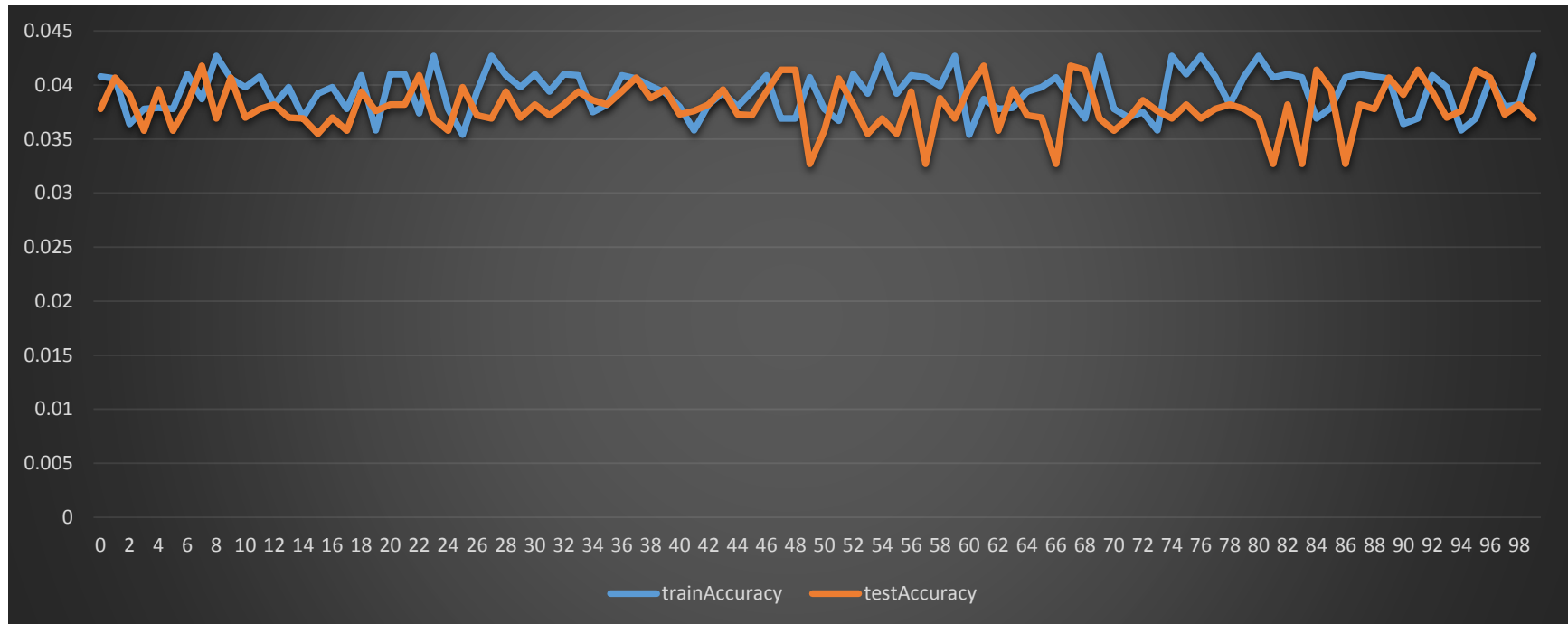


Experiment 1:

Hyper parameters: Set the learning rate  $\eta$  to 0.3, the momentum  $\alpha$  to 0.3, and the number of hidden units  $n$  to 4.

There is no evidence that my program is overfitting to the training data. There is evidence that the program is not adjusting weights enough to activate the correct letter.

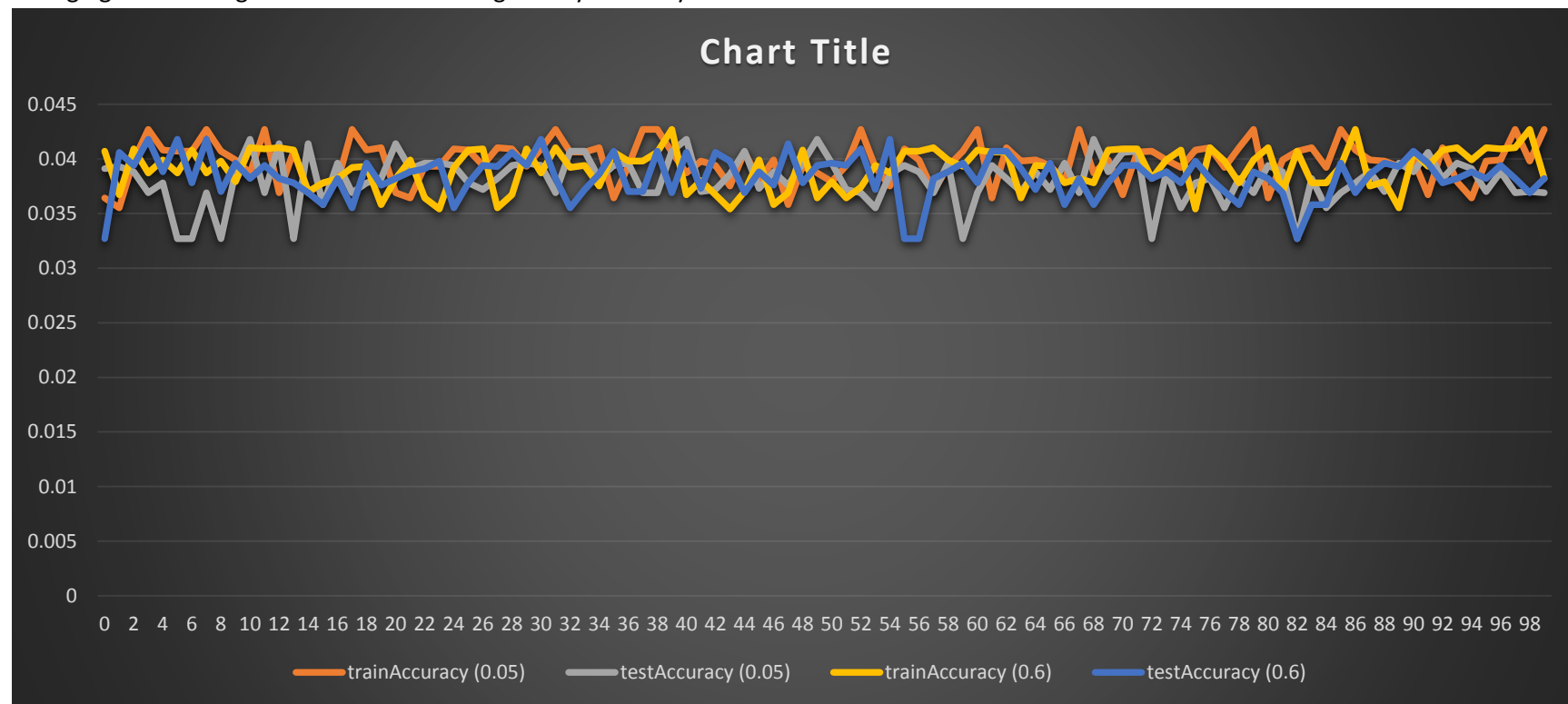


Expr 1 graph

Experiment 2:

Hyper parameters learning rate ( $\eta = 0.05$ ) and learning rate ( $\eta = 0.6$ ).

Changing the learning rate increased the range of my accuracy.

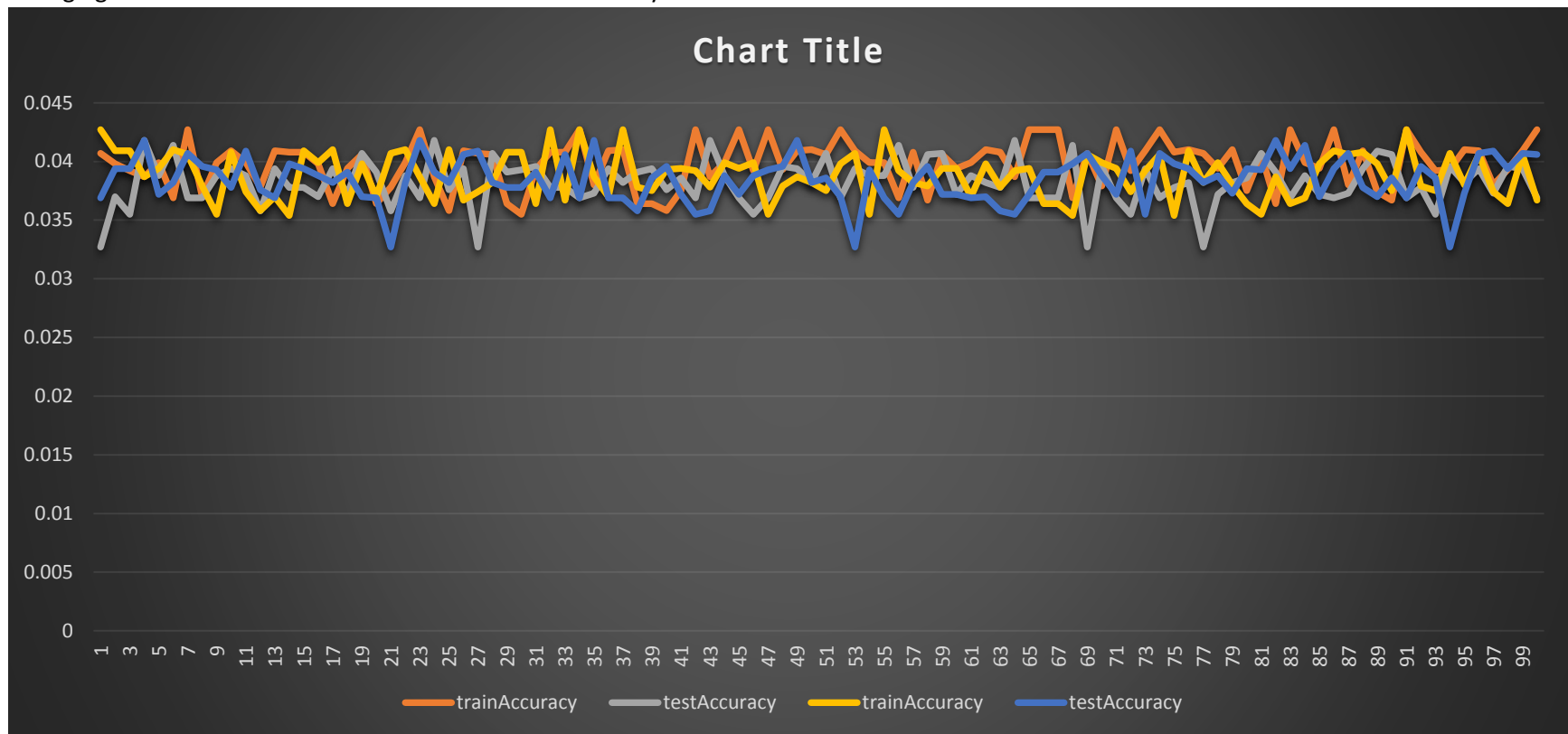


Expr 2 graph

### Experiment 3

Hyper parameters momentum rate ( $\alpha = 0.05$ ) and momentum rate ( $\alpha = 0.6$ ). (Set  $\eta$  back to 0.3.)

Changing the momentum did have a noticeable effect on my results.

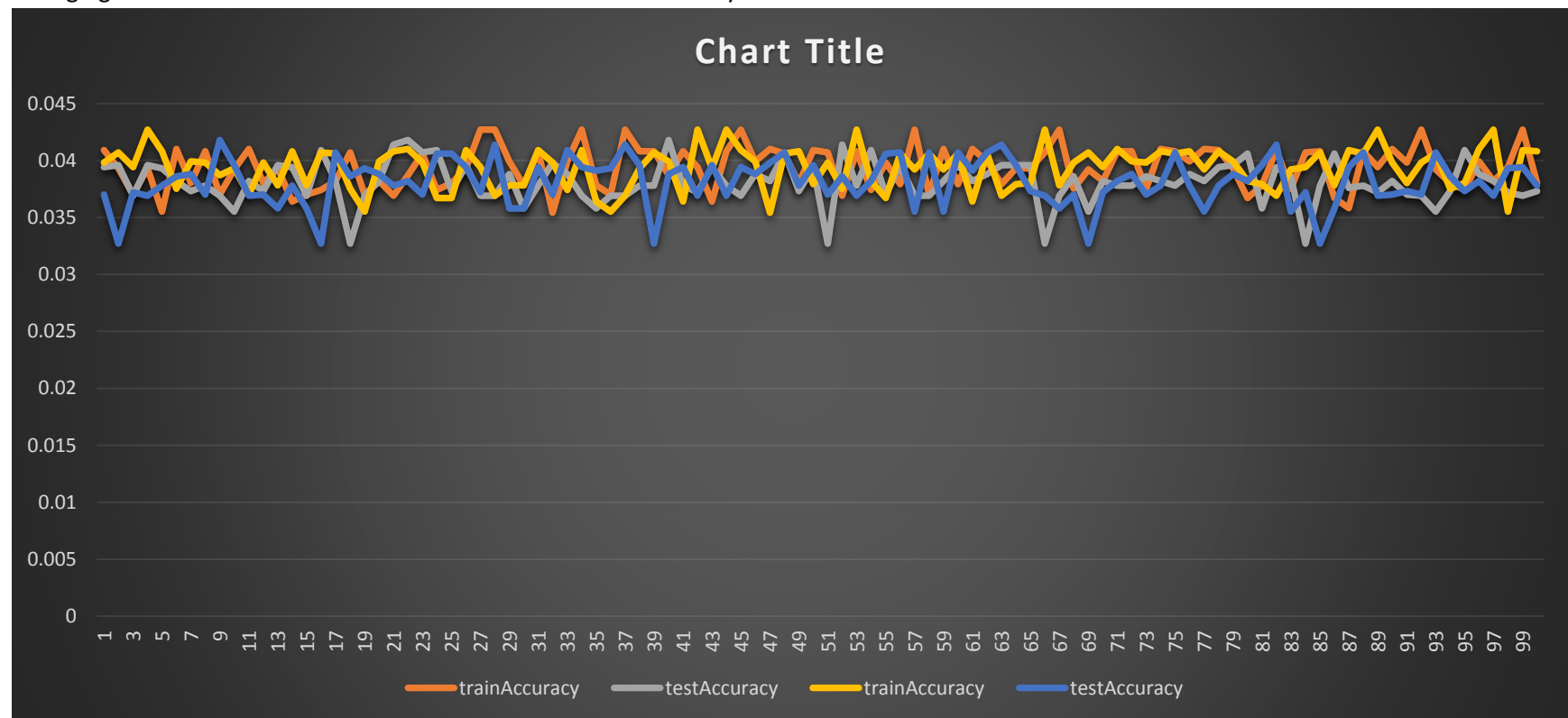


Expr 3 graph

#### Experiment 4

Hyper parameters hidden units ( $n = 2$ ) and hidden units ( $n = 8$ ). ( $\alpha$  and  $\eta$  back to 0.3.)

Changing the number of hidden units seem to have no effect on my results either.



Expr 4 graph

I have no idea why my program won't get an accuracy outside the range of 3.0 to 4.5. I have checked weights, deltas, and activation with a student that was getting better results and found my program to be an exact match. When I change to my set of training/test data I get the results shown above. I was able to find out that during testing for accuracy my highest activation is always the same, but during back propagation it changes.