The goal of this project is for each student to explore a course topic in greater detail, to provide future material for subsequent offerings of CSE5095 Biomedical Informatics. This project has the deliverables:

- A 15 page paper (single-spaced 12 point, 1 inch margins, Times New Roman) excluding references and figures on the topic with an extensive reference list.
- Hard (and soft if available) copies of the five key papers on the topic.
- A 1 hour 15 minute lecture (45+ PowerPoint 2003 slides using class template).

With six students, this will represent the final weeks of the class with student presentations. The due date for all of this material is April 6, 2010, to allow posting of the material on the web page, copying of five key papers on each topic, and distributing materials to the students in advance of the first presentation. Please note that we have some slack in the due dates/presentations. Specifically, we can use our final examination slot (Tuesday, May 3, from 1:00-3:00pm as a presentation plus an additional slot that week with agreement). We will determine this in April.

In terms of topics, there are two possible approaches. First, you can choose a computer science & engineering area and explore its relevance, scope, and application to biomedical informatics. Examples of this type from Spring 2008 (as posted on the web page) include:

- Data mining and its application and usage in medicine [1, 2, 3] on the Google search ("Data Mining"medicine).
- XML databases and their support and usage for BMI. For example, there were interesting links [4, 5, 6] on the Google search ("XML Database"medicine).
- Grid computing and its application and usage in medicine [7, 8, 9] on the Google search ("Grid Computing"medicine).
- Service-oriented architectures (SOA) and their application and usage in medicine [10, 11, 12] on the Google search ("Service-Oriented Architectures"medicine).
- Other areas of interest are also possible including: the role of algorithms in bioinformatics and/or medicine; natural language process and its application to medicine; etc. You can propose an area of interest.

Notice that these four examples are core computer science & engineering research areas with applicability to BMI/medicine. Again – the key issue is for you to choose a topic that is of interest to you, and to clear that topic with the instructor before beginning work (to avoid duplication of topics). Note that you can choose topics other than on this list!

Second, you can choose a topic related to biomedical informatics or with a medical emphasis (clinical and translation science, clinical trials, personal health record, etc.) such as:

- Clinical Decision Support Systems [16, 17] – a project from Spring 2008 – these systems are intended to provide providers, from an active knowledge (AI) perspective, with advice and guidance for addressing a particular medical (patient) case.
- Ontologies and their usage in biomedical informatics and medicine – a project from Spring 2008 – there is a wide range of utilization of ontologies in a medical context.
- Personal health record (PHR) – for this topic, you could do wide-ranging research into what this is, how it is intended to be used, what are current or emerging standards, the
products currently available to support this, etc. This may lead you to certain computer science & engineering research areas (e.g., collaborative computing, security, databases, graphical user interface design/human factors, etc.) that are vital for supporting a PHR. Googling via “personal health record” brings back many different sites – this would be patient focused and used by the patient to help him/her in controlling their health (and if required, chronic conditions).

- i2b2 [13], caBIG [14], BIRN [15] or NHIN [18] – for each of these topics, you would focus on exploring the scope and breadth of the topic (what is it, what is its promise, etc.), and then focusing on the biomedical informatics needs, requirements, and challenges in support of the topic. This may lead you to different computer science & engineering research areas that would be particularly critical for the topic.

For these examples, the focus is on the medical side; once a medical topic of interest is chosen, this topic should naturally lead you to corresponding and appropriate computer science & engineering research areas. Note that you can choose topics other than on this list!

References:
2. http://dlist.sir.arizona.edu/426/
13. https://www.i2b2.org/
15. http://www.nbirn.net/
17. http://www.openclinical.org/dss.html
CSE5095 02 Biomedical Informatics
Design/Research Project – Indepth Exploration of BMI Topic
Due Date: 5pm, Wednesday, April 6, 2010