

Detecting Plagiarism in Engineering Reports, Papers and Theses

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Abstract

A common problem in graduate engineering programs is plagiarism in technical reports, papers and theses that are predominantly student authored. Often, faculty advisors are ill equipped or unprepared to detect plagiarism, particularly in introductory passages and chapters where a review of the literature or prior work is outlined. This paper discusses how to use a popular Internet search engine to flush out suspect writing and errors in citations in technical writing. The author shows a number of examples that have been encountered over the years, primarily in thesis preparation. Often, graduate students are unaware of what plagiarism is due to a lack of emphasis in their undergraduate programs and this paper also aims to illuminate approaches to help remediate a lack of proper prior preparation. This paper is aimed more to help than condemn and approaches are discussed to assist in the instruction of wayward students on how to write without violating copyright and intellectual property.

INTRODUCTION

Plagiarism is defined by the Oxford American Dictionary as *the practice of taking someone else's work or ideas and passing them off as one's own [1]*. It goes on to state that the word is derived from the Latin word for kidnapper: *plagiarius*. A great deal of effort is expended in the American primary and secondary school systems to instruct students in avoiding plagiarism in their written work. A dilemma arises with every schoolchild in the apparent contradiction that occurs with the edict: you must read and study the work of others and then use it in your own work! So, how does one write and write well and at the same time accomplish two major ends: adequate citation and avoidance of plagiarism? The reality is that it is quite easy to do and over a period of time and with a great deal of practice and instruction, the student learns how to write without plagiarizing.

In engineering education, specifically at the undergraduate level, there is an expectation (driven by the ABET accreditation process) that students will have an understanding of professional and ethical responsibility and an ability to communicate effectively¹. As such, discussions of plagiarism appear in engineering fundamentals texts [2] along with other discussions of professional ethical behavior.

The American culture is predicated on individualism and also has strong emphasis on protecting the intellectual property of individuals and entities: witness our copyright, trademark and patent systems and the courts that defend and protect them. However, as engineering moves forward in time we find that engineering education in the global context has taken on a more pressing urgency. This was recently emphasized by the National Academy of Engineering in their *Educating the Engineer of 2020* initiatives [3]. Because of this, we often find the interface between academe in the United States and that of other countries shrinking. This occurs to a large extent in our graduate programs where often the minority are those students who were educated in the American educational system. Because of this we find the following to be true all too often:

In some cultures it is perfectly acceptable to borrow ideas and expressions from others and incorporate them freely into your own work. Indeed, some societies view it as a mark of respect to base your writing on the work or words of others, and there is little emphasis on issues of copyright, documentation, or plagiarism [4].

Many international students hail from cultures where cooperative work is celebrated and encouraged to the point that the origin of the work becomes indistinct. On many, many occasions the author has queried graduate students whose primary, secondary and baccalaureate education has been outside of the US to discover that they simply do not even know what the word plagiarism means. In every case, they have been astonished to discover that it is an issue. However, they have always been anxious to assimilate into our culture and they work diligently in order to avoid the problem in their written work.

As such, a first step is often education—letting students know that plagiarism is unacceptable and then showing them where to find resources so that they can ensure that their work is their own. This paper discusses some case studies that the author has discovered over the years and illustrates how to detect plagiarism using the Internet and fundamental heuristics. Students are not done any favors if they are allowed to proceed with poor writing habits in terms of plagiarized material, especially habits that influence their technical writing.

¹ Accreditation Board of Engineering and Technology, Criteria 3(f & g)

CASE STUDIES

We now present three case study examples. These are actual cases of work submitted by graduate students for papers, theses and reports. In all cases, phrases were input to the Google² Internet search engine. Figure 1 shows the first sentence from the student submission of Case 1 (see below) and the corresponding result returned.

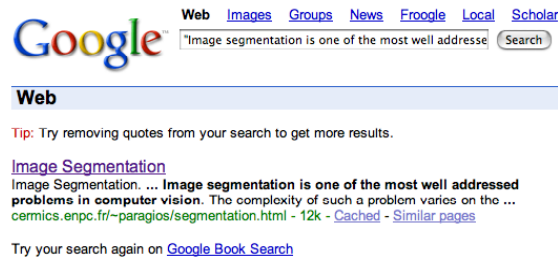


Figure 1. Google search on suspected plagiarized string.

Case Study 1:

Student Abstract	Online Document ³
Image segmentation is one of the most well addressed problems in computer vision. Consequently, a number of methods have been implemented for extraction of image features. Texture feature analysis for segmentation is one of the...	<i>Image segmentation is one of the most well addressed problems in computer vision. The complexity of such a problem varies on the application, where in the most general case one would like to partition an image in regions with consistent properties.</i>

In this case, the student copied the first sentence verbatim from the online reference. After having plagiarism explained, the student returned with a far better rendition of the concept: *Image Segmentation has proved to be one of the most challenging tasks in computer vision. Although this incident occurred in a paper being developed for a university sponsored on-line student journal, this student went on to produce a well-written thesis on the same topic.*

Case Study 2:

Student Submission	Online Document ⁴
Imagine a roulette wheel where all the chromosomes in the population are placed.	Imagine a roulette wheel where all the chromosomes in the population are placed.

Here the student copied a sentence verbatim, but in this case it was an example of a *cascaded* plagiarism. The student was quite surprised when called on the violation since he had copied

²<http://www.google.com>

³<http://cermics.enpc.fr/~paragios/segmentation.html>

⁴<http://www.elet.polimi.it/upload/bonarini/Didattica/IngegneriaConoscenza/download/Handout-5.pdf>

from another student's thesis. Of course, two wrongs don't make a right and again, this student went on to produce an excellent thesis

Case Study 3:

Student Submission	Online Document ⁵
This technique explicitly repeats the body of a loop with corresponding indices. As a stand-alone technique, loop unrolling is used to increase the ALU usage per loop step and reduce the loop cost.	Loop unrolling explicitly repeats the body of a loop with corresponding indices. As a stand-alone technique, loop unrolling is used to increase the ALU usage per loop step, as is illustrated in Code Example 6.

In this final example, the student made either an attempt to *not plagiarize*, or to better cover their tracks. The former is assumed here, but this example shows how a blatant plagiarism can be hidden within a sentence or pair of sentences where portions have been changed to give the appearance of original work.

DISCUSSION AND SUMMARY

This paper addressed issues with plagiarism in technical documents produced by graduate students in engineering. It was shown how plagiarism is relatively easily detected simply by inputting suspect phrases into an Internet search engine. The goal of this process should be to instruct and aid the students and to assist them in producing useful contributions to the profession as we enter what many are now calling the global age.

REFERENCES

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3. National Academy of Engineering, *Educating the Engineer of 2020: Adapting Engineering Education to the New Century*, The National Academies Press, Washington, DC, 2005.
4. *Plagiarism and Ways to Avoid It*, Writing Center, Lockhaven University of Pennsylvania, Spring 2005.

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⁵ http://www.freescale.com/files/dsp/doc/app_note/AN2094.pdf?srch=1