# xLSTNet:

# Predicting Futures Price with Feature Interaction and Time Series Model

SIGIR 2020: FinIR REPORT

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# Contents

# Task: Predict the change of metal prices

- ✓ 3 sub-tasks
- ✓ Evaluation metric: accuracy
- ✓ Predict the rise and fall of **6 metals** over **1-day, 20-day and 60-day** period

# Our Method: Data Collection

- ✓ Collect Dow Jones Industrial Index dataset
- ✓ Collect English and Chinese news text data
- ✓ Only use DOW dataset

# Our Method: Data Preprocessing

- ✓ Only use LME dataset **after 2005**
- ✓ Validation set: **the last 10%** of the above data
- ✓ Missing value preprocessing: replace it with the **previous day's value**
- ✓ Min-Max Normalization: scale the data into the **range [-1, 1],** where the maximum and minimum values are taken from the training set

# Our Method: xLSTNet

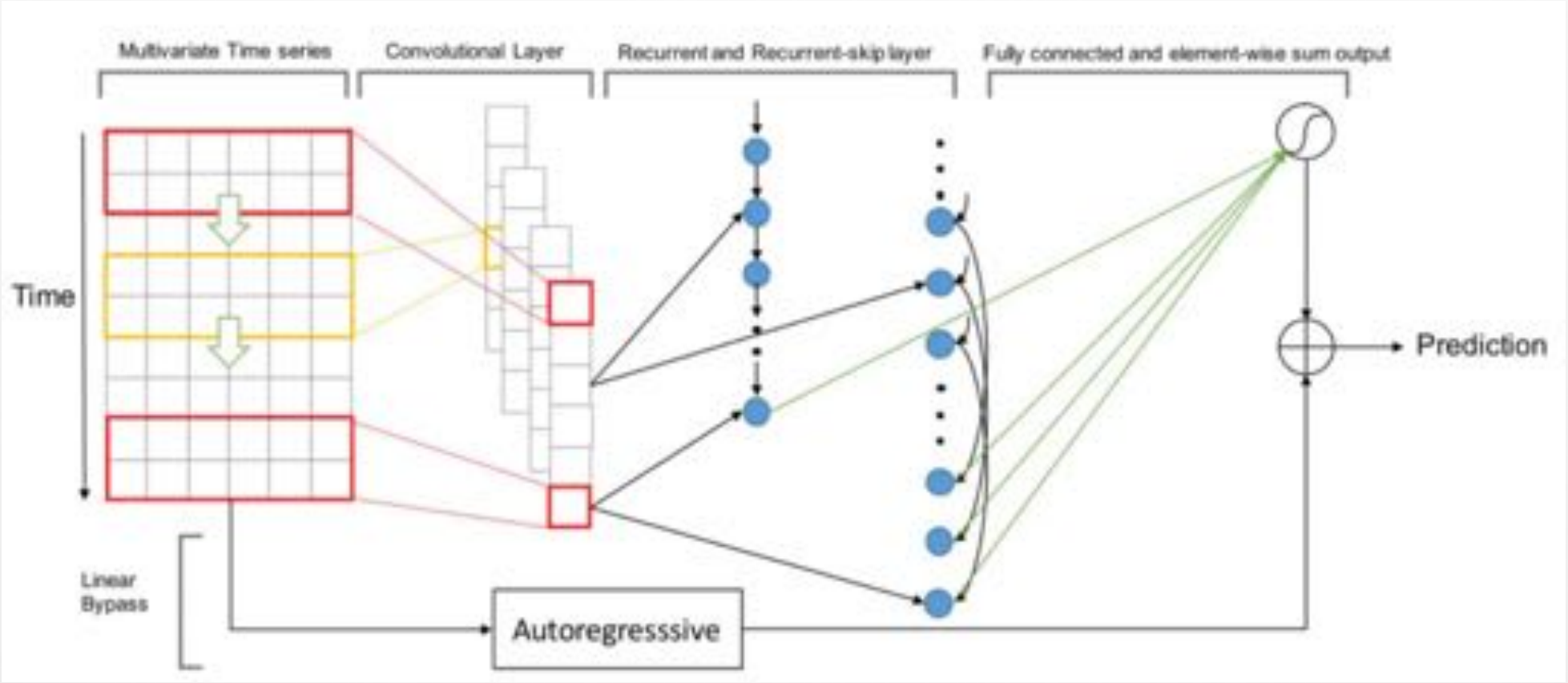
- ✓ Idea: incorporate feature interactions[1] into LSTNet[2]
- ✓ Use the feature interaction inspired by the xDeepFM[1]
- ✓ Use the LSTNet model[2], a deep Learning Network specially designed for time series prediction

[1] Lian, Jianxun , et al. "xDeepFM: Combining Explicit and Implicit Feature Interactions for Recommender Systems." (2018).

[2] Lai, Guokun , et al. "Modeling Long- and Short-Term Temporal Patterns with Deep Neural Networks." The 41st International ACM SIGIR Conference ACM, 2018.

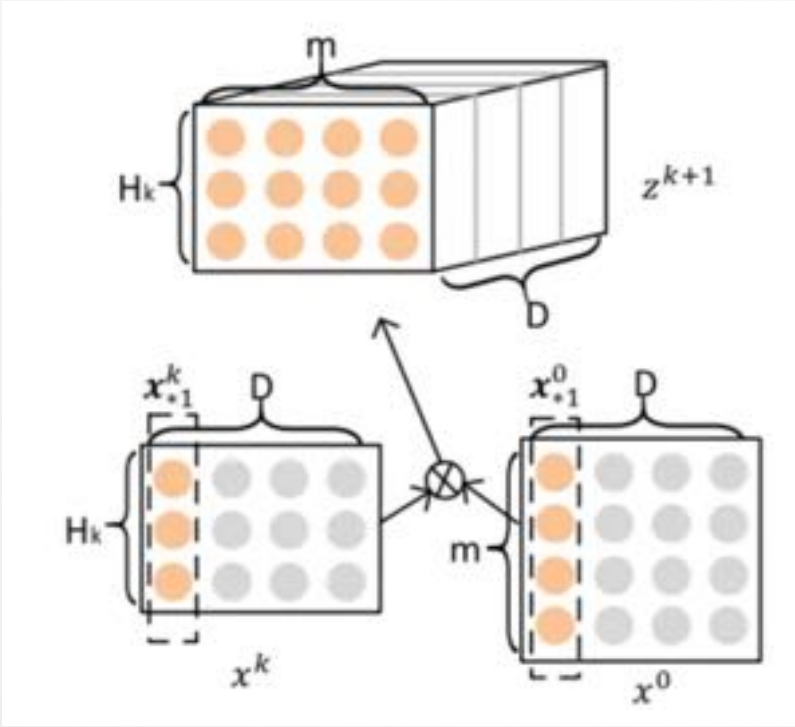
# Main idea: LSTNet

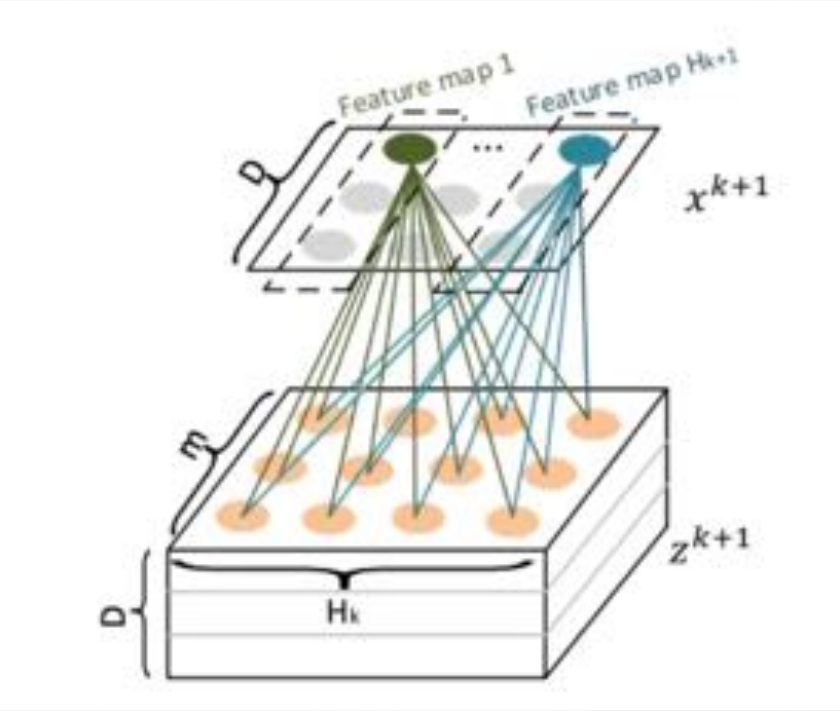
- ✓ Use LSTNet to predict the **Close Price**, then to compute the label
- ✓ Loss function: use **Minimum Mean Square Error** instead of Absolute Error



# Main idea: Feature Interactions

Simplify the Compressed Interaction Network module in [1] to interact features



# Experiments: Settings

```
window = 30
hidRNN = 200
hidCNN = 64
hidSkip = 100
CNN_kernel=5
skip = 10
highway_window = 0
dropout = 0.5
```

**Baseline**

1.Guess all 0

2.Lightgbm

3.LSTNet-Label

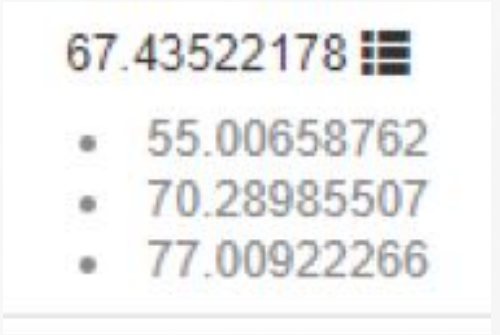
4.LSTNet-Close

# Experiments: Settings

| | All 0 | Lightgbm | LSTNet-Label | LSTNet-Close | xLSTNet |
|---|---|---|---|---|---|
| **Task1** | 53.16206 | 52.10803689 | - | 49.34123847 | **53.68906456** |
| **Task2** | 63.57049 | 55.59947299 | 62.31884058 | 64.49275362 | **65.87615283** |
| **Task3** | 63.96574 | 57.90513834 | 35.83662714 | 67.45718050 | **72.26613966** |
| **Overall** | 60.23276 | 55.20421607 | - | 60.43039087 | **63.94378568** |

# Results & Conclusion

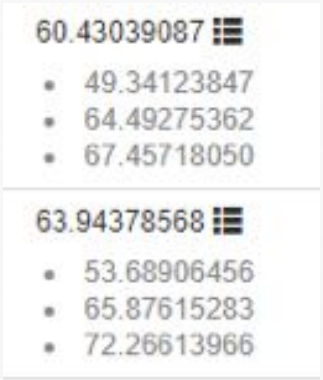

(a) The First Round




(b) The Second Round

# Results & Conclusion

1. Time series models such as LSTNet perform better than other models such as GBDT
2. Compared with LSTNet, xLSTNet has a significant improvement in the 3 tasks, which means that the feature interaction module can **well capture the impact between metals**




3. xLSTNet is sensitive to parameters

# THANK YOU