

Multiwoz data analysis

source: <https://www.repository.cam.ac.uk/handle/1810/280608>

Description

Dataset contains the following json files: 1. data.json: the woz dialogue dataset, which contains the conversation users and wizards, as well as a set of coarse labels for each user turn. 2. restaurant_db.json: the Cambridge restaurant database file, containing restaurants in the Cambridge UK area and a set of attributes. 3. attraction_db.json: the Cambridge attraction database file, containing attractions in the Cambridge UK area and a set of attributes. 4. hotel_db.json: the Cambridge hotel database file, containing hotels in the Cambridge UK area and a set of attributes. 5. train_db.json: the Cambridge train (with artificial connections) database file, containing trains in the Cambridge UK area and a set of attributes. 6. hospital_db.json: the Cambridge hospital database file, containing information about departments. 7. police_db.json: the Cambridge police station information. 8. taxi_db.json: slot-value list for taxi domain. 9. valListFile.json: list of dialogues for validation. 10. testListFile.json: list of dialogues for testing. 11. system_acts.json: system acts annotations 12. ontology.json: Data-based ontology.

Format

The Multi-Domain Wizard-of-Oz dataset (MultiWOZ), a collection of human-human written conversations spanning over multiple domains and topics. The dataset was collected based on the Wizard of Oz experiment on Amazon MTurk. Each dialogue contains a goal label and several exchanges between a visitor and the system. Each system turn has labels from the set of slot-value pairs representing a coarse representation of dialogue state for both user and system. There are in total 10438 dialogues.

Database

Contain 110 restaurants, 79 attractions, 33 hotels, 2828 trains, 66 hospitals, 1 police and generator of taxi.

Restaurant

110 restaurants, example:

```
1 {  
2   "address": "Finders Corner Newmarket Road",  
3   "area": "east",  
4   "food": "international",  
5   "id": "30650",  
6   "introduction": "",  
7   "location": [  
8     52.21768,  
9     0.224907
```

```

10 ],
11   "name": "the missing sock",
12   "phone": "01223812660",
13   "postcode": "cb259aq",
14   "pricerange": "cheap",
15   "signature": "african babooti",
16   "type": "restaurant"
17 }

```

There are 9 attributes that all restaurants have: 'address', 'area', 'food', 'id', 'location', 'name', 'postcode', 'pricerange', 'type'. 3 attributes may be missing: 'introduction', 'phone', 'signature'.

Attraction

79 attractions, example:

```

1  {
2    "address": "pool way, whitehill road, off newmarket road",
3    "area": "east",
4    "entrance fee": "?",
5    "id": "1",
6    "location": [
7      52.208789,
8      0.154883
9    ],
10   "name": "abbey pool and astroturf pitch",
11   "openhours": "?",
12   "phone": "01223902088",
13   "postcode": "cb58nt",
14   "pricerange": "?",
15   "type": "swimmingpool"
16 }

```

Hotel

33 hotels, example:

```

1  {
2    "address": "124 tenison road",
3    "area": "east",
4    "internet": "yes",
5    "parking": "no",
6    "id": "0",
7    "location": [
8      52.1963733,
9      0.1987426
10   ],
11   "name": "a and b guest house",
12   "phone": "01223315702",

```

```
13     "postcode": "cb12dp",
14     "price": {
15         "double": "70",
16         "family": "90",
17         "single": "50"
18     },
19     "pricerange": "moderate",
20     "stars": "4",
21     "takesbookings": "yes",
22     "type": "guesthouse"
23 }
```

Train

2828 train (with artificial connections), example:

```
1  {
2      "arriveBy": "05:51",
3      "day": "monday",
4      "departure": "cambridge",
5      "destination": "london kings cross",
6      "duration": "51 minutes",
7      "leaveAt": "05:00",
8      "price": "23.60 pounds",
9      "trainID": "TR7075"
10 }
```

Hospital

66 hospitals, example:

```
1  {
2      "department": "neurosciences critical care unit",
3      "id": 0,
4      "phone": "01223216297"
5  }
```

Police

1 police:

```
1  {
2      "name": "Parkside Police Station",
3      "address": "Parkside, Cambridge",
4      "id": 0,
5      "phone": "01223358966"
6  }
```

Taxi

slot-value list for taxi domain.

```
1  [  
2    "taxi_colors" : ["black","white","red","yellow","blue",'grey'],  
3    "taxi_types":  
4    ["toyota","skoda","bmw",'honda','ford','audi','lexus','volvo','volkswagen'  
5    , 'tesla']  
6    "taxi_phone": ["^[0-9]{10}$"]  
7  ]
```

Ontology

35 slots: (not reliable, lack some slots appeared in dialog_acts.json, maybe only have the slots that used in goal generation)

```
1  'hotel-price range',  
2  'hotel-type',  
3  'hotel-parking',  
4  'hotel-book stay',  
5  'hotel-book day',  
6  'hotel-book people',  
7  'hotel-area',  
8  'hotel-stars',  
9  'hotel-internet',  
10 'hotel-name',  
11 =====  
12 'train-destination',  
13 'train-day',  
14 'train-departure',  
15 'train-arrive by',  
16 'train-book people',  
17 'train-leave at',  
18 =====  
19 'restaurant-food',  
20 'restaurant-price range',  
21 'restaurant-area',  
22 'restaurant-name',  
23 'restaurant-book time',  
24 'restaurant-book day',  
25 'restaurant-book people',  
26 =====  
27 'attraction-area',  
28 'attraction-name',  
29 'attraction-type',  
30 =====  
31 'taxi-leave at',
```

```

32 'taxi-destination',
33 'taxi-departure',
34 'taxi-arrive by',
35 =====
36 'hospital-department',
37 =====
38 'bus-departure',
39 'bus-destination',
40 'bus-leaveAt',
41 'bus-day'

```

Dialog Act

6+1 domains: Booking, Restaurant, Hotel, Attraction, Taxi, Train and general.

Bus, Hospital, Police don't have dialog act.

```

1 Counter({'Attraction-Inform': 6976,
2         'Attraction-NoOffer': 490,
3         'Attraction-Recommend': 1451,
4         'Attraction-Request': 1641,
5         'Attraction-Select': 438,
6         'Booking-Book': 5256,
7         'Booking-Inform': 5703,
8         'Booking-NoBook': 1313,
9         'Booking-Request': 2708,
10        'Hotel-Inform': 8224,
11        'Hotel-NoOffer': 914,
12        'Hotel-Recommend': 1501,
13        'Hotel-Request': 3215,
14        'Hotel-Select': 1005,
15        'No Annotation': 1933,
16        'Restaurant-Inform': 8071,
17        'Restaurant-NoOffer': 1453,
18        'Restaurant-Recommend': 1495,
19        'Restaurant-Request': 3083,
20        'Restaurant-Select': 918,
21        'Taxi-Inform': 2087,
22        'Taxi-Request': 1613,
23        'Train-Inform': 7204,
24        'Train-NoOffer': 117,
25        'Train-OfferBook': 3032,
26        'Train-OfferBooked': 2309,
27        'Train-Request': 5522,
28        'Train-Select': 389,
29        'general-bye': 9107,
30        'general-greet': 2021,
31        'general-reqmore': 13773,
32        'general-welcome': 4786})

```

ATTENTION: It only contains dialog act and slot from system (or wizard) side. Slot from user such as "Attraction-Request-Post" are not listed! We must design by ourselves.

Update: see `dialog_act_slot.txt` or `Multiwoz_analysis.ipynb` for dialog act with slot.

User Goal

Example:

```
1  "goal": {
2    "taxi": {
3      "info": {
4        "arriveBy": "13:15"
5      },
6      "reqt": [
7        "car type",
8        "phone"
9      ],
10     "fail_info": {}
11   },
12   "police": {},
13   "hospital": {},
14   "hotel": {},
15   "topic": {
16     "taxi": false,
17     "police": false,
18     "restaurant": false,
19     "hospital": false,
20     "hotel": false,
21     "general": false,
22     "attraction": false,
23     "train": false,
24     "booking": false
25   },
26   "attraction": {
27     "info": {
28       "name": "the place"
29     },
30     "reqt": [
31       "postcode"
32     ],
33     "fail_info": {}
34   },
35   "train": {},
36   "message": [
37     "You are looking for information in Cambridge",
38     "You are looking for a **particular attraction**. Its name is called
**the place**",
39     "Make sure you get **postcode**",
```

```

40     "You are also looking for a **place to dine**. The restaurant should
be in the **centre** and should serve **modern european** food",
41     "The restaurant should be in the **moderate** price range",
42     "Once you find the **restaurant** you want to book a table for **4
people** at **13:15** on **saturday**",
43     "Make sure you get the **reference number**",
44     "You also want to book a **taxi** to commute between the two places",
45     "You want to make sure it arrives the restaurant **by the booked
time**",
46     "Make sure you get **contact number** and **car type**"
47 ],
48 "restaurant": {
49     "info": {
50         "food": "modern european",
51         "pricerange": "moderate",
52         "area": "centre"
53     },
54     "fail_info": {},
55     "book": {
56         "people": "4",
57         "day": "saturday",
58         "invalid": false,
59         "time": "13:15"
60     },
61     "fail_book": {}
62 }
63 },

```

Not all slots for a domain have value, when system ask, user can just reply "don't care".

All attributes occurred in goal:

```

1 attraction
2 {'info': {'area', 'name', 'type'}, 'reqt': {'entrance fee', 'address',
'phone', 'area', 'postcode', 'type'}, 'fail_info': {'area', 'name',
'type'}}
3
4 hospital
5 {'info': {'department'}, 'reqt': {'address', 'phone', 'postcode'},
'fail_info': set()}
6
7 hotel
8 {'info': {'name', 'parking', 'internet', 'area', 'stars', 'pricerange',
'type'}, 'fail_info': {'name', 'parking', 'internet', 'area', 'stars',
'pricerange', 'type'}, 'book': {'day', 'pre_invalid', 'people', 'stay',
'invalid'}, 'fail_book': {'day', 'stay'}, 'reqt': {'phone', 'parking',
'internet', 'address', 'area', 'stars', 'postcode', 'pricerange',
'type'}}
9

```

```

10 police
11 {'info': set(), 'reqt': {'address', 'phone', 'postcode'}, 'fail_info':
    set()}
12
13 restaurant
14 {'info': {'food', 'area', 'name', 'pricerange'}, 'reqt': {'phone',
    'address', 'food', 'area', 'postcode', 'pricerange'}, 'fail_info':
    {'area', 'food', 'name', 'pricerange'}, 'book': {'day', 'pre_invalid',
    'people', 'time', 'invalid'}, 'fail_book': {'day', 'time'}}
15
16 taxi
17 {'info': {'departure', 'leaveAt', 'destination', 'arriveBy'}, 'reqt':
    {'phone', 'car type'}, 'fail_info': set()}
18
19 train
20 {'info': {'departure', 'day', 'leaveAt', 'destination', 'arriveBy'},
    'reqt': {'leaveAt', 'price', 'arriveBy', 'trainID', 'duration'},
    'fail_info': set(), 'book': {'people', 'invalid'}, 'fail_book': set()}

```

Dialog state

The information provided by user (given in user goal) defines in 'semi' dict for each domain. The information that user need is not showed in dialog state.

Full state example:

```

1  "text": "Enjoy your stay at the hamilton lodge. Have a great day.",
2  "metadata": {
3      "taxi": {
4          "book": {
5              "booked": [
6                  {
7                      "phone": "07218068540",
8                      "type": "blue honda"
9                  }
10             ]
11         },
12         "semi": {
13             "leaveAt": "17:15",
14             "destination": "pizza hut fen ditton",
15             "departure": "saint john's college",
16             "arriveBy": "not mentioned"
17         }
18     },
19     "police": {
20         "book": {
21             "booked": []
22         },
23         "semi": {}

```



```
24 },
25 "restaurant": {
26     "book": {
27         "booked": [
28             {
29                 "name": "pizza hut city centre",
30                 "reference": "F3K2PQZZ"
31             }
32         ],
33         "time": "19:45",
34         "day": "thursday",
35         "people": "2"
36     },
37     "semi": {
38         "food": "not mentioned",
39         "pricerange": "not mentioned",
40         "name": "pizza hut city centre",
41         "area": "not mentioned"
42     }
43 },
44 "hospital": {
45     "book": {
46         "booked": [
47             {
48                 "department": "infusion services",
49                 "reference": "L2127Y9Q",
50                 "time": "14:00, next Thursday"
51             }
52         ]
53     },
54     "semi": {
55         "department": "infusion services"
56     }
57 },
58 "hotel": {
59     "book": {
60         "booked": [
61             {
62                 "name": "hamilton lodge",
63                 "reference": "TGSVA90C"
64             }
65         ],
66         "people": "1",
67         "day": "sunday",
68         "stay": "5"
69     },
70     "semi": {
71         "name": "not mentioned",
72         "area": "not mentioned",
```

```

73         "parking": "yes",
74         "pricerange": "moderate",
75         "stars": "3",
76         "internet": "not mentioned",
77         "type": "guesthouse"
78     },
79 },
80 "attraction": {
81     "book": {
82         "booked": []
83     },
84     "semi": {
85         "type": "museum",
86         "name": "not mentioned",
87         "area": "east"
88     }
89 },
90 "train": {
91     "book": {
92         "booked": [
93             {
94                 "trainID": "TR1567",
95                 "reference": "UIFV8FAS"
96             }
97         ],
98         "people": "1"
99     },
100     "semi": {
101         "leaveAt": "not mentioned",
102         "destination": "bishops stortford",
103         "day": "friday",
104         "arriveBy": "19:45",
105         "departure": "cambridge"
106     }
107 }
108 }

```

Automatic Annotation for User Dialog Act

Compare with dialog acts for system:

	System (come from data)	User (defined according to user goal and dialog state table)
Attraction-Inform	Area Type Choice Post Name Phone Addr Fee Open Price none	Area Type Name none
	Name Ref Type Choice Addr Post	Name Type Area Internet

Hotel-Inform	Area Internet Parking Stars Phone Price none	Parking Stars Price Day People Stay none
Restaurant-Inform	Post Food Name Price Addr Phone Area Choice Ref none	Food Name Price Area Time Day People none
Taxi-Inform	Phone Car Depart Arrive Dest Leave none	Depart Dest Leave Arrive none
Train-Inform	Arrive Id Leave Time Dest Ticket Depart Day Choice Ref People none	Depart Dest Leave Arrive Day People none
Hospital-Inform	lack annotation	Department none
Police-Inform	lack annotation	none
Booking-Inform	Time Stay Name Day People Ref none	don't need
Attraction-Request	Area Type Price Name	Area Type Post Phone Addr Fee
Hotel-Request	Area Price Stars Type Parking Internet Name	Ref Type Addr Post Area Internet Parking Stars Phone Price Ref
Restaurant-Request	Area Name Price Food	Post Food Price Addr Phone Area Ref
Taxi-Request	Depart Arrive Dest Leave	Car Phone
Train-Request	Leave Day Depart Dest Arrive People	Id Arrive Leave Time Dest Ticket Depart Ref
Hospital-Request	lack annotation	Post Addr Phone Ref
Police-Request	lack annotation	Post Addr Phone
Booking-Request	Time Day People Stay	don't need
Train- Offer[Book Booked]		don't need
Booking-[No]Book		don't need
*-NoOffer		don't need
*-Recommend		don't need
*-Select		don't need
general-*		by keywords?

User dialog acts include:

- **Inform**: annotated by dialog state update.
- **Request**: implied by system inform, not accurate.
- **General**: keywords detection.

For clarity, some details are not showed below, please refer to the code and comments.

Inform

When dialog state changes, the information must come from user by **Inform**. That means when user informs something (from user goal) that in the dialog state table, we can always annotate it. However, there are some problems:

- Can't annotate **Request**, **General** dialog act.
- There are few wrong annotations caused by wrong dialog state update.

Information comes from dialog state, user goal, utterance, system dialog act.

1. Difference of dialog state.
 1. Value is mentioned by user.
 2. Slot is mentioned by user.
 3. Coreference ("Can I please get **their** phone number and postcode? ").
 4. Answer system request ("Would you prefer British, Indian, or Chinese food, or a gastropub?"-"I don't have a preference.").
 5. Value for that slot in the goal is mentioned by user, which indicate wrong state update.
2. state don't change but value is in the goal.
 1. Binary value ("yes" or "no"), if '?' not in user utterance (not for confirmation "Does it have free wifi?").
 2. Digital value (for people, stars...), if value and slot are mentioned in user utterance and domain is mentioned in user utterance or lastest system utterance.
 3. String value, if value are mentioned in user utterance and domain is mentioned in user utterance or lastest system utterance.

Request

The value that user request will not be in the dialog state table. We may use user goal, user utterance, system response and its dialog act. Usually, user request includes but not limited to user goal.

1. Slot for request that in user goal and appear in user utterance. For the slot that multiple domain have (area, address...), reserve the one that informed or recommended by system in next utterance.
2. Slot "Ref" if " ref" appear in user utterance

General

First, if any domain mentioned in user utterance, the dialog act should be `DOMAIN-Inform`: `[["none", "none"]]`. Then, if there is no other dialog act mentioned above, consider the following:

- Bye: 'bye' in user utterance. Many of them have "thank". Example: "Thanks so much for your help. Bye."
- Thank: 'bye' not in user utterance but 'thank' in user utterance. Example: "Thank you. I also need a taxi two commute between the hotel and restaurant." (This should be Inform)
- Greet: 'hello', 'hi' in user utterance. Example: "Hello, I'd like to get some info one a hotel please."

Result

7091/71487 (10%) user utterances don't have annotation.

1	User Dialog Act:	
2	Attraction-Inform	
3	2084	Area
4	1447	Name
5	2477	Type
6	269	none
7	Attraction-Request	
8	1236	Addr
9	379	Area
10	1109	Fee
11	1314	Phone
12	1401	Post
13	258	Type
14	Hospital-Inform	
15	95	Department
16	231	none
17	Hospital-Request	
18	101	Addr
19	123	Phone
20	150	Post
21	Hotel-Inform	
22	2241	Area
23	2513	Day
24	1808	Internet
25	1996	Name
26	1894	Parking
27	2373	People
28	2375	Price
29	2335	Stars
30	3161	Stay
31	2731	Type
32	642	none
33	Hotel-Request	

34	518	Addr
35	190	Area
36	235	Internet
37	228	Parking
38	478	Phone
39	511	Post
40	243	Price
41	453	Ref
42	61	Stars
43	141	Type
44	Police-Inform	
45	161	none
46	Police-Request	
47	101	Addr
48	53	Phone
49	95	Post
50	Restaurant-Inform	
51	3225	Area
52	2582	Day
53	4661	Food
54	1790	Name
55	2489	People
56	3434	Price
57	3007	Time
58	855	none
59	Restaurant-Request	
60	1178	Addr
61	153	Area
62	138	Food
63	1156	Phone
64	832	Post
65	186	Price
66	515	Ref
67	Taxi-Inform	
68	638	Arrive
69	887	Depart
70	831	Dest
71	940	Leave
72	889	none
73	Taxi-Request	
74	378	Car
75	50	Phone
76	Train-Inform	
77	2150	Arrive
78	3963	Day
79	3846	Depart
80	4041	Dest
81	1907	Leave
82	2115	People

83	558	none
84	Train-Request	
85	296	Arrive
86	762	Duration
87	293	Leave
88	944	Price
89	607	Ref
90	465	TrainID
91	general-bye	
92	2714	none
93	general-greet	
94	45	none
95	general-thank	
96	9026	none
97		
98	System Dialog Act:	
99	Attraction-Inform	
100	2664	Addr
101	2365	Area
102	2241	Choice
103	1922	Fee
104	3072	Name
105	13	Open
106	1741	Phone
107	1579	Post
108	48	Price
109	2589	Type
110	28	none
111	Attraction-NoOffer	
112	1	Addr
113	324	Area
114	1	Choice
115	1	Fee
116	5	Name
117	325	Type
118	109	none
119	Attraction-Recommend	
120	530	Addr
121	338	Area
122	13	Choice
123	396	Fee
124	1461	Name
125	3	Open
126	153	Phone
127	165	Post
128	9	Price
129	217	Type
130	6	none
131	Attraction-Request	

132	797	Area
133	110	Name
134	86	Price
135	823	Type
136	Attraction-Select	
137	1	Addr
138	66	Area
139	7	Choice
140	47	Fee
141	57	Name
142	1	Phone
143	4	Price
144	286	Type
145	243	none
146	Booking-Book	
147	898	Day
148	1263	Name
149	788	People
150	4910	Ref
151	480	Stay
152	593	Time
153	107	none
154	Booking-Inform	
155	89	Day
156	277	Name
157	71	People
158	18	Ref
159	31	Stay
160	31	Time
161	5315	none
162	Booking-NoBook	
163	82	Day
164	72	Name
165	28	People
166	14	Ref
167	41	Stay
168	78	Time
169	1086	none
170	Booking-Request	
171	1633	Day
172	993	People
173	889	Stay
174	916	Time
175	Hotel-Inform	
176	1158	Addr
177	2398	Area
178	3855	Choice
179	1446	Internet
180	3677	Name

181	1373	Parking
182	704	Phone
183	648	Post
184	2282	Price
185	50	Ref
186	1784	Stars
187	2943	Type
188	44	none
189	Hotel-NoOffer	
190	225	Area
191	4	Choice
192	29	Internet
193	10	Name
194	33	Parking
195	199	Price
196	203	Stars
197	474	Type
198	322	none
199	Hotel-Recommend	
200	138	Addr
201	397	Area
202	13	Choice
203	183	Internet
204	1506	Name
205	170	Parking
206	36	Phone
207	39	Post
208	319	Price
209	290	Stars
210	190	Type
211	15	none
212	Hotel-Request	
213	1946	Area
214	191	Internet
215	84	Name
216	251	Parking
217	1243	Price
218	375	Stars
219	252	Type
220	Hotel-Select	
221	3	Addr
222	166	Area
223	37	Choice
224	12	Internet
225	115	Name
226	13	Parking
227	1	Phone
228	194	Price
229	77	Stars

230	388	Type
231	513	none
232	Restaurant-Inform	
233	1908	Addr
234	2864	Area
235	3294	Choice
236	3313	Food
237	4372	Name
238	1412	Phone
239	1028	Post
240	2424	Price
241	67	Ref
242	44	none
243	Restaurant-NoOffer	
244	366	Area
245	5	Choice
246	644	Food
247	5	Name
248	183	Price
249	745	none
250	Restaurant-Recommend	
251	251	Addr
252	346	Area
253	18	Choice
254	373	Food
255	1505	Name
256	69	Phone
257	62	Post
258	289	Price
259	13	none
260	Restaurant-Request	
261	1018	Area
262	1717	Food
263	56	Name
264	834	Price
265	Restaurant-Select	
266	5	Addr
267	158	Area
268	23	Choice
269	439	Food
270	165	Name
271	190	Price
272	481	none
273	Taxi-Inform	
274	115	Arrive
275	1879	Car
276	240	Depart
277	196	Dest
278	190	Leave

279	1860	Phone
280	51	none
281	Taxi-Request	
282	415	Arrive
283	691	Depart
284	546	Dest
285	721	Leave
286	Train-Inform	
287	2954	Arrive
288	2058	Choice
289	952	Day
290	1395	Depart
291	1635	Dest
292	3102	Id
293	3809	Leave
294	14	People
295	107	Ref
296	1177	Ticket
297	941	Time
298	28	none
299	Train-NoOffer	
300	9	Arrive
301	3	Choice
302	20	Day
303	21	Depart
304	19	Dest
305	3	Id
306	33	Leave
307	43	none
308	Train-OfferBook	
309	118	Arrive
310	10	Choice
311	31	Day
312	40	Depart
313	53	Dest
314	180	Id
315	158	Leave
316	35	People
317	4	Ref
318	22	Ticket
319	8	Time
320	2725	none
321	Train-OfferBooked	
322	146	Arrive
323	4	Choice
324	94	Day
325	120	Depart
326	114	Dest
327	474	Id

328	249	Leave
329	421	People
330	2124	Ref
331	1368	Ticket
332	15	Time
333	40	none
334	Train-Request	
335	971	Arrive
336	1570	Day
337	1572	Depart
338	1421	Dest
339	1901	Leave
340	591	People
341	Train-Select	
342	40	Arrive
343	6	Choice
344	24	Day
345	19	Depart
346	17	Dest
347	30	Id
348	91	Leave
349	4	People
350	1	Ticket
351	279	none
352	general-bye	
353	9105	none
354	general-greet	
355	2021	none
356	general-reqmore	
357	13769	none
358	general-welcome	
359	4785	none

Tokenization

Use [spaCy](#) for tokenization.

```

1 import spacy
2 nlp = spacy.load('en')
3 doc = nlp(turn['text'])
4 turn['text'] = ' '.join([token.text for token in doc]).strip()

```

Span info

For slots of **Inform, Select, Recommend, Book, OfferBook, NoBook, NoOffer** dialog act that have non-binary value, use rule to annotate the value occurrence. 175434 of 179796 (97.5%) such slots have been annotated.

- Exactly match: 172272
- Digit alias ("one" for 1): 1465
- Coreference-"same" ("same area"): 1002
- Don't care ("doesn't matter"): 285
- Time ("after 2:30"): 353
- Alias "center" for "centre": 57

The slots without span annotation (4362):

- Coreference-"name" ("Can I have **the** phone number"): 2513
- Wrong dialog act annotation
- Alias