CS 6440 Introduction to Health Informatics Team Projects Fall 2014

Current Electronic Health Records (EHRs) are often deficient in efficiently capturing and usefully displaying clinical data. There are innovative approaches to the data capture problem but the visualization problem is not as well explored. The team project is your opportunity to solve it! It will account for half of your grade.

1) You'll soon be asked to send the TA some basic background and interest data. In early September you will be assigned to a team of 4 students. At least one member of each team *must* be proficient in a web development language such as Java, Javascript, C++ or C-Sharp. Ideally, at least one member will have some health care background and another will have some design background. We'll do the best we can to assign everyone to "balanced" teams.
2) During the course you'll meet Marla, a make believe chronic disease patient. During Lesson 6 Marla's primary care physician (PCP) will refer her to a specialist. To better coordinate her care, he will send the specialist her electronic summary patient record in a specific XML format (called a CCD) you'll learn about in the course.
3) The goal of the team project is to develop a useful, user-friendly and adaptive web-based visualization tool for CCDs that helps support Dr. Johnson's (Marla's PCP) and Dr. Jones' (the pulmonary specialist to whom Marla is referred) mental model by showing them the data in Marla's (and, optionally, other) CCD(s) in one or more interesting ways that automatically adapt to the kind of patient or data requested and the reason for which it is being viewed. Keep in mind as you do your project that it must be designed to be used by and useful for physicians caring for patients!
4) This is a challenging project. You and your team should *not* delay getting started. Rather, you should begin reading, thinking and discussing the problem and your proposed solution as soon as your team is formed. In fact, you can even start yourself before then. To help with that you should read the NRC report *Computational Technology for Effective Health Care: Immediate Steps and Strategic Directions* to think about what supporting a physician's mental model means. For some state-of-the-art approaches to EHR visualization, you should study *Interactive Information Visualization to Explore and Query Electronic Health Records* and *Inspired EHRs Designing for Clinicians*. Be creative and resourceful. If you know one or more physicians you may want to ask them about their experience viewing data in their EHR.
5) In Exercise 7, Lesson 7 (Marla's CCD) you download Marla's CCD and add a medication to it. Optionally, but highly recommended for a good demonstration of your tool and a top grade, you can also download the Excel CSV file from which this CCD is derived and the Java tool we developed for the course that creates a CCD from a CSV file (installation instructions are included in the zip file). You could then edit the data in the CSV and/or add more data of the same types that are there (but with different values and dates) in order to enrich your visualization demonstration. This could be more problems, more visits, more vital signs, more medications and/or more lab tests. You could even create more CCDs to illustrate different patient types or clinical situations. There are no limits to what you can do if you think creatively. If your team doesn't have a healthcare expert, go find one! *In all cases, you must exercise care*

to use precisely the same formats as are in the origin CSV file you downloaded or the conversion may fail.

6) At the conclusion of course you must submit:
    a. A document *of no more than two pages in length* describing how you designed the solution, its capabilities and advantages and the challenge(s) you overcame to implement it. In this, you must explain how you feel it supports the physician's "mental model".
    b. The URL of your visualization tool.
7) This must be emailed to the TA by 8 AM, Monday, December 1st. Note that a late or incomplete submission will detract from your grade.
8) Your projects will be evaluated and graded by actual physicians with informatics expertise including your instructor and using this matrix. Note that it is possible to get more than 100 points which would make up for any questions you missed on the mid-term!