

Semantic representation for the DIHANA task

Although our method is generic, a specific set of semantic labels must be defined for each task. In addition, once the segmentation of the sentence is performed a second phase is required. This second phase is devoted to reordering the semantic labels following a canonical order and instantiating some values, mostly related to hours and dates.

During the DIHANA project a corpus of 900 dialogs was acquired using the Wizard of Oz technique. Four dialogs were acquired for each of the 225 users who cooperated in the acquisition process. The chosen task was the access to an information system using spontaneous speech. The information system provided information about railway timetables, fares, and services. The system was accessed by telephone in Spanish. The number of user turns acquired was 6 280 and the vocabulary size was 823 different words.

The semantic representation chosen for the task was based on frames. The understanding module takes the sentence supplied by the automatic speech recognizer as input and generates one or more frames (which are concepts with their corresponding attributes) as output. The frames are obtained after reordering the semantic labels from the best segmentation of the sentence and instantiating certain values as stated above. A total amount of 25 semantic labels were defined for DIHANA task. In order to label segments without semantic, a null label was also added to the label set. Ten labels related to frame concepts, divided in two different types, were defined:

1. Task-independent concepts: (ACCEPTANCE), (REJECTION), and (NOT-UNDERSTOOD).
2. Task-dependent concepts: (HOUR), (DEPARTURE-HOUR), (ARRIVAL-HOUR), (PRICE), (TRAIN-TYPE), (SERVICES), and (TRIP-DURATION).

The task-independent concepts represent generic interaction acts which could be used for any task.

The task-dependent concepts represent the information the user can ask for. In an user turn, each task-dependent concept can include one or more attributes from a set of fifteen. These attributes represent the constraints that the user can place on his query.

The fifteen attributes defined for the DIHANA task are: City, Origin-City, Destination-City, Class, Train-Type, Num-Relative-Order, Price, Services, Date, Arrival-Date, Departure-Date, Hour, Departure-Hour, Arrival-Hour, and Trip-Type.

Two examples of the semantic representation, translated from the original Spanish DIHANA corpus, are shown below:

“I want to know the timetable on Friday to Barcelona, on June 18th”

(HOUR)

Destination: Barcelona

Departure-Date: [Friday-18-06-????][Friday-18-06-????]

“yes, the fares from Valencia”

(ACCEPTANCE)

(PRICE)

Origin: Valencia