

Dialogue-Based Historical Text Comprehension

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Abstract

In this contribution we present the dialogue generator module of a Dialogue-based Interactive Diagnostic and Learning System (DIDLS) for Historical Text Comprehension (HTC). The dialogue generator, activated by the diagnostic results of the system, generates the appropriate for the learner individualized interactive diagnostic and learning dialogue. Throughout the dialogue the learner reflects back to claims about his reasoning and may change his reasoning.

1. Introduction

Recently, there is a growing interest in opening the student model to the learner, encouraging him to reflect on his beliefs and on the learning process [1][2]. What can make a learner model (LM) externally explicit and open are the diagnostic dialogues between the learner and the system about learner's own beliefs and the beliefs of the system about the learner. A method for improving learning through promoting reflection is to have the learner defend his views to the system by discussing and arguing the system's assessment of his knowledge and beliefs. In the present work we demonstrate the dialogue generator module of a dialogue-based interactive diagnostic and learning system for HTC.

2. The Learner Model of Students' HTC

During comprehension of historical text the learner composes a representation of the historical text, which contains the cognitive categories: *event*, *state* and *action*. The degree of recognition of the three cognitive categories reflects HTC. The underlying model of the DIDLS system is the LM of HTC [3][4]. This model presents to the learner a historical text in the appropriate form and question-pairs with alternative answers. The historical text includes factors, which represent instances of the 3 cognitive categories. For every factor a question-pair, which consists of two questions concerning the same factor, is submitted to the learner. The first question in the question-pair is relative to the learner's

position about the significance of this factor and the second question is relative to the learner's *justification* of this position. The learner has to use the given alternative answers, in order to express his positions and justifications. For every question-pair the combination of the learner's position and the corresponding justification constitute the learner's *argument*. The learners' cognitive profiles of HTC (Table 1) are formulated taking into account the number of his arguments with high degree of argument completeness [4].

Table 1. Cognitive categories and cognitive profiles.

Number of cognitive categories (c.c.) recognised fully or closely	Cognitive profiles
-	very low
close to one c.c.	very low+
one c.c.	low
close to more than one instance of a c.c.	low+
more than one instance of a c.c.	nearly low
close to two c.c.	nearly low+
two c.c.	below intermediate
close to more than two instances of two c.c.	below intermediate+
more than two instances of two c.c.	above intermediate
close to three c.c.	above intermediate+
three c.c.	nearly high
close to more than three instances of two c.c.	nearly high+
more than three instances of two c.c.	high
close to all instances of the three c.c.	high+
all instances of the three c.c.	very high

3. The Dialogue Generator

The focus of the DIDLS system is to help the learner in changing his reasoning if it differs from the expert's. The heart of the DIDLS system is the Dialogue Generator module. The system has at its disposal a library of dialogue-parts, each of which is designed to remedy a particular learning difficulty. Following a predefined strategy, the task of the dialogue generator is to activate from the library the appropriate sequence of dialogue-parts for the learner, which consists an individualized learning dialogue.

Dialogue Stages: The dialogue is generated in 4 stages (Figure 1) as a sequence of dialogue-parts. In

stage 1, the system assesses whether the learner is correct or not, in stage 2 indicates where the learner has errors, in stage 3, presents the contradictions with the learner and in stage 4, discusses, justifies itself and argues with the learner for his contradictions. At the end, the system encourages the learner to try again so it can have a second chance to reassess the learner. So, the learner is involved in the diagnosis process and is expected to change his model.

The excerpt below is an example concerning one of a learners argument: The sequence of dialogue-parts S1D1, S2D3, S3D1 and S4D2 (Figure 1) is generated by the system in case the learner wants the system to explain him the differences between his answers and the system, his responses correspond to intermediate argument completeness, he insists in his justification. The actions of the system have to be driven towards the aim of eliminating the contradiction and therefore changing the learner's reasoning.

1 System: Your answers concerning the LIVING CONDITIONS indicate that you consider it as THE MOST IMPORTANT REASON for the French Revolution. Your argument is characterized INTERMEDIATE. Do you want the system to EXPLAIN or to CONTINUE?

Learner: EXPLAIN

2 System: You asked the system to explain. Your answers concerning the LIVING CONDITIONS consist of your position and your justification. Your position is that the LIVING CONDITIONS were THE MOST IMPORTANT REASON for the French Revolution. This is a NON-SCIENTIFIC position. Your justification for that position is that the LIVING CONDITIONS WERE THE SAME FOR MANY YEARS. This is a SCIENTIFIC justification.

Your position about the LIVING CONDITIONS is CONTRADICTIONARY TO your justification. That is why your argument is characterized INTERMEDIATE. What do you intend to do now? INSIST or NOT INSIST.

Learner: I INSIST in my position that the LIVING CONDITIONS ARE THE MOST IMPORTANT REASON.

3 System: You INSIST in your position. Let consider that the LIVING CONDITIONS as a reason for the French Revolution didn't exist. Do you believe that the outbreak of the French revolution would have happened?

Learner: I believe that the outbreak of the French revolution would have NOT HAPPENED.

System: But the outbreak of the French revolution has happened. So, what is your logic conclusion?

Learner: The LIVING CONDITIONS ARE NOT THE MOST IMPORTANT REASON

4 System: You can try to answer again.

We applied the system with the participation of 20 learners. Before applying the interactive dialogue 19 out of 20 learners didn't recognize the category state and after, 16 out of 20 learners changed their reasoning. This means that the dialogue can help the learners overcome learning difficulties in comprehending the historical text. How the learners changed their reasoning needs further investigation.

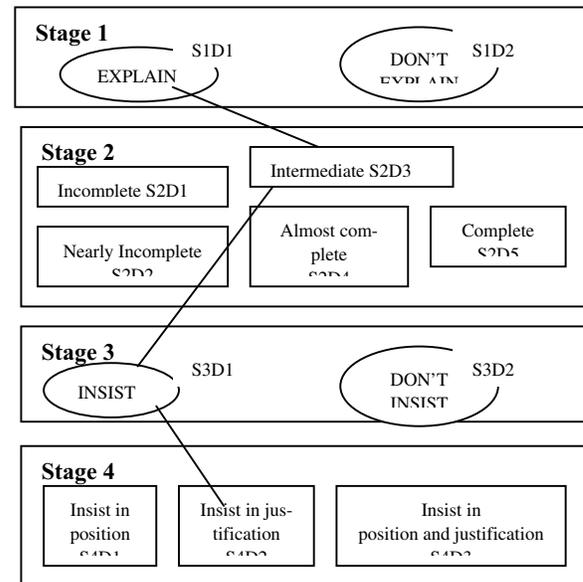


Figure 1: Dialogue stages.

4. Conclusions and Future Plans

In this work we presented and evaluated the dialogue-based process of a dialogue-based interactive learning environment. Based on the diagnostic results the dialogue generator component activates the learner in an interactive diagnostic and learning dialogue, which promotes learner reflection. The application perspectives aim at individualized learning. In our future plans falls research concerning the application and evaluation in real conditions.

5. References

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