Paper Summary

1.Recommendation System

1.1 Deep Neural Network for YouTube Recommendations

- ACM RecSys 2016
- Citation: 595
- Summary:

Due to the data on YouTube is very massive, in this paper they not only provide a solution to improve the performance of recommendation, they also specify on how to deal with the top three issue below while recommending :

- Scale: Many recommendation algorithm are proven to work well on small problems fail to operate on YouTube's scale

- Freshness: YouTube has a very dynamic corpus with lots of video uploaded every second.

- Noise: Historical user behavior on YouTube is very sparse and have many unobservable external factors.

Turn out that they used two neural network to solve the problem, one for Candidate generation, another for Ranking. At that time, their algorithm outperformed linear and tree-based method for watch time predictions.

- 選擇原因：

Citation 有高達 595 次，是我們目前找到 Deep Learning 做推薦系統引用數最高的，且為第一篇提出要如何基於大量資料去做推薦系統的論文。

1.2 Wide and Deep Learning for Recommender System

- ACM DLRS 2016
- Citation: 577
- Summary

Memorization of feature interactions through a wide set of cross-product feature transformations are effective and interpretable, while generalization requires more feature engineering effort. In this work, they present Wide&Deep learning - jointly trained wide linear model and deep neural network, to combine the benefits of memorization from linear model and generalization from neural network for recommender system.

1.3 Session-Based Recommendations with Recurrent Neural Networks

- ICLR 2016
- Citation: 424
- Summary

　　Real-life recommender system often face the problems of having to recommend base on short session data instead of long historical data. Most of the recommendation system recently only use the last behavior to do Item-to-item recommendation. In this work, they argue that by modeling the whole session can be more accurate on recommendation, so they implement RNN to solve the problems.

- 選擇原因：

　　有 424 次的引用數，是第一篇把 Session 的概念引入 RNN 的 paper。很多電商不會去跟蹤使用者進入平台的資料，更不用說針對 Session 的推薦系統。

1.4 Recurrent Recommender Networks

- ACM WSDM 2017
- Citation: 202
- Summary

　　Recommender system traditionally assume that the user profiles and movie attribute are static. Unfortunately, tradition approaches are lacking when it comes to temporal and causal aspects inherent in the data. There are three mainly problems which are:

1. Change in Movie Perception: Movies will become popular after they won some prize.
2. Seasonal Changes: Christmas movie are more likely to be watch in winter
3. User Interest: User preferences is not really static, they changes.

　　In this work, they propose a time-dependent model which includes two RNNs, one for users and the other for movie.

- 選擇原因：

　　從 2017 到現在就累積了 202 次引用，並且提出了一個很不同的模型：利用兩個不同的 RNN 去做推薦，一個是基於用戶的，一個是基於物品的。

2.Credit:

2.1 E.T.-RNN: Applying Deep Learning to Credit Loan Applications

- KDD 2019
- Citation: 0
- Summary

In this paper we present a novel approach to credit scoring of retail customers in the banking industry based on deep learning methods. Our approach significantly outperforms the baselines based on the large customer data. Moreover, one of the crucial features of our approach is that we did not have to do feature engineering for our method, unlike the classical methods which rely heavily on the hand-crafted features. The advantage of this study is that even complex multivariate time series data can be directly used for training without need for feature design. The neural networks learn meaningful internal representations of input data during training, this greatly reduces the need for aggregated features compared with typical approaches. In summary, our E.T. -RNN method may be more suitable than the classical methods in cases where data is in low-level, granular form and there is enough data to train complex neural net based model.
- 選擇原因：

在做 credit 的目前還不多，會選擇是因為這是今年 KDD 出的，並且用了新的 model。

2.2 Deep Learning Detecting Fraud in Credit Card Transactions

- IEEE SIEDS 2018
- Citation: 16
- Summary

In this paper, we apply the Deep Learning as a solution to the problem for increase of credit card fraud detection due to the rise of digital payments systems such as Apple Pay, Android Pay.

We evaluate a subsection of Deep Learning topologies – from the general artificial neural network to topologies with built-in time and memory components such as Long Short-term memory – and different parameters with regard to the fraud detection on a dataset of nearly 80 million credit card transactions.

We also conducted sensitivity analysis the impact of hyper parameters on model performance. It's found that size of the network to be the largest driver of model performance. It's seen that larger network tended to perform better than smaller

networks in the case of 4 different topologies.

選擇原因：

是去年發表，但有 16 次引用，在做 credit 的論文當中算是比較高的。

3.Stock prediction

3.1 Deep Learning for Event Driven Stock Prediction

- AAAI 2015
- Citation: 227
- Summary

Movement of stock prices is in response to news or events. With growing of computational power and natural language processing (NLP) techniques, it enables more accurate models to predict stock market by mining news. The author has discovered that extracting text into structured event representation can better capture actor and event object. Ding et al., in 2014, have shown improvement on model by using structured representation instead of words as features. However, structured representation leads to increased sparsity. To handle this problem, the author trained an embedded network and mapped the representation into dense vector.

Combing news into sequence of dense vectors, the author proposed a convolutional network to capture both short-term and long-term influence of events on stock market. And the model is shown to defeat other two financial-news-based stock market prediction systems proposed in other studies in S&P 500 Index prediction and individual stock prediction.

- 選擇原因:

目前引用次數最高的股票預測的論文。

3.2 Listening to Chaotic Whispers A Deep Learning Framework for News-oriented Stock Trend Prediction

- ACM WSDM 2018
- Citation: 39
- Summary

Unfortunately, the quality, trustworthiness, and comprehensiveness of online content related to stock market vary drastically, and a large portion consists of the low-quality news, comments, or even rumors. To address the challenges, the author proposed imitated human learning process following three principles: sequential

context dependency, diverse influence, and effective and efficient learning, and proposed a news-level attention based bidirectional gated recurrent unit(GRU) network with self-paced learning(SPL) mechanism. In result, extensive experiments on real-world stock market data is demonstrated to show the effectiveness of proposed framework.

- 選擇原因:

　　北京大學跟微軟一起做的論文，對不同質量的新聞分配了不同權重。且算是很新的論文。

3.3 Deep Learning for Stock Prediction Using Numerical-and Textual Information

- IEEE ICIS 2016
- Citation: 78
- Summary

　　Many artificial intelligence has been investigated to predict stock market trends. However, these studies encounter four issues. First, many of models use Bag-of-Words (BoW) as textural representation despite limitation of BoW. Second, no previous studies used both textural and numerical information. The author expects to use both to capture more complex pattern in stock market. Third, many previous works have considered only one company on training. They have ignored the correlation. Finally, previous works using textural information did not consider stock price as time series. To address these problems, the author proposes the method combining paragraph vectors and diary open prices of 10 companies. Long Short-Term Memory(LSTM) is employed to capture influence of time series. In experiment result, the author demonstrated the approach on real-world data of fifty companies listed on Tokyo Stock Exchange.

- 選擇原因：

　　在這篇發表之前，股票預測不是只用 numerical data 就是只用 textual data，這篇是第一篇結合兩種 data 的論文，且引用數 78 次也算不少。