Deep Learning and Neural Networks

Swapnoneel Kayal
Roll Number: 200100154
Mentor: Anuj Srivastava

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1 Materials to be used

- Deep learning Specialization on Coursera by Andrew Ng

- TensorFlow tutorials at :
  `https://www.youtube.com/watch?v=5Ym-dOS9ssA&list=PLhhyoLH6IjfxVOdVC1P1L5z5azs0XjMsb&index=1`

- Numpy tutorials at:
  `https://www.youtube.com/watch?v=8JfDAm9y_7s`

- Book : "Neural Networks and Deep Learning" by Michael Nielson

- Book : "Deep Learning" by Ian Goodfellow and Yoshua Bengio and Aaron Courville published by MIT Press
  `http://www.deeplearningbook.org`

- For computer vision:- Convolutional Neural Networks Course for Visual Recognition offered by Stanford.

2 Modified Plan Of Action

- **Week 1: 18 May - 24 May**
  Conventional Machine Learning tools I : Linear and Logistic Regression, Decision trees

- **Week 2: 25 May - 31 May**
  Conventional Machine Learning tools II : SVM and PCA

- **Week 3: 1 June - 7 June**
  Neural Networks and Deep Neural Networks

- **Week 4: 8 June - 14 June**
  Optimization of Deep Neural Networks

- **Week 5: 15 June - 21 June**
  Convolutional Neural Networks

- **Week 6: 22 June - 28 June**
  Recurrent Neural Networks and Building Sequence Models

- **Week 7: 29 June - 5 July**
  Implementing Convolutional Neural Network : Traffic Sign Classification

- **Week 8: 6 July - 12 July**
  Implementing Recurrent Neural Network : Language Translator

3 Progress Till Now

- In the first course of the Deep Learning Specialization, I was introduced to the foundational concept of neural networks and deep learning. By the end, I become familiar with the neural networks and was able to build, train, and apply fully connected deep neural networks. Not only that, I was also able to implement efficient vectorized neural networks and identify the key parameters in a neural network's architecture.

- In the second course of the Deep Learning Specialization, I was systematically introduced to the various processes that drive the performance of a deep neural network and are key in generating good results. By the end, I learnt the best practices to train and develop test sets and analyzed bias/variance for building deep learning applications and was able to use standard neural network techniques such as initialization, L2 and dropout regularization, hyperparameter tuning, batch normalization, and gradient checking. I also implemented and applied a variety of optimization algorithms, such as mini-batch gradient descent, Momentum, RMSprop and Adam, and checked for convergence in each case.

- Initially I went through the Numpy tutorials at : `https://www.youtube.com/watch?v=8JfDAm9y_7s` and then also completed the TensorFlow tutorials at : `https://www.youtube.com/watch?v=5Ym-dOS9ssA&` `list=PLhhyoLH6IjfxVOdVC1P1L5z5azs0XjMsb&index=1`

4 End Goal

Currently, I have the basic knowledge in the domain of Deep Learning and Neural Networks but still I feel till now I have been only scratching the surface. From this point onwards, I would be diving deep into the various different types of Neural Networks like Convolutional Neural Networks, Recurrent Neural Networks and would be implementing some of them as mini-projects just to get the feel of how powerful these can actually become.

5 Gratitude For My Mentor

I decided to keep a separate section where I would like to formally thank my mentor, Anuj Srivastava, who kept his patience, guided me in the right direction from the starting and helped me whenever I required him. He made sure I am confident with each and every concept and that I utilized the time well which I feel was only possible because of his expertise in the field of Neural Networks and Deep Learning. I also thank the MnP club for giving me such an opportunity.