

Chapter 5.11

Plagiarism Detection Tools in Learning Management Systems

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ABSTRACT

The main objectives of this chapter are to review the state-of-the art in plagiarism detection methods, discuss the most popular software tools available on the market and describe the new open architecture for plagiarism detection tools. The proposed architecture emphasizes the extensibility feature that allows it to be easily adapted for handling new types of assignments in the future. This chapter shows how the proposed architecture was implemented in a desktop application and a server-side plug-in for the Moodle course management system. An extended set of user trials is provided to support the proposed solutions. This set includes extensive tests for intra-corporal and internet plagiarism searches, tests with non-English assignments and promising results on cross language plagiarism detection.

INTRODUCTION

The problem of digital plagiarism arose along with development of digital technologies. In the last two decades, another dimension developed as the Internet became the most popular tool for information access. Digital plagiarism appears not only in education but it also exists in different forms in industry (Nitterhouse, 2003), web

design (Bailey, 2006), and research publications (Boisvert & Irwin, 2006). Although from this point forward this chapter primarily focuses on digital plagiarism in education, many of the concepts discussed here can be extended to plagiarism detection on websites and in research papers and other sources of information.

The level of plagiarism has remained high all over the world for the last two decades (Austin and Brown, 1999; Hart and Friesner, 2004). For example, one study estimated the proportion

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of students in American high schools engaged in different kinds of plagiarism as up to 90% (Jensen, Arnett, Feldman, and Cauffman, 2002). Another study has also indicated a high level of plagiarism in higher education institutions in Ethiopia (Teferra, 2001). In this chapter under student submission, we mean a file that contains virtually any kind of information such as text or a picture, sound file or motion picture. This chapter primarily concentrates on plagiarism detection tools with regards to text submissions but it will be highlighted if the approach can be extended to other kinds of submissions.

Software tools for uncovering digital plagiarism are evolving along with information technology, moving from simple single-user desktop applications in the early 1980's to the Internet-based plagiarism detection services of today. Plagiarism detection tools uncover plagiarism using two main approaches: (i) comparing the submission with other submissions by searching for similarities in content or (ii) comparing the submission with previous work done by a student and looking for unusual style.

This study is focused on the search of similarities between the submitted work and other documents. For purpose of detection, each case of digital plagiarism can be categorized into two types: intra-corporeal (local) and extra-corporeal (global) plagiarism. Extra-corporeal plagiarism occurs if parts of a paper were obtained from a source outside the learning community (university, school, or learning center) and used without an appropriate reference. Such sources for global plagiarism include the Internet, books, periodicals, CDs, and P2P networks (Underwood and Szabo, 2003). The second type of plagiarism is intra-corporeal plagiarism, where the original source of the plagiarized submission is located inside the learning community. The source can be from the same class, another section of the course, or the same course offered in a previous semester. As many studies have found, local plagiarism is very common all over the world (Austin and Brown, 1999), especially

in developing countries where Internet access is limited or expensive (Odinma, Butakov, Grakhov, and Bollou, 2008). For example, Teferra (2001) shows that in Ethiopia, copying from classmates may account for as much as 80% of academic misbehavior.

The evolution of plagiarism detection tools brought up a lot of advances in both algorithms and implementations of anti-plagiarism methods. The following section provides the background information on the available plagiarism detection methods and tools. The subsequent sections discuss the open architecture of plagiarism detection tools and provide extensive descriptions of user trials.

BACKGROUND

This section briefs the reader on methods for plagiarism detection and the available software solutions. We start with detection methods because advances in algorithms and information technologies in general are exactly the main driving force for software development. Since most commercial software tool vendors do not reveal the algorithms they use, we hope that a general description of methods and available tools will give the reader an understanding of state-of-the art technology in this field.

Plagiarism Detection Methods

As mentioned in the introduction, methods for plagiarism detection in texts can be separated into two major groups: authorship detection methods and text comparison methods. The methods from the first group (also known as stylometry or intrinsic plagiarism detection (Eissen & Stein, 2006)), detect anomalies in the style of writing. This is very similar to the natural process of detection used by many professors, if, for example, they encounter a nearly perfect English paper submitted by a student who is not a native speaker of English.

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