Monday: Deep Dive into Pytorch and Neural Networks

The week commenced with a deep dive into deep learning using Pytorch. The focus was on understanding neural networks, batch size, and the significance of flattening in the context of code implementation. The awe-inspiring realization of how the neural network layers deepened as the code expanded was a testament to the complexity of the field. The functions for training, validation, and training epochs were intricate, emphasizing the necessity of careful configuration in selecting loss functions and optimizers. The application of the code to fashion MNIST data rather than handwritten data hinted at broader potential applications, such as optical character recognition.

A pivotal moment arrived with the introduction of Convolutional Neural Networks (CNN). The shared parameters through the kernel-based matrix creation process were highlighted, and concepts like dropout and data augmentation were explored. The day culminated with the practical experience of GPU allocation and a transition to using fashion MNIST data for CNN exercises. Overcoming challenges in configuring the existing code to the new dataset showcased adaptability and problem-solving skills.

Tuesday: CRISP-DM Framework and Practical Data Mining

The week progressed with a deep dive into the CRISP-DM framework, an inter-industry standard process for data mining. The stages of business understanding, data preparation, modeling, evaluation, and construction were explained, positioning data at the core of the process. Real-world examples, such as diagnosing COVID-19, added practical context to the framework. The practical session involved revisiting past data mining problems, providing an opportunity to break down completed tasks and articulate the step-by-step process for each.

Post-lunch, attempts were made to engage with the Nvidia deep learning course, featuring the Jetson Nano board. However, hardware access challenges hindered hands-on participation. The professor's demonstration using the Jetson Nano board and a webcam provided valuable insights into the practical application of learned concepts. The day concluded with problem-solving for obtaining the Nvidia Certificate.

Wednesday: Mastering Hyperparameters and Introduction to RNN

The midweek session commenced with a detailed exploration of hyperparameters and the rationale behind their adjustments. The distinction between random search and guided optimization was elucidated through visual aids. The unfamiliar concept of pruning, a method for reducing model parameters by eliminating low-importance weights, was introduced. A reminder of the null accuracy concept reinforced the importance of meaningful model predictions.

In the afternoon, the focus shifted to Recurrent Neural Networks (RNN). Although the basics of LSTM were covered, the emphasis was on understanding without direct code implementation. Padding's role in sentimental analysis, Tiny language model exercises, and the temperature element's impact on text generation were explored. The practical application of learned concepts using limericks data added a creative touch to the exercises.

Thursday: Navigating Text Mining Challenges and Exploring Generation Models

Thursday's session dived into text mining, acknowledging challenges such as language and domain dependency. The six processes of text mining, including web crawling and pre-processing techniques like tokenization and lemmatization, were explored. Vectorization concepts, such as word

embeddings and word2vec, emerged as solutions to issues like large vocabulary size during one-hot encoding.

The latter part of the day included an intriguing exploration of text and image generation models. Concepts like the diffusion model and image generation using dall-e were explained with visual examples. The transformative impact of the transformer model on text and image generation processes was unveiled.

Friday: Industry Visit, Langchain Theory, and Real-world Applications

Friday commenced with an enriching industry visit to a SWU company, providing a practical perspective on data analysis and artificial intelligence application. The company's role in creating a smart city through citizen data analysis resonated with the earlier learning of CRISP-DM.

The afternoon session delved into Langchain theory, offering insights into code-centric applications. The utilization of pretrained models from Hugging Face and the importance of prompt engineering were highlighted. The exploration of the RAG model, combining search and generation, demonstrated the evolving landscape of natural language processing.

The final segment of the week addressed using the LLM model for classification, featuring fine-tuning with OpenAI's gpt3.5. This practical application showcased the versatility of learned concepts in adapting to different tasks.