

ML SIG 2019 Task 2

DEADLINE 20th June 2019

1 Introduction to Machine Learning Terminologies

Learn about the following terminologies:

- Accuracy, Precision and F-Score
- Curse of Dimensionality
- Bias Variance Tradoff
- Loss Functions

1.0.1 Resources

- [Visual Introduction to Machine Learning Part 1](#)
- [Visual Introduction to Machine Learning Part 2](#)
- [Introduction to Curse of Dimensionality](#)

1.0.2 Wikipedia Articles

- [Wikipedia Accuracy vs Precision](#)
- [Wikipedia Bias vs Variance](#)
- [Wikipedia Curse of Dimensionality](#)

2 Genetic Algorithms

2.1 What are Genetic Algorithms?

- [UC Davis Introduction to Genetic Algorithms](#)
- [Evolutionary computation course \(AEC 02 and 03 only\)](#)
- <https://lethain.com/genetic-algorithms-cool-name-damn-simple/>
- Reference/Additional Reading : [David Goldberg's Book on Genetic Algorithms and Soft Computing](#)

3 Task 1

DEADLINE 13th June 2019 (Wednesday)

3.1 Merge [this](#) repository into your fork/clone

[Github Merging into fork](#)

3.2 Solve [this](#) notebook

Implement a GA to extremize a polynomial within range.

4 Neural Networks

4.1 Visualization:

Youtube videos - good, intuitive, in-depth <https://youtu.be/aircArvnKk>

4.2 Online e-book

<http://neuralnetworksanddeeplearning.com/>

4.3 Neural network made by google - Can understand hyper-parameter tuning

[Tensorflow Playground](#)

5 Task 2

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5.1 Solve fill and solve [this](#) file

5.1.1 Resources:

- <https://youtu.be/aircAruvnKk>
- <http://neuralnetworksanddeeplearning.com/>
- <http://playground.tensorflow.org>

5.1.2 Instructions:

There are 11 TODOS in this python file Fill each one of those appropriately and you will have a working neural network Instructions and resources have been provided wherever possible. The implementation may not be perfect, so feel free to point out any mistakes / ask any doubts

After completing the task, some of the things you could try are (optional):

- Implement different cost functions (binary cross-entropy)
- Implement different activation functions (tanh, ReLU, softmax)
- Incorporate these changes in the neural network code so that you can select the loss / activation function
- Play with the hyper-parameters!

6 Genetic Algorithms and Neural Networks

Combining Genetic algorithms and neural networks Read up on these resources as. Later we will ask you to implement something similar.

- <https://github.com/yugrocks/Genetic-Neural-Network>
- <https://github.com/shahril96/neural-network-with-genetic-algorithm-optimizer>