A Cascade Model for Argument Mining in Japanese Political Discussions: the QA Lab-PoliInfo-3 Case Study

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https://raruidol.github.io/
1 The Task

2 The Model
   - 7BERT
   - 5BERT
   - rVRAIN

3 The Results
   - Local Evaluation
   - Dry-Run Evaluation
   - Formal-Run Evaluation
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Budget Argument Mining

INPUTS:
- Speech transcripts from political discussions.
- Budget item list.
- Numeric expressions.

OUTPUTS:
- Argument Class (i.e., Premise, Claim, Other, etc.)
- Related ID (i.e., budget item related to the monetary expression)

→ 7-class Argument Classification + Information Retrieval

1https://poliinfo3.net/en/tasks/budget-argument-mining/
Budget Argument Mining: Argument Classification

CLASSES:

- Premise:
  - Past and Decisions.
  - Current and Future / Estimates.
  - Other.

- Claim:
  - Opinions, suggestions, and questions.
  - Other.

- No Monetary.

- Other.

470億円

また、超高齢社会、人口減少が進行する中で、交通需要も大きく変わると考えられ、470億円に及ぶ都市高速道路を空港に延伸する事業は必要がないと考えますが、所見を求めます。

Argument Segmentation

Claim: 意見・提案・質問

Argument Classification

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Budget Argument Mining: Relation Identification

Monetary Expression + Budget Item → Related ID
Outline

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Strong **class imbalance**:  
→ Detected issues with **underrepresented** classes.
5BERT Architecture

1st modification:
→ Detected issues with **intra-class imbalance**.
FINAL PROPOSAL:

[Diagram of rVRAIN Architecture]

Monetary Expression → Segmentation and pre-processing → Argument Proposition

Utterance / Speech Transcripts → BERT Argument

AC

Non monetary → BERT Relation

Other → BERT Relation

RID

Budget → BERT Claim

Other → BERT Premise

Past → BERT Claim

Future → BERT Claim

Other → BERT Claim

Opinions → BERT Claim

Other → BERT Claim

BERT Relation → BERT Claim

Sentence → Cosine Similarity

AP Embedding

B Embedding

ID

Non monetary

Other

Budget

AC

RID

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R. Ruiz-Dolz (VRAIN)
rVRAINE at QA Lab-PolInfo-3
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Table 1: Local evaluation of the different models for AC.

| Model        | Accuracy | Macro-F1 |
|--------------|----------|----------|
| 7BERT        | 0.71     | 0.19     |
| 7BERT(BD)    | 0.56     | 0.16     |
| 5BERT        | 0.76     | 0.25     |
| 5BERT(BD)    | 0.55     | 0.19     |
| rVRAIN       | 0.47     | 0.27     |
| rVRAIN(BD)   | 0.42     | 0.22     |
## Dry-Run Evaluation

### Table 2: Dry-run (early) evaluation of the different models for BAM.

| Team             | Score AC+RID |
|------------------|--------------|
| *fuys*           | 0.51         |
| *rVRAIN (5BERT)* | 0.45         |
| *rVRAIN*         | 0.40         |
| *OUC*            | 0.33         |
| *rVRAIN (7BERT)* | 0.25         |
| *RB*             | 0.09         |

### Table 3: Dry-run (late) evaluation of the different models for BAM.

| Team             | Score AC+RID | AC  | RID |
|------------------|--------------|-----|-----|
| *fuys*           | 0.13         | 0.57| 0.17|
| *OUC*            | 0.13         | 0.37| 0.21|
| *rVRAIN (5BERT)* | 0.06         | 0.48| 0.21|
| *takelab*        | 0.00         | 0.33| 0.00|
| *RB*             | 0.00         | 0.13| 0.00|
Table 4: Formal-run evaluation of the different models for BAM. (*)The team contains task organisers.

| Team              | Score | AC+RID | AC  | RID  |
|-------------------|-------|--------|-----|------|
| JRIRD*            | 0.51  | 0.58   | 0.61|
| OUC*              | 0.45  | 0.57   | 0.66|
| fuys*             | 0.23  | 0.57   | 0.34|
| rVRAIN            | 0.17  | 0.48   | 0.21|
| rVRAIN (5BERT)    | 0.06  | 0.48   | 0.21|
| takelab           | 0.04  | 0.39   | 0.06|
| SMLAB             | 0.00  | 0.38   | 0.00|
| RB                | 0.00  | 0.13   | 0.00|
Thank you for your attention.

See you at the NII from September 2022.