Semantic Annotation for Mandarin Verbal Lexicon: 
A frame-based constructional approach

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Outline

1. Problems of existing works
2. A frame-based constructional approach
3. Conclusion
Major Issues

- Existing works in semantic annotation
  - Sinica Treebank (Chen et al., 1999)
  - Chinese Proposition Bank (Xue and Palmer, 2005)
  - FrameNet (English) (Fillmore & Baker, 2002)

- What is the problem of these existing works?
Generic Roles Assignment

◊ Sinica Treebank: a pre-determined, generic tagset of semantic roles.

◊ Overgeneralization and low flexibility.

◊ AGENT of the action verb *hit*

1. **The boy** *hit* her hard. \(\rightarrow\) human Agent

2. **The wind** *hit* her hard. \(\rightarrow\) non-human physical Agent (?)

3. **His words** *hit* her hard. \(\rightarrow\) non-human, non-physical Agent (??)
Verb by Verb Role Assignment

◊ Chinese Propbank: a predicate-specific frameset
  ◊ Solves the problem of overgeneralization

◊ E.g. Frameset of 搬 (caused to move)

◊ Problem:
  ◊ Simple listing of verbs
  ◊ Lacks a systematic analysis
A Frame-based Approach

- FrameNet:
  - Verbs that are similar in meaning are put together

- E.g. **Cause** motion frame

- Problem:
  - Only a list of semantic roles.
  - Ignore syntactic properties.
Syntactic Behaviors Matter

- Distinctions of frames can be made with clearly defined collo-construction.

- 搬 vs. 放:

<table>
<thead>
<tr>
<th>Action</th>
<th>Agentive BA</th>
<th>Locative Inversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>搬 (move)</td>
<td>我把書搬到桌上</td>
<td>*桌上搬著一本書</td>
</tr>
<tr>
<td>放 (put)</td>
<td>我把書放在桌上</td>
<td>桌上放著一本書</td>
</tr>
</tbody>
</table>

- Locative Inversion is an identifying construction of PL verbs (Liu & Chang 2015).
Collocations Matter

✧ Compare the PPs with 搬 vs. 放
(corpus: Chinese GigaWord)

<table>
<thead>
<tr>
<th></th>
<th>+在</th>
<th>+到</th>
</tr>
</thead>
<tbody>
<tr>
<td>搬</td>
<td>2</td>
<td>3203</td>
</tr>
<tr>
<td>放</td>
<td>24384</td>
<td>2704</td>
</tr>
</tbody>
</table>

✧ Caused Motion (搬, 移) : typically collocate with 到
✧ Caused to MOVE
✧ Placement (放, 擺): typically collocate with 在
✧ Caused to BE-AT
A Frame-Based Constructional Approach

- A frame is defined with
  - The collo-constructions
  - A set of frame-specific elements

- Frame Semantics (Fillmore 1982) + Constructional Grammar (Goldberg 1995)
Cause-motion Frame

✧ Elements: Mover, Mv.Figure, End.Ground

Collocations: Path (e.g. 到/進)

✧ Lemmas: 搬 (move), 移 (move), 推 (push), etc.

✧ Basic constructional patterns

i. **Mover-prominent transitive BA**

[我們 Mover] 把 [兩張桌子 Mv.Figure] 搬 [到 Path] [教室裡 End.Ground]

‘We moved two tables to the classroom.’

ii. **Figure-prominent Inchoative**

[桌子 Mv.Figure] 搬 [進 Path] [教室裡 End.Ground] 了

‘The tables (were) moved to the classroom.’
Placement Frame

ドル

Elements: Placer, Pl.Figure, Loc.Ground

Collocation: Locative (在)

Lemmas: 放 (put), 擺 (set), 掛 (hang), 裝 (load), etc.
Placement Frame

Diamond Basic constructional patterns:

i. **Placer-prominent transitive BA**
[布希 Placer] 把 [紙條 Pl.Figure] 放 [在 Locative] [口袋裡 Loc.Ground]
‘Bush put the note in the pocket.’

ii. **Figure-prominent Inchoative**
[炸彈 Pl.Figure] 放 [在 Locative] [紙盒裡 Loc.Ground] (了)
‘lit. The bomb (was) put in the box.’

iii. **Ground-prominent Locative Inversion**
[房間裡 Loc.Ground] 放著 [一張桌子 Pl.Figure]
‘lit. In the room (was) put a table.’
Sense Disambiguation of 放

放: Placement vs. Releasing (cf. Liu and Chang 2015)

1. 她把貓放出來 ⇒ Releasing
   She let the cat out

2. 房間裡放了一隻貓 ⇒ Placement
   In the room was put a cat

 Distinctions of senses can be made with clearly defined collo-construction.
How Verbs are Annotated

Verb: 
- 搬, 移

Frame: 
- Cause-Motion
- Placement
- Releasing

Annotation:
- [他們 Mover 把 書 Mv.Figure 搬到 Paht 二樓 End.Ground]
- [布希 Placer 把 紙條 Pl.Figure 放在 Locative 口袋裡 Loc.Ground]
- [他 Releaser 把 鳥 Rl.Figure 從 簾子裡 Source 放出來 Path_out]
Conclusion

- A frame-based constructional approach

- Frames are defined by elements, and also identified with syntactic collo-constructions.
  - Class-specific: unique behaviors of the frames of CM verbs and PL verbs
  - Verb-specific: analysis of the polysemy of 放

- Semantic annotation based on frame-specific elements.

- Information of verbs are clearly provided.
References


- FrameNet: [https://framenet.icsi.berkeley.edu/](https://framenet.icsi.berkeley.edu/)
- Chinese GigaWord: [https://catalog.ldc.upenn.edu/LDC2011T13](https://catalog.ldc.upenn.edu/LDC2011T13)
Thank You