

## **Diary Entry - Week 13**

Date: 07-10-2024 to 11-10-2024

### **Summary:**

Week 13 featured an exploration into dynamic programming, recurrent neural networks (RNNs) in deep learning, and various machine learning algorithms including multivariate Bernoulli, multinomial, and Naive Bayes. Additionally, the week delved into syntactic vectorization and latent semantic analysis in natural language processing (NLP).

### **Dynamic Programming:**

- Explored dynamic programming as a method for solving complex problems by breaking them down into simpler subproblems.
- Learned about the principles and applications of dynamic programming in optimizing solutions for problems with overlapping subproblems and optimal substructure.

### **Recurrent Neural Networks (RNNs) in DL:**

- Continued the study of recurrent neural networks (RNNs), focusing on their architecture and training techniques in deep learning.
- Explored the challenges of training RNNs, including vanishing and exploding gradients, and investigated solutions such as gradient clipping and gated recurrent units (GRUs).

### **Machine Learning Algorithms:**

- Studied multivariate Bernoulli, multinomial, and Naive Bayes algorithms, understanding their principles and applications in classification tasks.
- Explored the assumptions underlying these algorithms and their effectiveness in modeling complex data distributions.

## **Syntactic Vectorization and Latent Semantic Analysis in NLP:**

- Investigated syntactic vectorization techniques for representing textual data in vector space models.
- Explored latent semantic analysis (LSA) as a method for dimensionality reduction and uncovering hidden semantic structures in text corpora.

## **Coding Challenge - Week 9:**

- Engaged in the coding challenge focusing on dynamic programming and recurrent neural networks.
- Implemented dynamic programming solutions for sample problems and developed RNN models for sequence prediction tasks.