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Final Project Report

Making Medical Coding More Accurate

Abstract
The medical field makes use of coding standards to provide accurate records of patient visits to the agencies responsible for reimbursing the facility that performed the procedures. It is easy for a physician to omit commonly used codes. A system has been designed that addresses this need by learning from a national bank of medical claims and the claims at each facility that utilizes the system and reported codes that may have been omitted.

Introduction

Physicians diagnose and treat millions of people every day. They are required to keep accurate records of these diagnoses and treatments for every patient so that the patient's records are correct and so that the patient, insurance companies, and the government may correctly reimburse the physician. The process of keeping these records can be a daunting task, and common treatments and minor complications could very easily be forgotten when the physician submits his report to the medical coders. A medical coder is a person whose job is to properly transcribe the physician's report into a system, and catch anything that the physician may have omitted.

Each visit to a physician, be it a routine checkup or an extended stay in the hospital, produces a claim. A claim is simply a list of all the diagnoses and procedures performed on the patient during his/her visit. To standardize claims across hospitals and physician's offices, coding systems were developed which map each diagnosis, procedure, and complication to a unique code, typically a four to five digit number. Since part of a medical coder's job is to examine a claim for any omissions, it is feasible that an intelligent, computer program would be able to assist the medical coder in making these decisions.

Mission Statement

To provide an automated, intelligent system to assist in a medical coder's everyday decision-making processes with regards to what, if any, codes a doctor has neglected to document on his/her report.

Tools

This system was created in Java version 1.4.2 on the Solaris systems at Northeastern University's College of Computer and Information Science.

Software
The system is designed to allow the medical coder to enter each claim and receive feedback in the form of suggested codes before the claim is submitted to the necessary parties.

Coding System
For the purposes of this research, a coding system was created as a proof of concept. The coding system is as follows:

Diagnosis Codes
1. 1001 - Forearm Lesion
2. 1002 - Broken Leg
3. 1003 - Rash
4. 1004 - Animal Bite
5. 1005 - Drug Overdose

Procedure Codes
1. 2001 - Stitches
2. 2002 - Topical Anisthetic
3. 2003 - Staples
4. 2004 - Cast
5. 2005 - X-Ray
6. 2006 - Rabies Test
7. 2007 - Topical Ointment A
8. 2008 - Topical Ointment B
9. 2009 - Oral Drug A
10. 2010 - Oral Drug B
11. 2011 - Intravenous Drug A
12. 2012 - Intravenous Drug B

Complication Codes
1. 3001 - Drug Interaction
2. 3002 - Allergic Reaction

Knowledge Base
The system utilizes a knowledge base to make its suggestions. This knowledge base is a compilation of all the previous claims a medical coder has made.

Successes
After running the system through its tests, it will accurately report all, potentially, missing codes from each claim that the user gives it. Running on a Power Mac G5 with Dual 2.0Ghz processors and 1.5GB RAM, the system is extremely fast and offers no noticeable lag.

Failures
Due to time constraints and other factors such as the author's lack of knowledge, the system's knowledge base does not get written out to file and preserved across multiple instances. Furthermore, the GUI was unable to be completed, so the interactive nature of the system is non-existent. However, the concepts are accurately represented, despite the author's lack of expertise in actually implementing a system to fully utilize an interface and file I/O.

Where to Go
There are two major steps that should be completed immediately. One, the GUI has to be implemented to make the system useable to an end-user. Two, the knowledge base needs to be properly recorded and written out to file at program exit, and read back in on program open.

Conclusion
Physicians and medical coders have a daunting task in front of them: accurately record and report all medical codes associated with every patient. A system to aid the job of the medical coder would be invaluable in reducing the number of accidental omissions of commonly used medical codes by learning the practices of the hospital (and being bolstered by national data) and suggesting any codes that may have been forgotten for every claim the coder enters into the system. This system can be implemented and should provide a huge benefit to its users by not only giving them a system with the knowledge of national data, but also by learning what codes the facility at which the coder works most commonly uses.