LIPI at the NTCIR-16 FinNum-3 task: Ensembling transformer based models to detect in-claim numerals in financial conversations...
Fidelity Investments, Jadavpur University

Sohom Ghosh
Sudip Kumar Naskar
Overview

- **Introduction**
  - Understanding in-claim versus out-of-claim numerals

- **Motivation**
  - Help investors to identify out-of-claim numerals so that they do not get allured by in-claim numerals.

- **Problem Statement**
  - Determine if numerals in financial texts are out-of-claim & in-claim

![Example of in-claim and out-of-claim numerals](image)
Dataset

- NTCIR-16 FinNum-3: Investor’s and Manager’s Fine-grained Claim Detection (English dataset)
- Training: 8,337 records (In-claim: 1,039)
- Validation: 1,191 (In-claim: 114)

Each labelled instance consists of:

- Financial Text
- Numeral (present within the text)
- Starting position of the numeral
- Ending position of the numeral
- Category of the numeral
- Label (In-claim or Out-of-claim)
Methodology

Input Text

M1: FinBERT classifier (Context window size = 8)

M2: FinBERT classifier (Context window size = 6)

M3: BERT embedding of target numeral + EF + LR

Ensemble (Majority Voting)

Output (Claim/Not claim)
## Results & Discussions

<table>
<thead>
<tr>
<th>Submission</th>
<th>Validation</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Micro-F1</td>
<td>Macro-F1</td>
</tr>
<tr>
<td>LIPI_1</td>
<td>94.45%</td>
<td>85.84%</td>
</tr>
<tr>
<td>LIPI_2</td>
<td>95.80%</td>
<td>88.15%</td>
</tr>
<tr>
<td>LIPI_3</td>
<td>94.79%</td>
<td>86.71%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Macro-F1</th>
<th>Micro-F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3 (only)</td>
<td>0.8318</td>
<td>0.6646</td>
</tr>
<tr>
<td>M3 (-EF)</td>
<td>0.8238</td>
<td>0.7990</td>
</tr>
<tr>
<td>FinBERT classifier (CW=5)</td>
<td>0.8318</td>
<td>0.7250</td>
</tr>
<tr>
<td>FinBERT classifier (CW=6)</td>
<td>0.8439</td>
<td>0.6603</td>
</tr>
<tr>
<td>FinBERT classifier (CW=7)</td>
<td>0.8381</td>
<td>0.8244</td>
</tr>
<tr>
<td>FinBERT classifier (CW=8) (LIPI_1)</td>
<td>0.8585</td>
<td>0.6345</td>
</tr>
<tr>
<td>FinBERT classifier (CW=9)</td>
<td>0.8247</td>
<td>0.8262</td>
</tr>
<tr>
<td>Ensemble (LIPI_3)</td>
<td>0.8671</td>
<td>0.9479</td>
</tr>
</tbody>
</table>
Conclusions & Future Works

Conclusions

● We ranked 9th and 10th out of 16 submissions in terms of micro and macro F1 scores respectively
● Developed and open sourced the tools “FiNCAT”- Financial Numeral Claim Analysis Tool and “FiNCAT-2” ([https://github.com/sohomghosh/FiNCAT_Financial_Numeral_Claim_Analysis_Tool/](https://github.com/sohomghosh/FiNCAT_Financial_Numeral_Claim_Analysis_Tool/))

Future Works

● Take the numeral to be evaluated as an input from the user
● Improving model performance
● Web browser extension development
Thank You
Any Questions