CS 3001-A: Computing, Society & Professionalism

Munmun De Choudhury | Associate Professor | School of Interactive Computing

Week 1: Case Study: Therac-25
January 10, 2024

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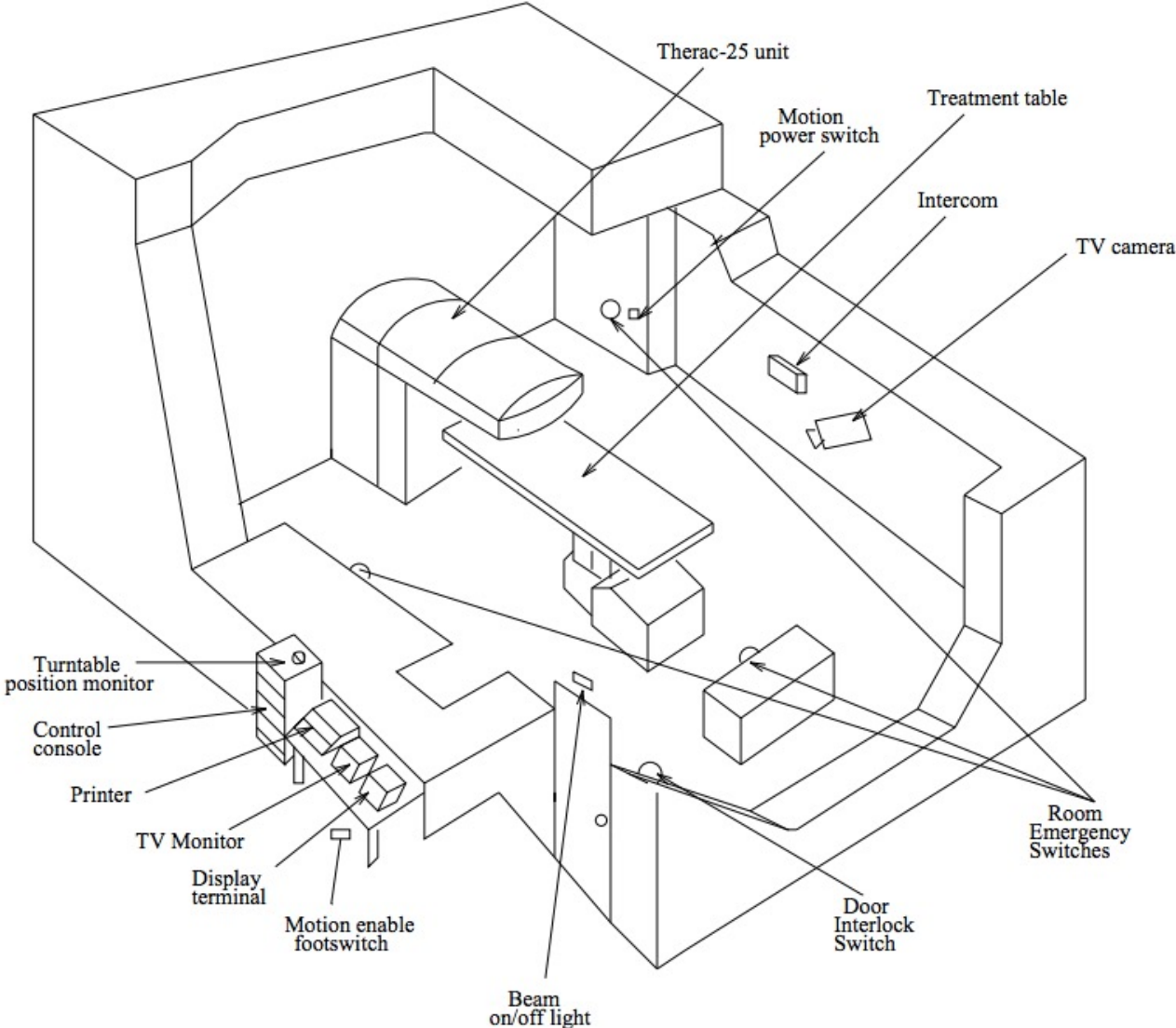Yesha Jigneshkumar Thakkar [A14, A31]

Homework 1

- Available on class website: http://www.munmund.net/courses/spring2024/cs3001a/Assignment1.pdf

- Due: January 22, 2024 (11:59pm Eastern Time)

- Submission on Canvas.

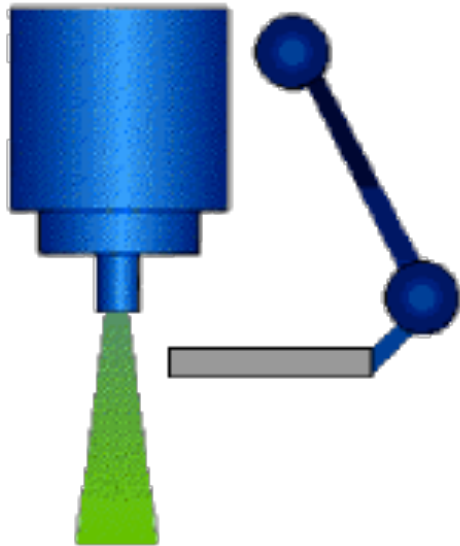# Why you, as a CS major need to know about ethics…
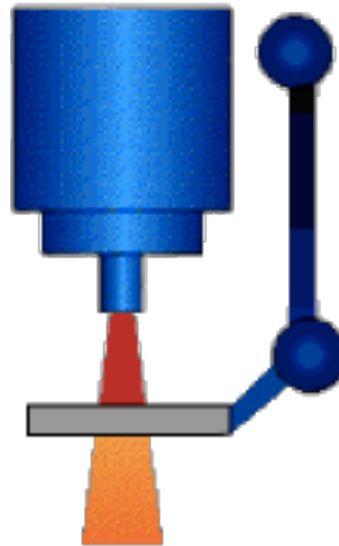
Genesis of the Therac-25

low current electron beam was scanned across the field
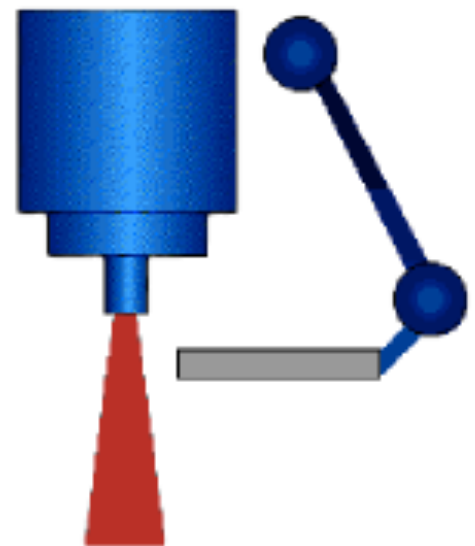
Electron Mode

high current electron beam was tracked at the target

X-Ray Mode

high current electron beam with no target > 'lightning'

THE PROBLEM

The Context of the Accidents

↗ Radiation therapy
  ↗ Many people with cancer were diagnosed and treated, but were also exposed more radiation than they needed

What Went Wrong: Gap in End Users' Understanding

What Went Wrong: Infrastructural Gaps

What Went Wrong: Issues in the Design of Therac-25

What Went Wrong: A Lack of Fault Tolerance

Post Mortem

Have we placed too much trust in technology?

TRUST IN SPECIFIC INNOVATIONS VARY

TRUSTED
NEUTRAL
DISTRUSTED

69% ELECTRONIC AND MOBILE PAYMENTS

59% ELECTRONIC AND PERSONAL HEALTH TRACKERS

55% CLOUD COMPUTING

47% HYRDRAULIC FRACTURING

32% GENETICALLY MODIFIED FOODS

Solution: Defensive Design

Solution: Incident Learning System

Lesson Learned

London (CNN Business) — Google (GOOGL) says it has developed an artificial intelligence system that can detect the presence of breast cancer more accurately than doctors.

A study that tested the accuracy of the system, which was developed through a collaboration between the tech giant and cancer researchers, was published Wednesday in the scientific journal Nature.

Related Article: How AI came to rule our lives over the last decade

The program was trained to detect cancer using tens of thousands of mammograms from women in the United Kingdom and the United States, and early research shows it can produce more accurate detection than human radiologists.

According to the study, using the AI technology resulted in fewer false positives, where test results suggest cancer is present when it isn't, and false negatives, where an existing cancer goes undetected.

Vinay Prasad
@VPrasadMDMPH

Now back to this idea of biopsies that don't exist.

The other big problem with AI of diagnostic imaging is retrospective validation does not account for the fact that prospective deployment may change the way data is collected

4:00 PM · Jan 2, 2020 · Twitter Web App

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Vinay Prasad @VPrasadMDMPH · Jan 2
Replying to @VPrasadMDMPH
There may be biopsies that AI would have encouraged that do not exist, and we don't know the results of tests that were not done.

People involved in the tragedies

- ↗ Company who made the softwares for the accelerometers

- ↗ Programmers and testers behind the softwares

- ↗ Doctors who prescribed medication

- ↗ Staff and technicians who managed the accelerometers

- ↗ ** Think about it for your recitation section!