

# Next Cashtag Prediction on Social Trading Platform with Auxiliary Tasks

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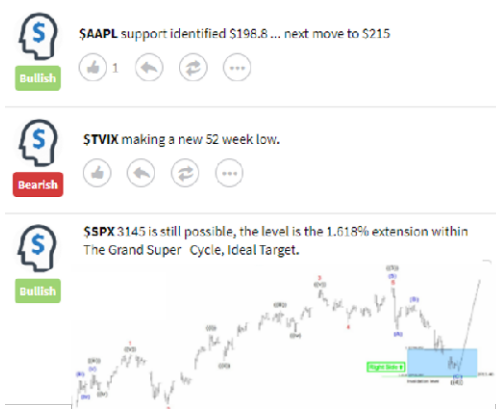
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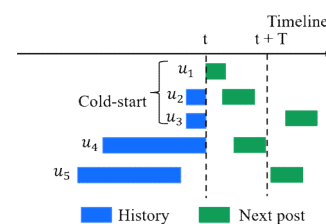
## Motivation



## Task Design

### Next Cashtag Prediction

We use the post(s) of  $user_i$  at time  $t$  to represent the preference of  $user_i$ . With the help of this information, we predict the cashtags that  $user_i$  will mention within next 5 days.



### Auxiliary Task

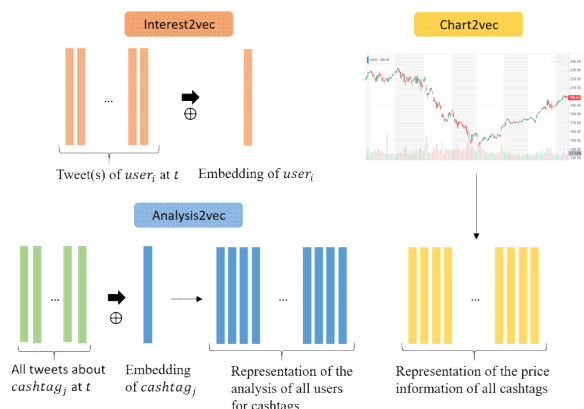
#### Hottest cashtag prediction ( $A_{hot}$ )

This task is aimed at predicting which cashtag will have the highest growth rate of being mentioned within the following  $T$  days.

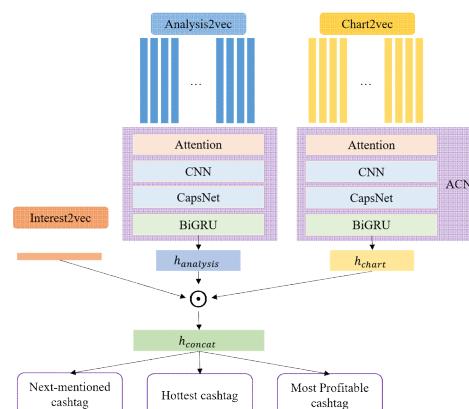
#### Most profitable cashtag prediction ( $A_{profit}$ )

This task is aimed at predicting which cashtag will have the highest return within the following  $T$  days.

## Representation



## Attentive Capsule Network (ACN) & The Joint Model



## Dataset

	Statistic
Number of users in the experimental set	126,369
Avg. number of cashtags mentioned per tweet	4.85
The first date in the training set	May 27, 2018
The last date in the training set	Jan. 2, 2019
Number of instances in the training set	97,740
The first date in the test set	Jan. 3, 2019
The last date in the test set	Feb. 23, 2019
Number of instances in the test set	21,538

## Experimental Results & Ablation Analysis

Model	hit@2	hit@3	hit@5
Joint ACN	<b>69.03%</b>	<b>74.01%</b>	<b>80.33%</b>
-Attention	67.30%	71.95%	78.04%
-CapsNet	66.90%	72.05%	78.87%
- $A_{hot}$	68.96%	73.78%	80.24%
- $A_{profit}$	68.74%	73.60%	79.89%

The proportions of errors with  $hit@k$  evaluation is significantly different on our test set with 21,538 instances under McNemar's test with  $p < 0.05$  when  $k \in \{2,3\}$

Model	Precision@2	Precision@3	Precision@5	Recall@2	Recall@3	Recall@5
Joint ACN	<b>45.50%</b>	<b>38.23%</b>	30.91%	35.70%	<b>41.44%</b>	<b>50.13%</b>
-Attention	43.44%	36.40%	29.35%	33.71%	39.03%	47.19%
-CapsNet	43.62%	36.70%	30.03%	33.59%	39.09%	48.07%
- $A_{hot}$	45.42%	38.12%	<b>30.96%</b>	<b>35.71%</b>	41.17%	50.02%
- $A_{profit}$	45.19%	38.01%	30.84%	35.49%	41.06%	49.74%

## Conclusion and Future Works

### Experimental results show

- the effectiveness of the proposed ACN model
- the usefulness of the corresponding auxiliary tasks

### The proposed task can be extended to

- user grouping
- dynamic interest prediction
- market information prediction such as price movement prediction and market volatility prediction

## Works with Financial Textual Data

### FinNum-2 Shared Task in NTCIR 2020

- The pilot dataset proposed in this paper is available now.
- More than 15,000 instances in 10,000 unique tweets will be available.
- Macro-F1 score is adopted for evaluating the experimental results.



<http://finnum.nlpfin.com>

### Numeracy-600K in ACL 2019

- Learning Numeracy for Detecting Exaggerated Information in Market Comments

<http://numeracy600k.nlpfin.com>



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