Ethical Analysis

Case study

- Medical systems development
  - Basic idea:
    - "Bedside assistant"
    - Patient records database, plus a rule-based system for suggesting diagnoses, proposing treatments, and recognizing potential problems (drug interactions, etc.)
    - A terminal in every room
  - Potential benefits:
    - Immediate access to all information on a patient
    - Analytic and diagnostic features could reduce risks of interactions, etc.
  - Potential risks:
    - What if there are bugs in the system? Who is responsible if it makes a "bad call"? (The doctor/nurse? The hospital? The designers?)
    - The rule base may not be complete (or completely accurate), and can be tough to maintain.
    - Effectiveness of the UI is unknown, especially outside of controlled conditions (e.g., "code blue")

Questions from case study

- The case study raises a number of questions, including:
  - How can they decide if the system should be deployed?
  - How long a test cycle is appropriate?
  - What is an adequate level of reliability for the system?
  - What level of risk is acceptable?
  - What safeguards and checks are adequate for protecting physicians and patients from errors?

Ethical analysis

- Questions such as the preceding are not purely technical, though they have their sources *in* technology
- The real concerns are about:
  - the benefits of the system
  - the risks it imposes on patients
  - the conflicting goods and harms involved
- In short, it's a matter of ethics
- There are a number of different approaches to ethical analysis, three of which are outlined in the paper:
  - Normative ethics
  - The ethics of virtue
  - Social ethics

Normative ethics

- Involves the development and justification of rules for "right conduct"
- Four fundamental principles are relevant to the introduction of inherently risky technology into a situation affecting human life/well-being
  - Beneficence – the obligation to do good
  - Nonmalfeasance – the obligation to avoid doing harm
  - Autonomy – respect for the freedom/self-determination of all people
  - Justice – the fair distribution of benefits and burdens

Potentially opposing principles

- Most people will agree that all four principles are important: the problem is prioritizing them
- Two or more principles may conflict with each other
  - Is it always more important to avoid harm than to do good?
    - This could mean passing up opportunities to improve people's lives, out of a fear of taking comparatively small risks
  - If beneficence and nonmalfeasance are always more important than justice/autonomy, then we can focus solely on efficiency.
    - But this would mean ignoring the rights of individuals to choose.
  - "Medical paternalism" ("doctor knows best") is another example.
- No ethical system has been able to unify/prioritize the principles in a generally acceptable fashion.
- The most we can do is to say that they're all important, and to try to find a good balance.

Guidelines for applying the four principles

- We need to strive for:
  - Proportionality
    - the good achieved by the technology must outweigh the harm/risk
    - there must be no alternative with less harm/risk that can provide the same/comparable benefits
  - Informed consent
    - those affected should understand and accept the risks
  - Justice
    - the benefits and burdens should be distributed fairly
    - those who benefit should assume a fair share of the risk; those that do not, should not suffer significantly increased risk
  - Minimized risk
    - even given the other three guidelines, the technology must be implemented so as to avoid all *unnecessary* risk

The ethics of virtue

- Unlike in normative ethics, the ethics of virtue don't focus on what is the right thing to do in a given situation.
- Instead, we consider what *kind of person* does the right thing.
  - What is good and desirable about technology?
  - What motivates engineers and other technologists?

Three "goods" of technology

- The exercise of human creativity
  - Technology can be seen as an end in itself.
  - Incentives include:
    - The challenge of solving tough problems
    - The satisfaction of "making it work", or creating something new and useful
- Economic benefits
  - The creation of wealth
  - Incentives include:
    - Hope for financial reward (and continuing employment) as a result of creating successful products
- Bettering human existence
  - Possibly the "most noble"
  - Also the most remote in experience for many computer professionals

Social ethics

- Recognizes that values and choices are not just at an individual level
  - They are embodied in social structures
- Can be seen as a source of answers to questions like:
  - Why does the computer profession sometimes fail to protect the public?
  - Why is the public sometimes exposed to technology that is unjustifiably risky?

Some possible "social ethics" answers

- There may be insufficient knowledge (or analysis) of the risks and benefits of a given technology
- Computer professionals too often focus on purely technical issues, ignoring *human* issues
- Computer professionals frequently define their obligations primarily in terms of loyalty to their company/organization and to its goals (e.g., making profits)
  - Protecting the public welfare may not be seen as a competing or overriding goal

Some possible solutions to these weaknesses

- Education
  - A fundamental part of every doctor's training is a detailed understanding of not just their obligation to a patient, but also the implications of that obligation.
- Risk analysis
  - This is tough, especially in computing
    - "When civil engineering was this old, the right triangle hadn't been invented yet"
  - We need to learn (as a profession) to do this better, and to do it more consistently

Some possible solutions to these weaknesses

- Participatory design
  - Make the customers/users who will be affected by the technology a part of the design/implementation process
    - This will help it to better meet their needs
    - Respects the right to users' autonomy
    - Increases computing professionals' contact with the public, helping to increase awareness of our obligation to uphold public welfare
- Support and protection
  - Professional societies (and members) need to support those who act in the public interest (e.g., "whistle-blowers", etc.)

We're engineers, damn it!

- We don't like asking questions about "right and wrong".
  - We want it to be black and white (Boolean), not all "soft and squishy"
- But it's important to make sure that these questions are not only asked, but are *answered*.
  - Most professional organizations (IEEE, ACM, etc.) have codes of ethics that bind their members
  - Our profession is playing a larger and larger role in many dimensions of life, and thus has the potential for an ever-increasing impact