Machine Learning Assignment 2
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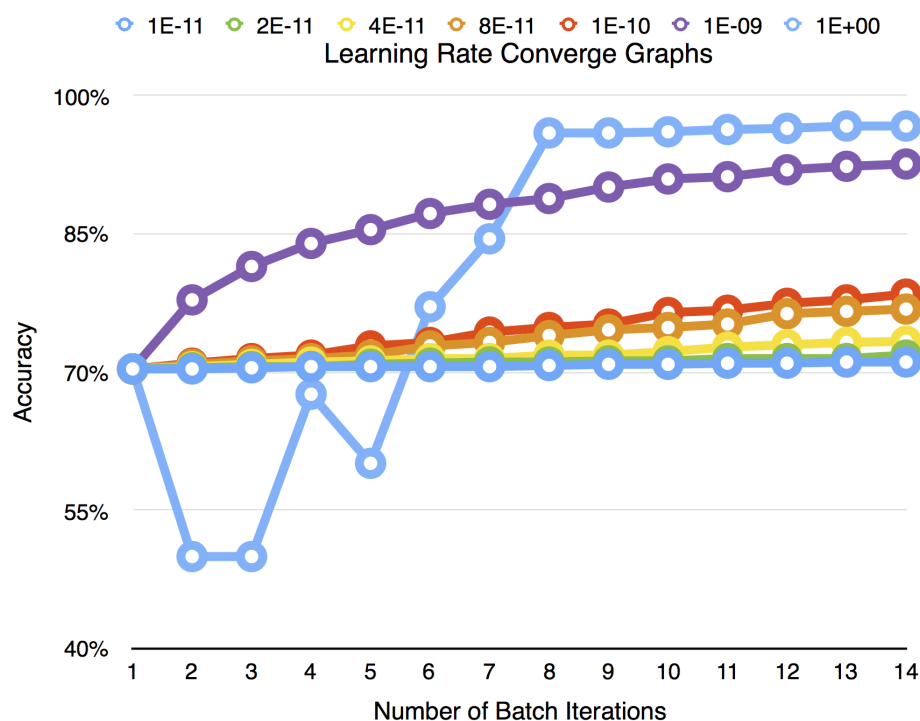Daniel Kirkpatrick

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Question 1

Figure 1: chart 1

For most of the assignment 15 fixed iterations was used. Some parts were also tested with 300 and 1,000 iterations. Different learning values produce difference convergence graphs. 10^-9 produced a smooth but quickly climbing convergence graph.

Question 2

They are very similar however the training data beats the test data until close to the end.
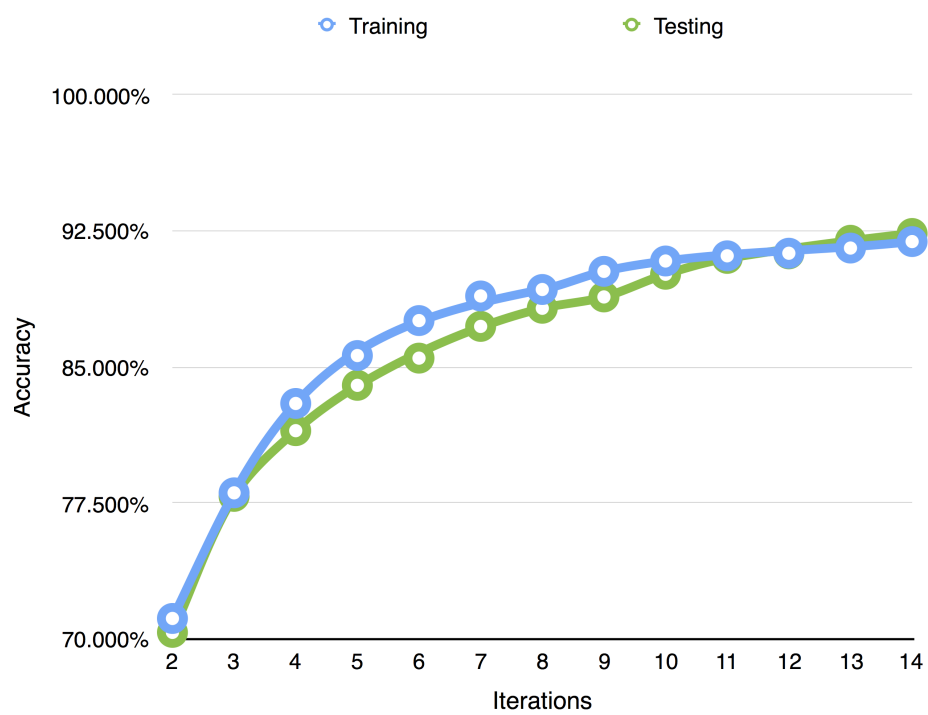
Figure 2: chart 2

Question 3

```
def g(weight, data):
        return 1.0 / (1.0 + e^(-weight.transpose().dot(data)))

def batch_learn(input_data, answers, learning_rate, iterations, regularization):
    for each iteration:
        accumulate = [0... input_data_length]
        for answer, data in answers, input_data:
            prediction = g(weight, data)
            error = answer - prediction
            accumulate += (error * data) + weight.dot(regularization)
        weight += accumulate * learning_rate
    return weight
```
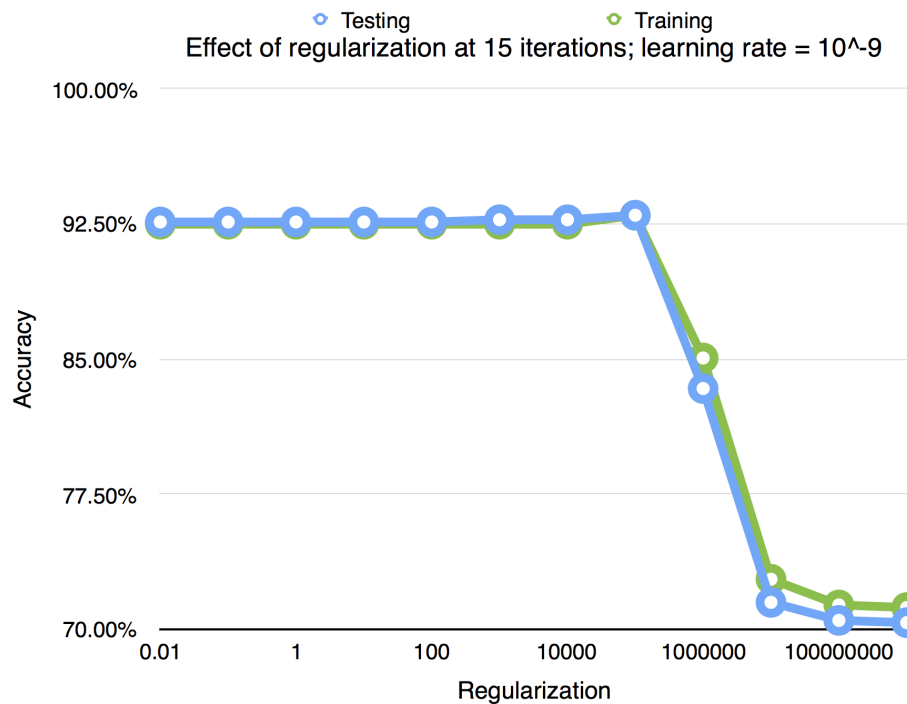
Question 4

Figure 3: chart 3.png

The regularization didn't have huge impact on accuacy, there was a small spike before a massive falloff.