Medical Informatics

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http://www.it.uu.se/research/hci

Course home page:
http://www.it.uu.se/edu/course/homepage/medinf/ht12
Have you ever...

- ...visited a health care unit?
- Who did you meet there?
- Did you see any computers? Technology?
The use of computers and information technology contributes to better and more efficient health care?
Many different kinds of applications
Important for safety, efficiency

From life saving systems......

...to administration
Image processing
Decision support, expert systems

• Can technology support very skilled professionals?
• Can technology make people skilled?
Home care – mobile work
Mobile acute care
The design is important
E.g.: A “clinical overview”
Are there problems??

• Yes, many!!

• E.g.:
  – Low usability – users often not satisfied
  – Systems not adjusted to the context
  – Many systems not integrated
  – Expensive/slow development – high costs
  – Introduction & training problems
  – Safety risks
  – Security risks, integrity problems

• Why do these problems exist?
What makes IT in health care so special (and difficult)?
Example 1

• The NHS National Programme for IT (NPfIT) is an initiative by the Department of Health in England to move the National Health Service (NHS) in England towards a single, centrally-mandated electronic care record for patients and to connect 30,000 General practitioners to 300 hospitals, providing secure and audited access to these records by authorised health professionals.
• NPfIT is said by the NHS CFH agency to be "the world's biggest civil information technology programme".
• Originally expected to cost £2.3 billion (bn) over three years, in June 2006 the total cost was estimated by the National Audit Office to be £12.4bn over 10 years. Today??
• http://www.connectingforhealth.nhs.uk/
• Leading British computer scientists have called for an independent audit of the NHS’s information technology programme to verify that the network of systems being installed in England is technically feasible and secure.
Example 2

• “Patient record notes were by mistake taken from another patient’s record – the patient got the wrong drug”

• – In the information system, electronic patient record, the medical data is not presented clear enough. The focus is often on administrative data. Safety for patients depend on the correct availability of medical notes.
Example 3 – Dialysis
On 28 Nov 1983 three patients died during dialysis in a Swedish hospital.

“They died when diluted dialysis fluid damaged the red blood cells, causing acute cell damage in vital tissues. The dialysis concentrate was not available, and water was pumped into the system”.

“The court found that a nurse has caused the accident when she by mistake turned off the alarm system. She was convicted to have caused the death of the three patients and seriously injured several others.”

*What is your opinion?*
IT in health care

• Should contribute to......?
• Must fulfil...?
• How to accomplish this?
The course goal

The course will give you a base for applying information technology in medicine and health care. We will explain some important concepts and problem areas. Especially we will focus on what is needed for development of efficient and usable IT-systems in health care.

You know IT – now you will learn (some aspects) how to apply it to the health care domain.
You will learn about:

• Medical documentation, patient records and communication
• Medical terminology
• Systems development in health care
• Medical image processing
• Telemedicine and decision support systems
• Design of user interfaces in health care
• Standards, laws and regulations
Site visits

Heart surgery

Radiology
Digital X-ray
Course content

- Overview, Assignment specification
- Documentation, patient records
- Usability in health care and mobile systems
- Standards, laws, rules, regulations
- Medical image analysis and systems
- University Hospital: Heart surgery
- University Hospital: Radiology department
- IT and usability in radiotherapy
- Telemedicine and decision support
- IT development and usability in industry
- Supervision
- Examination
- Group reports
Assignment

• A small project, assignment, to be performed in groups of e.g. 5 persons.

• To analyse an existing system, evaluate its usability and suggest preliminary solutions to usability problems.
  – or.....

• To investigate, by literature studies etc., some interesting facts related to the use of IT in medicine or health care.

• Start early, i.e. now!!!
Assignment

• In both types of assignments, the focus should be on usability, design of the user interface and the benefit for the health care professionals and/or for the patients. You are supposed to spend **one week working time per person** for the assignment (~40 hours).
The purpose of the assignment is

• To get a feeling for how professionals in health care use IT as a tool in their everyday work,
• to understand problems that are associated with use of IT in health care,
• to understand problems related to development and deployment of IT in health care,
• to see which positive effects that potentially could be reached, if everything was made in an optimal way.
Assignment, logistics

• **Step 1:** Form groups of 5 persons. This should be done **latest Monday Nov 5.** Each group should send an (one) email to Bengt Göransson (Bengt.Goransson@it.uu.se) latest Nov 5, with a list of the group members’ names. Write “Medical Informatics” on the subject line.
Assignment, logistics

• **Step 2**: You must specify your assignment and get an approval before starting the assignment work. Also here, write an email to Bengt.Goransson@it.uu.se and specify your assignment, the application area, eventual contact persons and a few lines about how you plan to perform your assignment project. You will get a reply with an OK or some advice how to proceed. This should be done **latest Monday Nov 12**.
Assignment

As the time for the assignment is rather short you should especially consider:

• It takes time to specify the objectives, to establish contacts, to book meetings etc. So start as early as possible!

• It is much better to study a very small application/system/problem and have time to analyse it in more detail. Do not try to look at larger systems. It is better to study a (very) small isolated part of a larger application or system.

• Focus on users, usability and benefits.
The written report - outline suggestions

• Background – Describe the application area and the system you study.
• Problem description. – Describe the problem you find outgoing from the users’ perspective.
• Describe the system under study in more detail.
• Analysis of the usability. Describe the method, the analysis and the conclusions.
• Describe your ideas for improvements of the system, how the usability problems could be solved. Give some preliminary descriptions of what the solution could look like. Motivate and try to evaluate your ideas.
• Discussion.
• References.
Assignment – hand in and presentation

- The presentation of your assignment work must be made both **orally** and in **written form**. The oral presentation is specified in the course schedule (prel. December 12).
- Send the written report by mail to Bengt Göransson (Bengt.Goransson@it.uu.se) no later than **Monday Dec 10, 12.00**
- The written report will normally be approx. 6-10 pages.
Contents
- News
- Registration
- Schedule
- Literature
- Examination
- Assignments

Literature
- If available, we recommend: van Bemmel, Handbook of Medical informatics, Springer-Verlag. This is a good and comprehensive book. See the home page for more.

Examination
- The examination is performed through the assignment (written, oral presentation) and a short written examination.
  The assignment is 60% and the written exam 40% of the basis for course credits.

Lecture notes
- Will continuously be added here.

Assignments
- Assignment instructions