MNIST DIGIT CLASSIFICATION USING NEURAL NETWORKS AND CNN

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SUMMARY

- This project is customized version the implementation of neural networks from scratch. I reffered to this book Neural networks and deep learning to learn more about the topic. It is an online book which can be accessed here: http://neuralnetworksanddeeplearning.com/ . This book gave me insight and knowledge on how to build neural networks from scratch . It also helped me get a very good understanding of Feed forward functions, back propagation functions, activation functions and cost functions. I have made a simplified version of the model in this book which is easy to understand and implement. The dataset which I have used can be downloaded from: http://yann.lecun.com/exdb/mnist/ . You can also get the data from popular data science platforms like Kaggle(https://www.kaggle.com/c/digit-recognizer/data) and Analytics Vidhya(https://datahack.analyticsvidhya.com/contest/practice-problem-identify-the-digits).
- I have also implemented the same using TensorFlow package and also Convolutional Neural Networks (CNN) version.

IMPLEMENTATION

- I have implemented four versions.
    - First version is using basic quadratic cost function and implementation of sigmoid activation function feed forward and back propagation functions.
    - The second version is the improvement of the 1st version by using a cross entropy function as cost function and also adding regularization techniques. We also added the evaluation of validation data which was not performed in previous version
    - The third version is an implementation of basic neural networks with SoftMax cost function using TensorFlow.
    - The fourth version is an implementation of Convolutional Neural Networks using TensorFlow to solve the same problem statement