Identifying Weak Sentences in Student Drafts:
A Tutoring System

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Abstract. The first draft of an undergraduate student thesis generally presents deficiencies, which must be polished with the help of the academic advisor to get an acceptable document. However, this task is repeated every time a student prepares his thesis, becoming extra time spent by the advisor. Our work seeks to help the student improve the writing, based on intelligent tutoring and natural language processing techniques. For the current study, we focus primarily on the conclusions section of a thesis. In this paper we present three tutoring system components: Identifying Weak Sentences, Classifying the Weak Sentences, Customizing Feedback to Students. Our system identifies weaknesses in sentences, such as the use of general instead of specific terms, or the absence of reflections and personal opinions. We provide initial models and their evaluations for each component.

Keywords: Weak sentences, Thesis drafts, Conclusion evaluation.

1 Introduction

Writing a thesis involves complying with certain requirements and rules established by institutional guides of universities and authors of methodology books. In this way, students have guidelines to follow when developing their first draft. However, the experience of teachers is that the student theses present different types of errors, ranging from misspellings to content errors.

A survey applied to students of Computer-related careers about the problems in preparing a thesis revealed that 8% have problems with the structure of the document. This lack of knowledge leads students to write poor documents [1].

Our work focuses on the conclusions section of theses. In our current work, this section is considered acceptable if it provides: a) an analysis of compliance with each of the research objectives; b) a global answer to the research question, and c) a contrast or value judgment of the results. Its content should avoid the use of general terms instead of specific terms and the use of speculative words.

We develop a tutoring system that identifies sentences that do not follow these guidelines for the conclusion section. For instance: In the project, we have developed
two concept tests, one has been to do the survey that collected data from people, and another has been to make a concept test of the peripheral. Here, we can observe that the student describes a part of the experimentation, instead of providing a value judgment of the results. This sentence would be more suitable to another section of the thesis, for example, the methodology section. Our tutoring system starts by identifying weak sentences in the student conclusion. If the sentence is weak, the system identifies the type of weakness. Finally, the system sends feedback to the student depending on the type of weakness found. The results reported here are part of a larger project that can help students to evaluate their early drafts, and facilitate the review process of the academic advisor.

2 Background

An intelligent tutoring system (ITS) is a system that provides personalized instruction or feedback to students with the aim of giving them permanent support. Advances in ITS include the use of natural language technologies to perform automated writing evaluation and provide feedback.

This work [2] focuses on improving the cohesive devices of the student essay. Similarly, our work seeks to improve the writing, but focuses on sentences in the conclusion section. The tutor Writing Pal [3] offers strategy instruction and game-based practice for developing writers, and was also used with an experimental group, obtaining significant improvements in students who participated in the experiment. Our work considers such lexical, cohesion and rhetorical features, augmented with other measures with the goal of capturing behaviors specific to the conclusions section.

A dialogue-based ITS called Guru has an animated tutor agent engaging the student in a collaborative conversation that references a hypermedia workspace, displaying animating images significant to the conversation [4]. Another dialogue-based ITS, Auto Tutor, uses dialogues as the main learning activity [5]. One interactive essay-writing tutor was designed to improve science knowledge by analyzing student essays for misconceptions. The authors presented five modules that allow the system to identify if the student is using concepts improperly [6]. We take some inspiration from their work in developing our model of weak sentences. All these works use natural language to interact with the student, as we do.

3 System Overview

Our system has a Weak Sentences Identifier, which contains three main components (see Fig. 1). The component Identifying Weak Sentences (IWS) is responsible for discerning whether a sentence is weak or strong, and includes five models, that use different techniques and resources such as lexical richness, measure of similarity between sentences, the use of speculative terms and the overlap with terms from the conclusion sections of approved theses. The component Classifying the Weak

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1 All example sentences have been translated to English from the original in Spanish.