



# Week 4 Presentation

PHY 496

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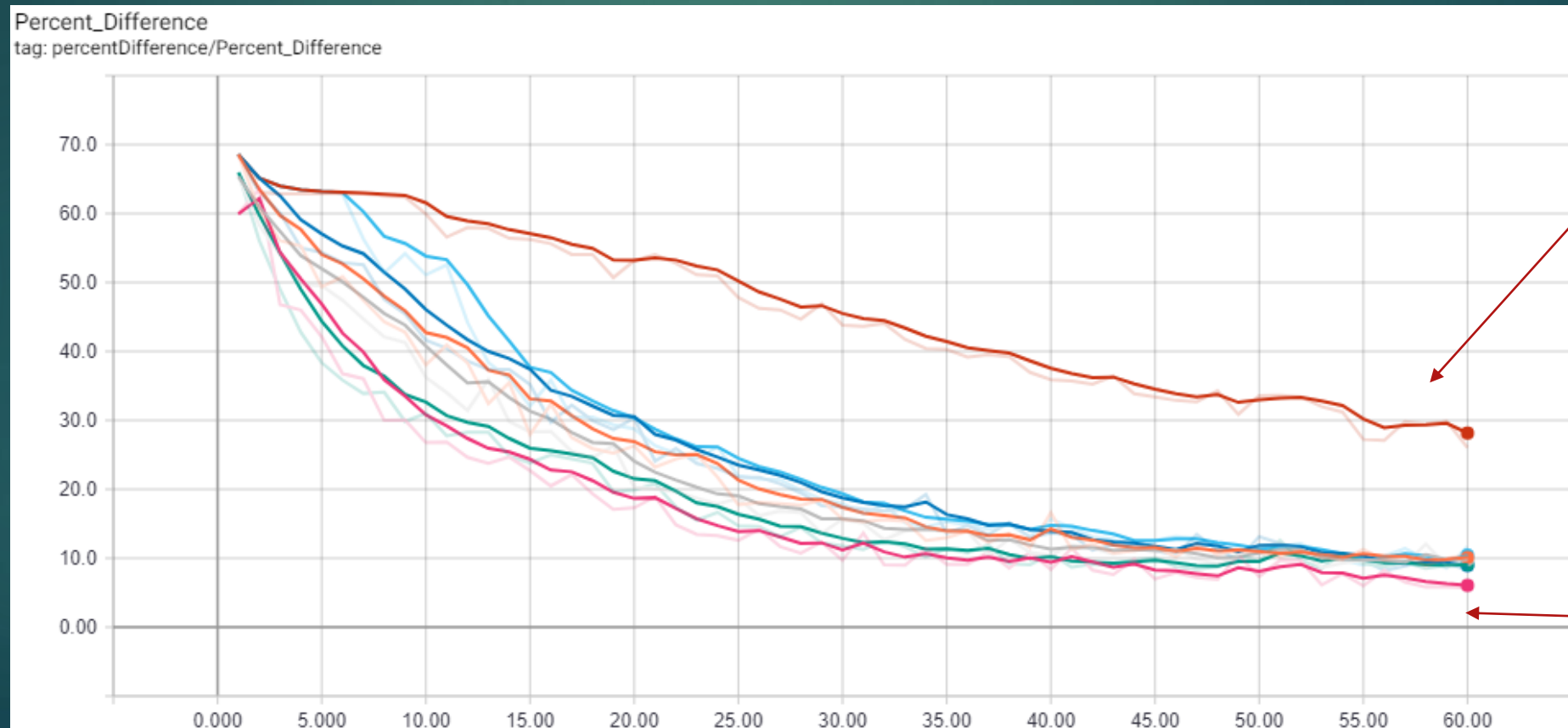
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# Errors fixed

- ▶ Using truly normalized output data now
  - ▶ Before the output data was just normalized via log
- ▶ Properly un-normalizing data for percent difference calculations
  - ▶ Before the unnormalizing was done after the log, not before it
- ▶ The combination of these errors made the predictions look about 3% more accurate than it actually was

# Activation function experiments

- ▶ Tested sigmoid, tanh, relu, prelu, elu, selu, and leaky-relu.



Sigmoid

prelu

# Bayesian Output over 100 trials

| Epoch | Inside 1<br>Standard<br>Deviation | Inside 2<br>Standard<br>Deviations | Inside 3<br>Standard<br>Deviations | Outside 3<br>Standard<br>Deviations | Loss  | Percent<br>Difference |
|-------|-----------------------------------|------------------------------------|------------------------------------|-------------------------------------|-------|-----------------------|
| 10    | 82.98                             | 96.72                              | 98.78                              | 1.21                                | 0.015 | 52.96                 |
| 20    | 68.20                             | 90.68                              | 96.03                              | 3.96                                | 0.005 | 26.307                |
| 30    | 46.99                             | 77.13                              | 89.72                              | 10.27                               | 0.003 | 17.540                |
| 40    | 37.05                             | 64.67                              | 81.32                              | 18.67                               | 0.002 | 13.931                |
| 50    | 32.41                             | 58.56                              | 76.33                              | 23.66                               | 0.001 | 12.096                |
| 60    | 24.43                             | 46.92                              | 65.33                              | 34.66                               | 0.001 | 10.931                |

# Goals for next week

- ▶ Implement click
- ▶ Add the ability to save networks
- ▶ Verify that previous conclusions about network depth, width, and activation were correct