CSE 424
Task #6 (Report)
Fall 2022

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I have recently done Stanford CS230: Deep Learning course on youtube and it was, personally, an enriching experience for me. I have got to learn about some key skills that are very necessary in today's world; most notable is research skills. I learned new techniques of data preprocessing and preparation through this course. This course also helped me build a strong understanding of the different types of neural network architectures and how to choose the most appropriate one for a given task.

Another important skill I learned is the ability to effectively fine-tune and optimize the model during training. This includes selecting appropriate hyperparameters, such as learning rate and batch size, and using techniques such as early stopping and weight decay to prevent overfitting. In this manner this course helped me to acquire a strong understanding of the mathematics behind the algorithms being used, as this can help inform the choices made during model optimization.

In addition to these technical skills, I also learned about the importance of having strong research skills in order to effectively conduct deep learning research. This includes the ability to locate and evaluate relevant literature, as well as the ability to design and conduct experiments in a rigorous and reproducible manner. I realized it is also important to be able to clearly communicate research findings through writing and presenting at conferences or in peer-reviewed publications.

Review of Fall 1999 Sl 18.01 Lectures of Gilbert Strang on Linear Algebra

On December 13, I successfully completed watching the course "Lectures of Gilbert Strand on Linear Algebra" that was available for all through the youtube platform. I have to say, it was an enriching experience. This and "3blue1brown" contents have given me a perspective on Linear Algebra that was completely new and "out of the box" in my opinion. One of the most memorable points were the analogies of how closely tied the concept of eigenvectors and eigenvalues are to speech processing. Many concepts of optimization and integration in engineering rely on concepts of linear algebra. It is used

to design and analyze structures, like bridges and buildings. In my personal experience, the most fun part of the course were the puzzles of finding whether a certain set of vectors lie on an arbitrary vector space, finding the behavior and property of the vector spaces like basis and dimensions and doing critical thinking and problem solving along the process.

Review of tasks completed in R

I have done R tasks, some of the topics I covered are: basic syntax, data manipulation, data visualization, data aggregation and summarization, tidyverse, packages like dplyr and tidyr. Tidyverse is a collection of R packages that are designed to work together and make data manipulation and visualization easier. It includes packages like ggplot2, dplyr and tidyr. I am providing and the tasks and additional work I have done in the [github link](#) below:

https://github.com/abidxg/CSE424/blob/main/R_tasks.txt

Review of OpenRefine

I have done some work with Openrefine. Google OpenRefine, formerly known as Google Refine, is a data cleansing and wrangling tool that allows users to explore, clean, and transform data from various sources. It is a powerful tool that is commonly used by data scientists and analysts to prepare data for analysis and visualization. One of the key features of OpenRefine is the ability to handle large datasets efficiently. It can handle datasets with millions of rows and columns and can perform various operations on them like filtering, sorting and aggregating data. It can detect and correct errors in data such as spelling mistakes, duplicates, missing values and so on. It uses various algorithms to achieve such tasks. Lastly, it is extremely useful and flexible as it can handle data of various formats like csv, excel (xlsx, xls), json and many more.
I am providing and the tasks and additional work I have done in the [github link](#) below:
https://github.com/abidxg/CSE424/blob/main/submission1