Caesar statuit sibi Rhenum esse transeundum: From language to choremes

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Introduction

Caesar statuit sibi Rhenum esse transeundum: Caesar thought it expedient for him to cross the Rhine. How do we understand Caesar's narration when we read *De Bello Gallico*? What kind of mental images do we conjure up in our mind? It seems intuitively plausible that understanding implies the ability to create and manipulate spatio-temporal representations while reading and interpreting Caesar's text. Is it possible to devise a system which, in a similar way, would proceed from the natural language text as input and outputsome graphical or schematic representation of what is happening?

Representing battles in terms of schematic maps augmented with annotations and symbols (simple geometric figures for armies, arrows for motions, names of generals, and so on) is a standard way of making the spatio- temporal layout of battles graspable to human readers. We think that this type of representation, which can be considered as a particular kind of choreme in the sense of Brunet, can be extended to the kinds of events mentioned by Caesar, which involve various groups of people moving around, crossing rivers, advancing and retreating across Gaul, Germany, and Britain.

This paper describes a project in progress where the idea of generating choremes from a text is applied to Book IV of Caesar's *De Bello Gallico*.

We describe the main steps of a process of representation which, starting from the text (actually an English translation of the original Latin), generates a text annotated with XML tags based on a simple ontology covering the main entities appearing in the text. We then use a structured description of the elements to be used in the map and the choremes (this description is expressed using the UML formalism as a basis for an object-oriented implementation) to relate the annotated text to (a sequence of) schematic maps enriched by choremes.

Outline of the process

The system currently under development proceeds in two phases:

- From the text to an abstract specification.
- From the abstract specification to a visual representation. The objective in this part is to build a graphical representation of the spatio-temporal processes described in a abstracted manner, and to show the representation on

the screen to the user via an interactive application. The abstract specification language used is called ASTL. Basically, it describes landmarks and spatio-temporal processes organized into units called (elementary) scenes (the formalism is based on Przytula et al.).

From the text to its ASTL representation

A special-purpose parser called Tinki is used to build the abstract representation. It has two main tasks:

- Finding and categorizing the references to spatial entities and spatio-temporal processes (called action patterns) in the text.
- Assigning the spatial entities to specific action patterns.

The parser uses the Link grammar and Tree Tagger as external tools. It is written in the Python language.

The abstract representation language (ASTL)

The ASTL describes the elementary scenes and their associated landmarks and action patterns in terms of XML structures.

Building a graphical representation

We start from a map of the region where the action takes place. This map can be described in terms of map objects. On the other hand, the analysis of the text, as described by the XML annotations, results in the task of representing a process which can be described in terms of (generalized) elementary scenes.

The pictorial avatars of elementary scenes (elementary scenes are abstract conceptual entities) can in turn be expressed in terms of pictorial objects (including symbols like arrows). The goal of this part of the representation process is to describe how the map has to be enriched by pictorial/graphical objects (choremes) in order to obtain the final enriched schematic map.

Using the data structures produced by the parsing operation, the graphical representation of each spatio-temporal process is drawn on the screen. Each process is contained in a well-defined scene of the ASTL specification. The application offers a still view of the process by considering only those processes that belong to the current scene. The dynamic aspects of the representation are taken into account by the use of a set of choremes.

Perspectives

In its present state, the system can accommodate the representation of parts of the text with a simple syntactic structure. Extending the coverage is a first goal of the current work.

The graphical representation module uses a limited set of choremes which allows the representation of situations with a limited number of action patterns. Extending the system will involve more sophisticated methods for computing the placement and determining the sizes of the graphical objects.

Finally, it can be expected that static representations will not be sufficient for representing complex sequences of events (although the role of symbolic artifacts should not be underestimated: think for instance of the maps representing the initial phases of Napoleon's attack of Russia in 1812). The static representations may then have to be considered as snapshots in sequences of representations. This could also result in animated schematic maps.

References

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