Master Project: Application of word-level encoding in Event Prediction Models

The current event prediction models in scheduling systems are used to predict the events of the next cycle based on the historical data of the current cycle. The event prediction models for predicting the events of several cycles can be implemented with the help of techniques in Natural Language Processing Task (NLP). In NLP, a sentence can be converted into a sequence of numbers using **word-level encoding**, making it possible to train a deep learning model. The sequence of events that occur in each scheduling cycle can be thought of as a "word", while the list of sequence of events in multiple cycles can be seen as a "sentence". This technology can be used in the event prediction model. The goal of this project is to compare the performance of the Seq2Seq model with and without the word-level encoding to predict the events of the next several cycles.

Challenge: The number of events can be greater than 20 or 30. How to reduce the size of "event dictionary"?

Your Profiles:

1. Familiar with and independent work in Python.
2. Experience in PyTorch.
3. Good knowledge of RNN and Seq2Seq models.

Your Jobs:

1. Literature review of **Event Prediction** and **Word-level Encoding** in NLP.
2. Creating the code of Seq2Seq model based on PyTorch.
3. Adding the word-level encoding into the model.
4. Try to solve the challenge.
5. Designing experiments for comparing performance.
6. Master Thesis.

Master Project: Application of character-level encoding in Event Prediction Models

The current event prediction models in scheduling systems are used to predict the events of the next cycle based on the historical data of the current cycle. The event prediction models for predicting the events of several cycles can be implemented with the help of techniques in Natural Language Processing Task (NLP). In NLP, a sentence can be converted into a sequence of numbers using **character-level encoding**, making it possible to train a deep learning model. Each event can be regarded as a "character", while a sequence of events that occur in several scheduling cycle can be thought of as a "sentence" rather than a "word". This technology can be used in the event prediction model. The goal of this project is to compare the performance of the Seq2Seq model with and without the character-level encoding to predict the events of the next several cycles.

Challenge: The character-level encoding ignores the boundary between the each cycle. How to distinguish the predicted events? or how to determine which cycle these predicted events belong to?

Your Profiles:

1. Familiar with and independent work in Python.
2. Experience in PyTorch.
3. Good knowledge of RNN and Seq2Seq models.

Your Jobs:

1. Literature review of **Event Prediction** and **Character-level Encoding** in NLP.
2. Creating the code of Seq2Seq model based on PyTorch.
3. Adding the character-level encoding into the model.
4. Designing experiments for comparing performance.
5. Try to solve the challenge.
6. Designing experiments for comparing performance.
7. Master Thesis.

Master Project: Event Prediction Framework Based on MANN Model

Event prediction models have been widely used in many fields such as business process management, stock prediction, industrial manufacturing, and autonomous driving, and have achieved good results. This project focuses on the development of event prediction model architectures in multi-core real-time scheduling systems. Based on existing process mining technologies, there are many event prediction models that can be used, and MANN (Memory-Augmented Neural Network) is one of them. The main task of this project is to explore the feasibility of the MANN model in event prediction tasks and to develop the corresponding framework.

Your Profiles:

1. Familiar with and independent work in Python.
2. Experience in PyTorch.
3. Good knowledge of RNN.

Your Jobs:

1. Literature review for Seq2Seq Model and MANN.
2. Seq2Seq model implementation as baseline.
3. MANN framework development based PyTorch.
4. Performance comparison between MANN and Seq2Seq Model.
5. Master Thesis.