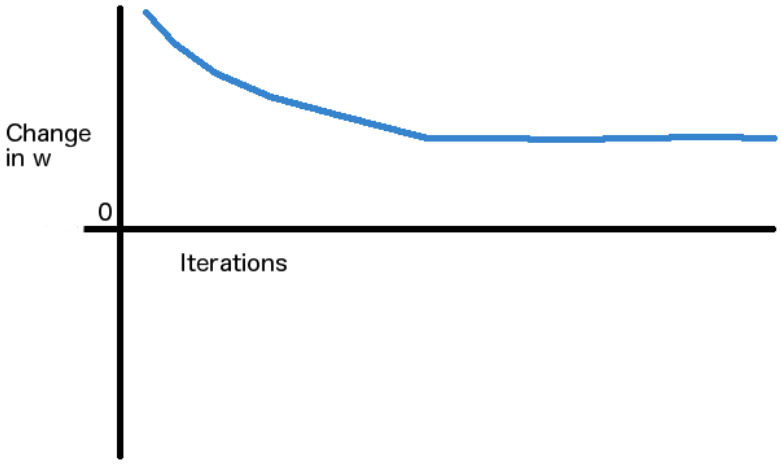

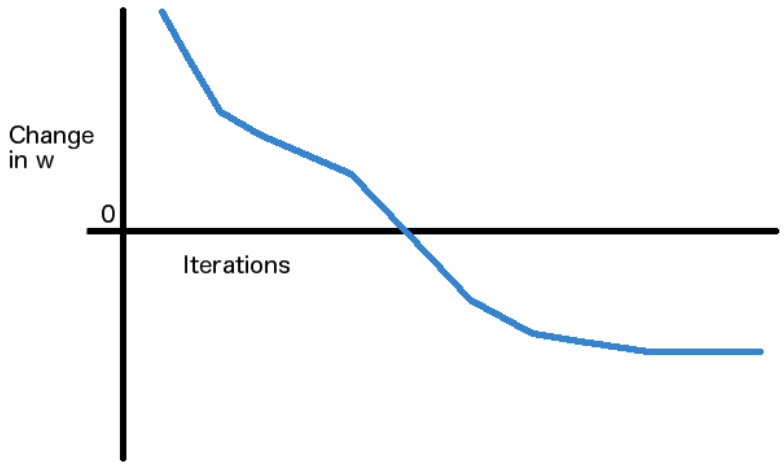

1 point

2.

Suppose you are using mini-batch gradient descent for training some neural net on a large dataset. You have to decide on the learning rate, weight initializations, preprocess the inputs etc. You try some values for these and find that the value of the objective function on the training set decreases smoothly but very slowly. What could be causing this? Check all that apply.

- [x] The learning rate may be too small.
- [x] The inputs might have a very large scale (hint: think of what this would do to the logistic hidden units).
- [ ] The dataset is too small.
- [x] The weights might have been initialized to very large values (hint: think of what this would do to the logistic hidden units).

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3.

Full-batch gradient descent can be used to minimize an objective function if the dataset is not too large. Which statement regarding full-batch gradient descent is **false**?

- (●) Full batch gradient descent is guaranteed to find a better local minimum than mini-batch gradient descent.
- ( ) Adaptive learning rate methods perform well for full-batch (or large mini-batch) gradient descent.
- ( ) For some setting of the learning rate, it is possible that the objective function increases in some iteration.
- ( ) Using momentum can be useful for full batch gradient descent.

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1 point

4.

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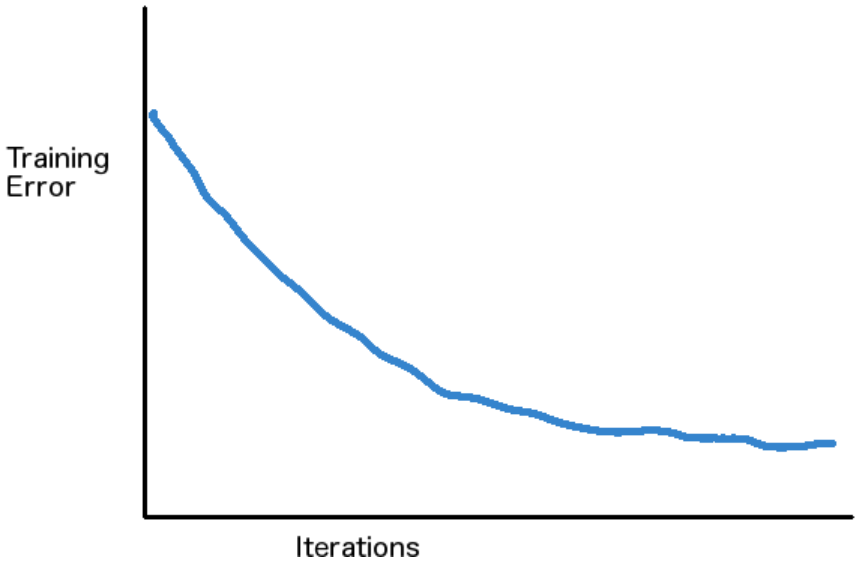
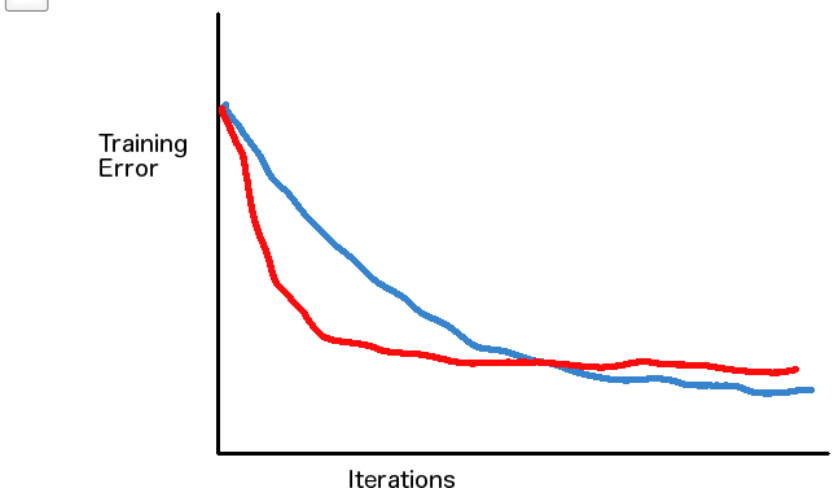
Claire is training a neural net using mini-batch gradient descent. She chose a particular learning rate and found that the training error decreased as more iterations of training were performed as shown here in blue



She was not sure if this was the best she could do. So she tried a **smaller** learning rate. Which of the following error curves (shown in red) might she observe now? Select the two most likely plots.

Note that in the plots below, each *iteration* refers to a single *step* of steepest descent on a *single minibatch*.



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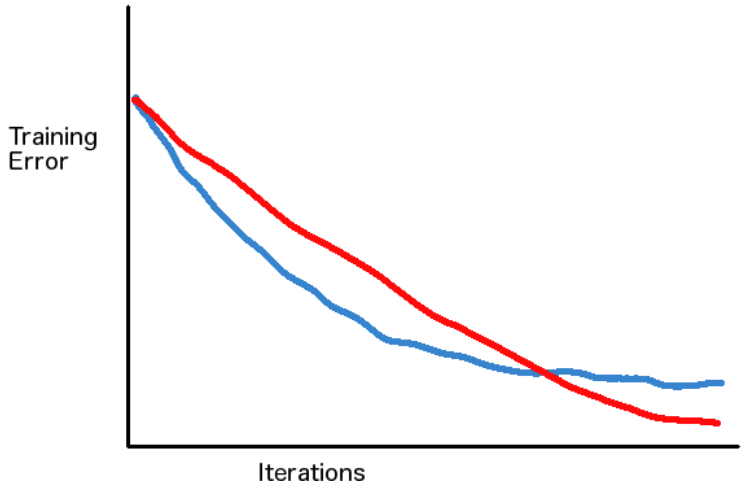

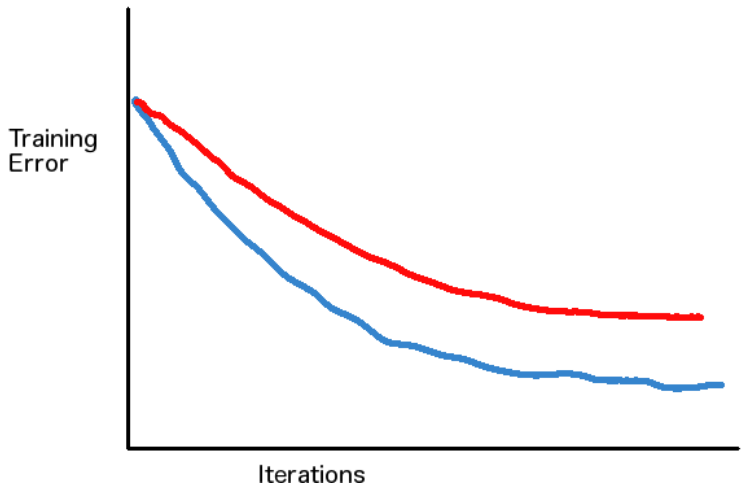

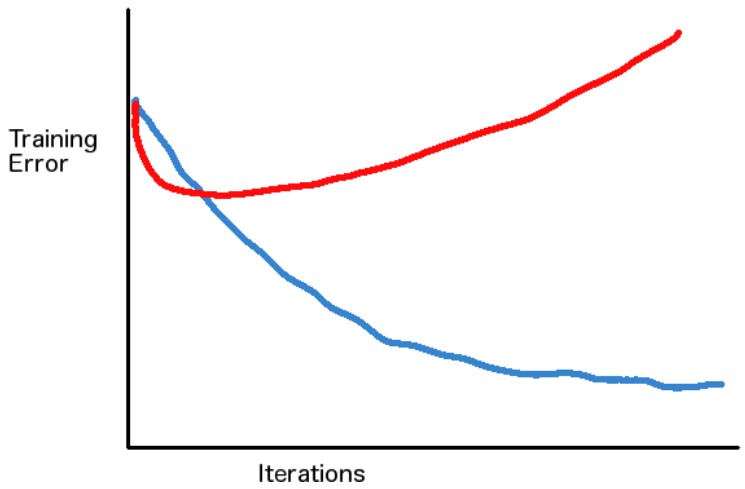

1 point

5.

Lecture 6 Quiz

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In the lectures, we discussed two kinds of gradient descent algorithms: mini-batch and full-batch. For which of the following problems is mini-batch gradient descent likely to be **a lot better** than full-batch gradient descent?

- [ ] Sentiment Analysis: Decide whether a given movie review says that the movie is 'good' or 'bad'. The input consists of the word count in the review, for each of 50,000 words. The training set consists of 100 movie reviews written by experts for a newspaper.
- [ ] Predict if an experiment at the Large Hadron Collider is going to yield positive results. The input consists of 25 experiment parameters (energy level, types of particles, etc). The training set consists of the 200 experiments that have already been completed (some of those yielded positive results; some yielded only negative results).
- [x] Sentiment Analysis: Decide whether a given movie review says that the movie is 'good' or 'bad'. The input consists of the word count in the review, for each of 50,000 words. The training set consists of 1,000,000 movie reviews found on the internet.
- [x] Object detection: Identify which of 1000 categories an object image belongs to, given 10 million 256 X 256 pixel images.

- [ ] I, **Alan Wright**, understand that submitting work that isn't my own may result in permanent failure of this course or deactivation of my Coursera account.

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