Interior Decoration Data Documentation

Domain Knowledge Files

The following are user-independent files that are used to encode knowledge in the Interior Decoration domain:

Interest Area Definition (interestAreas.ias) File:

The interest area definition file specifies the location of each interest area (object) in the interior decoration scene, one per line. Each line, excluding comments (lines that start with the pound symbol (`#`)), is a tab delimited list with the following fields:

1. shape: `RECTANGLE` or `FREEHAND`

2. object id: integer value

3. coordinate list:

    - for `RECTANGLE` shape: tab separated list consisting of the upper left x, upper left y, lower right x, and lower right y coordinates defining the rectangle
    - for `FREEHAND` shape: list of tab separated x,y coordinate pairs defining a polygon

4. object name: string value

semanticDomainKnowledge.xml:

The domain model file defines the semantic properties and terminology that can be used to refer to each object in the domain.

Each object must have a `type` property and may have additional properties (e.g., classification, color, size, location, orientation). Each object property is annotated with a concept (WordNet synset in the format of "`<word>#<pos-tag>#<sense-id>`". Each property has a list of *gold standard* attributes that correspond to the object. The *gold standard* terminology is manually compiled from all users' speech transcripts. An example object is shown in Figure 1, where:

- Object `lamp_bedleft` (id=17) has three properties.

- The concept of property `type` is "`lamp#n#2`".

- The concept of property `classification` is "`bedside#n#1`".

- The concept of property `orientation` is "`crooked#a#1`".

- The *gold standard* terms that can refer to this object are "lamp", "lampshade", "bedside", and "crooked".

```
<object name="lamp_bedleft" id="17">
  <properties>
    <type text="lamp#n#2">lamp lampshade</type>
    <classification text = "bedside#n#1">bedside</classification>
    <orientation text="crooked#a#1">crooked</orientation>
  </properties>
</object>
```

Figure 1: Example `object` in `semanticDomainKnowledge.xml` domain model file

Lexicon Files:

Two alternative lexicon files specify valid lexical entries and their part of speech (POS) tags in this domain. Each line, excluding comments (lines that start with

the pound symbol (`#`)), has the format of "`<lexical entry>:<POS>`". The file `lexiconSpatial.txt` contains the same lexical entries as `lexiconNonSpatial.txt` plus additional spatial language terminology.

Parse Rule (lexiconSpatial.txt) File:

This file defines the parsing grammar. Each line, excluding comments (lines that start with the pound symbol (`#`)), specifies a production rule consisting of two elements— (1) a list of non-terminal symbols that can be generated from (2) another non-terminal symbol—separated by the colon symbol (`:`).

Canonicalization Files:

Three alternative canonicalization files specifies a list of lexical entries with corresponding (attribute, value) pairs that encode a semantic interpretation in the interior decoration domain. The files are formatted as follows:

@<lexical entry>

$attribute_1 : value_1$

$attribute_2 : value_2$

...

$attribute_n : value_n$

`-------`

@<lexical entry>

...

For example, the lexical entry `them` has attributes `NUMBER` and `TOPIC` with values `Multiple` and `Collection`, respectively—indicating that this lexical entry refers to an unknown-sized collection of objects.

The three alternative canonicalization files are supersets of each other, with the file `canonSimple.txt` defining only attributes pertaining to semantic types; the file `canonComplexStatic.txt` additionally defining attributes pertaining to static (unchangeable) object properties; and the file `canonComplexDynamic.txt` defining additional attributes pertaining to dynamic object properties.

User Data Files

The following are data files that were constructed via user studies in the Interior Decoration domain:

user<id>_speech_sentences.xml:

This user speech log file contains a list of "trials", indicating a user's answer to a question posed about the interior decoration scene. Each trial consists of one or more sentences. Each sentence consists of words or references (referring expressions), which themselves consist of words. Each referring expression is classified as type "1" or "2" indicating a definite noun phrase or a pronominal expression, respectively. A sample trial is shown in Figure 2, where:

- Each word contains the attributes `token` (which indicates the uttered word) and `timestamp`.

- The `<reference/>` tag contains the referring expression "the desk".

- This definite noun phrase (type="1") refers to object with id="12" and starts 9448 ms after beginning of the trial.

fixation_*.csv:

```
<trial id="12">
  <sentence>
    <word token="my" timestamp="7240"/>
    <word token="favorite" timestamp="7344"/>
    <word token="piece" timestamp="7608"/>
    <word token="of" timestamp="7776"/>
    <word token="furniture" timestamp="7893"/>
    <word token="is" timestamp="8610"/>
    <reference token="the desk" type="1" id="12" timestamp="9448">
      <word token="the" timestamp="9448"/>
      <word token="desk" timestamp="9792"/>
    </reference>
  </sentence>
    ...
  </sentence>
  ...
</trial>
```

Figure 2: Example trial in user<id>_speech_sentences.xml file