

# Legend Design by a Novice User on the Web

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**Abstract.** Powerful cartographic tools are proposed on the Web enabling to create on-demand maps. Nevertheless using such tools requires time and cartographic expertise. Therefore, users could meet difficulties to personalise maps according to their tastes and needs. The presented work aims at proposing a system to assist users in creating a satisfying legend that complies with cartographic rules. We propose to use dialogue techniques and particularly negotiation between the system and the user to carry out that task. In order to minimise cartographical difficulties for the user, we choose to use map samples as objects of dialogue helping a user to explain his/her constraints. A global strategy of dialogue is required to manage interactions between a user and the system.

## 1 INTRODUCTION

Our work contributes to research works about on-demand Maps on the Web. Conceiving an on-demand map requires to fulfill the user needs and to follow a logical process of creation dictated by cartographic rules (Jolivet et al. 2007). We focus on one particular stage of this process: the definition of the structure of a legend according to the user needs and its relevance in regards to the user data. The existing cartographic Web tools (Brewer 2003, Chesneau 2006) require theoretical and technical knowledge in semiotics and GIS from the user. Therefore users may cope with difficulties to design maps fitting their tastes and needs. Moreover, they may lack creative know-how to draw innovative maps. Lastly, the creation of a legend via a standard graphic interface requires time.

A user may need to create a map for his work even if he is novice. To overcome these difficulties, we aim at proposing a system that helps a novice user to conceive a satisfying and cartographically correct legend on the Web. A major choice we make is to use dialogue techniques to represent the user needs and to find a compromise solution between those needs and cartographic rules. This paper presents our starting work: the global strategy of this dialogue and next the design of a specific creation strategy.

## 2 METHODOLOGY: OUR GLOBAL STRATEGY OF DIALOGUE

Caelen (2003) defines a strategy of dialogue as a “way to manage a dialogue between interlocutors in order to drive a conversation”. Thus we propose a global strategy in accordance to this definition. In our context, “to drive a conversation” means to get more and more precise specifications of the optimal legend. Moreover “to manage a dialogue” means to maintain it and to guide the user through the design process.

The legend handled by the system is formalised as shown in figure 1:

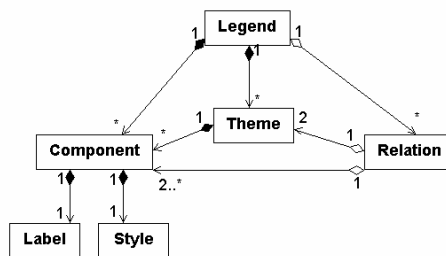


Figure 1: The model of legend

We call:

- *Component*: a label and a style.
- *Theme*: a set of components with relations (association, order).
- *Relation* what binds components (association, order) or themes (association, order, difference).

During the conception process, each element of the model has to be described by the user. The system is also enriched by all the preferences (styles in particular) chosen by the user. Then it checks if they correspond to cartographic rules.

In order to guide the user, the global strategy relies on alternative and complementary sub-strategies to create a legend. They are carried out by four different dialogues proposed to the user through the interface:

- Selection and refinement of a map sample (presented in the following section): the user selects a sample and can modify it.
- Choice of colours: the user selects his colours in a palette to apply to his data.

- Representation theme by theme: the user works on each theme, one by one, and searches for a representation.
- Representation of important objects: the user represents any significant objects on his map.

On the contrary to standard interfaces, the global strategy can evaluate the dialogue during all the process and can propose another strategy if the current one is blocked. The next section details the first sub-strategy.

### 3 OUR FIRST CREATION STRATEGY: “SELECT A SAMPLE AND REFINES IT”

Our current work focuses on the design of the creation strategy “Select a sample and Refine it”. The other strategies will be designed later.

We assume that the user is a “novice” in cartography: he does not necessarily know what he exactly wants and how to describe it. An analogical reasoning is useful: instead of directly describing his needs, the user expresses himself about something related to these needs. The objects of this analogy are map samples, i.e. small maps with a specific legend:

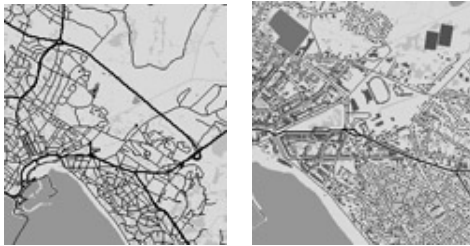


Figure 2: Map samples

Map samples have previously been used by (Hubert 2003) to converge to a satisfying parameterisation in generalisation algorithm. We also use the result of (Domingues and Bucher 2006) that created a database of 104 map samples.

The two steps of this strategy are detailed below:

- “Select a sample”: The user has to choose the most satisfying legend in the samples database. In order to assist him, the system makes a proposition of six samples. The user comments them by selecting a sample or a color and by clicking on a button such as: “I like this sample”, “I don’t like this colour”.... According to those constraints, the system

proposes samples once again and so on until the user makes his final choice.

- “Refine it”: Once the user finds the most satisfying sample, he could adjust it in slightly changing styles.

In parallel, the global strategy verifies that the dialogue occurs well, without deadlock and time-consuming steps. Otherwise it proposes to switch with another creation strategy.

#### **4 CONCLUSION AND PERSPECTIVES**

This research work aims at proposing a man machine dialogue to assist users in conceiving a satisfying legend on the Web. We present a global strategy to drive the dialogue that relies on legend creation strategies. A prototype is under construction. A major difficulty now is to interpret the user constraints in order to propose him pertinent samples and to converge towards a solution.

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