Linking Japanese FrameNet with Kyoto University Case Frames
Using Crowdsourcing

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Research Goal
- To scale up the Japanese FrameNet (JFN)

Methods
- Link JFN with Kyoto University Case Frames (KCF)
  - Assign a JFN semantic frame to each KCF case frame of a predicate (verb/adjective/adjectival noun) that correspond to the same meaning of the predicate
- Crowdsourcing of example sentence selection tasks

Contributions
- Scaling up the JFN annotated corpus by orders of magnitude
- Facilitating identification of missing semantic frames in JFN
- Addition of new words to existing semantic frames in JFN

Japanese FrameNet (JFN)
- A sister project of English FrameNet (FN), sharing DBs, data formats, and tools with FN
- Semantic Frame: A script-like conceptual structure that describe a particular type of situation, object, or event along with its participants and props, i.e. Frame Elements (FEs)
- Lexical Units (LUs): Pairing of a word with a meaning

Kyoto University Case Frames (KCF)
- Case Frame: A predicate-argument structure, represented as a predicate and a set of case filler words
- Constructed by applying Chinese Restaurant Process-based clustering to 10 billion Japanese sentences 110,000 predicates; 54 case frames/predicate on average

Experimental Settings
- 37 Predicates (27 verbs; 5 adjectives; 5 adjectival nouns)
  - That exist in JFN & in KCF; Defined in two semantic frames in JFN
  - 712 case frames in KCF
- 10 crowdworkers/case frame
- Answers aggregated by majority voting; Used gold questions
- 272 crowdworkers in total; Completed in 2 hours and 10 minutes

Experimental Results & Analyses

<table>
<thead>
<tr>
<th>KCF Case Frame ID</th>
<th>KCF Target Sentence</th>
<th>JFN Semantic Frame with the largest # of votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>okuru (1)</td>
<td>watashi tachi ga iomeuru o okuru</td>
<td>✔ Sending</td>
</tr>
<tr>
<td>okuru (2)</td>
<td>futari ga seien o okuru</td>
<td>✔ “OTHER”</td>
</tr>
<tr>
<td>okuru (3)</td>
<td>watashi ga shiyousho o okuru</td>
<td>✔ Sending</td>
</tr>
<tr>
<td>okuru (4)</td>
<td>okuru</td>
<td>✔ “OTHER”</td>
</tr>
<tr>
<td>okuru (5)</td>
<td>watashi ga senga o okuru</td>
<td>✔ Sending</td>
</tr>
<tr>
<td>okuru (6)</td>
<td>watashi ga tokyo eki made sannin o okuru</td>
<td>✔ Bringing</td>
</tr>
<tr>
<td>okuru (7)</td>
<td>jiban ga seishun jidai o okuru</td>
<td>✔ “OTHER”</td>
</tr>
<tr>
<td>okuru (8)</td>
<td>mashaoo ka</td>
<td>✔ Sending</td>
</tr>
<tr>
<td>okuru (9)</td>
<td>boku no noo ga kiken shingoo o okuru</td>
<td>× OTHER</td>
</tr>
</tbody>
</table>

Classification of Predicates based on Results
- Category I (9 predicates) **Accuracy: 83.9%**
  - The two JFN semantic frames are semantically distinct e.g. okuru ‘send’ (Sending & Bringing JFN semantic frames)
- Category II (11 predicates) **Accuracy: 57.9%**
  - The two JFN semantic frames are semantically close e.g. iku ‘go’ (Motion & Self_motion JFN semantic frames)
- Category III (17 predicates) **Accuracy: 26.3%**
  - The semantic frames assigned to the predicate in JFN do not correctly characterize its meanings e.g. teiketsu-da ‘appropriate’ (Suitability & Desirability JFN semantic frames)

Uses of the “OTHER” Option by Crowdworkers
- Support-predicate uses can be detected e.g. KCF case frames okuru (2), (4) & (7)

Conclusion and Prospects
- Proposed a method to crowdsource assignment of JFN semantic frames to KCF case frames, to scale up the JFN annotated corpus
  - Category I Predicates with two JFN semantic frames: promising results
  - “OTHER”: May be utilized to find support-predicate uses
- Next steps
  - Predicates with three or more JFN semantic frames
  - Assignment of JFN Frame Elements (FEs) to KCF case slots