Abstract. In this paper we present a framework for the interpretation of the tense and aspect of each sentence of a text using the context provided by the previously interpreted sentences. In the proposed interpretation process the text temporal structure is captured. Each eventuality introduced by a new text sentence is temporally anchored relatively to the previously interpreted eventualities. Whenever it is possible it is structurally related with some of those eventualities.

The interpretation process is driven by querying a knowledge base with the temporal predication of the new sentence's main eventuality. The answer to that query is the semantic interpretation of the sentence. It provides the additional knowledge that was not explicitly conveyed by the sentence, and the update of the text temporal structure.

1 Introduction

In this paper we present a framework for the interpretation of the tense and aspect of each sentence of a text. This is done in the context provided by the previously interpreted sentences. In the proposed interpretation process the text temporal structure is captured and is used to provide the interpretation context of each sentence.

In order to build the text temporal structure we need a clear criterion to group text sentences. In our approach sentences are grouped by constructors called segments. The criterion we use is based on the maintenance of temporal coherence between segments[16]. It relies on the inference of temporal relations between segments. These relations should be supported either by world knowledge about action and change or by linguistic knowledge. The inference of temporal relations between segments is a feasible and precise method for discourse segmentation[16, 17].

Discourse segmentation is accomplished in order to address temporal anaphora resolution. Our criterion uses the result of temporal anaphora resolution and supplies the information necessary for further anaphora resolution.

* This work has been supported by JNICT, FCT/UNL and Gabinete de Filosofia do Conhecimento.

2 The word structurally is used in the sense that we need to describe the structure of events and the relation between events and states.
The anchoring of the eventuality time relative to previously introduced eventualities (temporal anaphora resolution) depends on syntactic constraints (sentence tense and aspect) and on the relations that can be assumed between the newly introduced eventuality and the previously interpreted eventualities [20, 6, 12, 3, 7, 2]. These relations are what some authors call contingency relations [10]. They reflect the internal structure of events and states.

Consider the texts:

Max opened the door. The room was pitch dark. (1)
Max switched off the light. The room was pitch dark. (2)
Max switched on the light. The room was pitch dark. (3)

The above three texts are similar in their syntactic forms. The first sentence describes an event and simple past tense is used. The second sentence introduces a state description. However, the tense and aspect interpretation of the above texts give different temporal relations between the event and the state. Namely, for text 1 $t_{open} \subseteq t_{darkroom}$, for text 2 $t_{switchoff} < t_{darkroom}$ and for text 3 $t_{switchon} > t_{darkroom}$.

In order to obtain these interpretations we must take into account more than the syntactic forms of the sentences. We need knowledge about the structure of events and states.

It is by considering that "switching off the light has a dark room as consequence" that we are able to give text 2 the interpretation $t_{switchoff} < t_{darkroom}$.

The accommodation of an eventuality described by a text sentence involves the recognition of the structure of the events and states already described by the text.

So we need an explicit representation for the event structure. We use predicates such as consq, part, etc that explicitly represent that an event has a state as a consequence, or that an event is in the preparatory phase of another event. With such predicates we are representing the structure of an individual of sort "event", not the structure of event types.

Regarding the interpretation process, we follow Hobbs' idea [4] and take interpretation as abduction. The interpretation of a text sentence is the set of assumptions that if true make that sentence true. We will only describe the process of interpretation of a sentence tense and aspect. And we claim that this process could be integrated in a more general process of text processing as a subprocess of tense and aspect interpretation.

So, our general strategy for tense and aspect interpretation is to query a knowledge base with the temporal predication of the sentence's main eventuality. The answer to this query is the set of assumptions (abductions) that make the eventuality a logic consequence of the interpretation knowledge base.

In [4], the discourse structure is captured by building rhetorical relations between sentences, but there is no concern in constraining sentence interpretation by the context defined by the previous discourse structure. In our approach we use the text temporal structure to provide an interpretation context for each sentence. This way we have a notion of temporal focus [20] or temporal reference [6] for the interpretation of tense and aspect.