COSC1147: PCP

Professional Computing Practice

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Lecture 10

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- Virtual reality, robots, cyborgs, ethics around computers replacing people

Virtual Environments

- What is virtual space, and how is it different from physical space, or geographical space? … in terms of ethics considerations

Virtual Environments

- a range of *computer-generated environments* that could not exist without computers and cybertechnology.
- include online or virtual communities (which we covered in week 5), as well as (three-dimensional) virtual reality (VR) applications.

Defining “Virtual” in Virtual Environments

- At least three different senses of “virtual” can be distinguished, because the term *virtual* can be:

1) contrasted with “real,” as in cases where virtual objects are differentiated from “real objects”;
2) contrasted with “actual” – e.g., where a person claims that they have “virtually finished” their project;
3) used to express a feeling that one has “as if” they were physically present – i.e., the feeling of presence that one can have in a telephone conversation or an online messaging exchange.

Defining Virtual-Reality Technologies (or Applications)

Virtual Reality is

"*a three-dimensional interactive computer-generated environment that incorporates a first-person perspective.*"

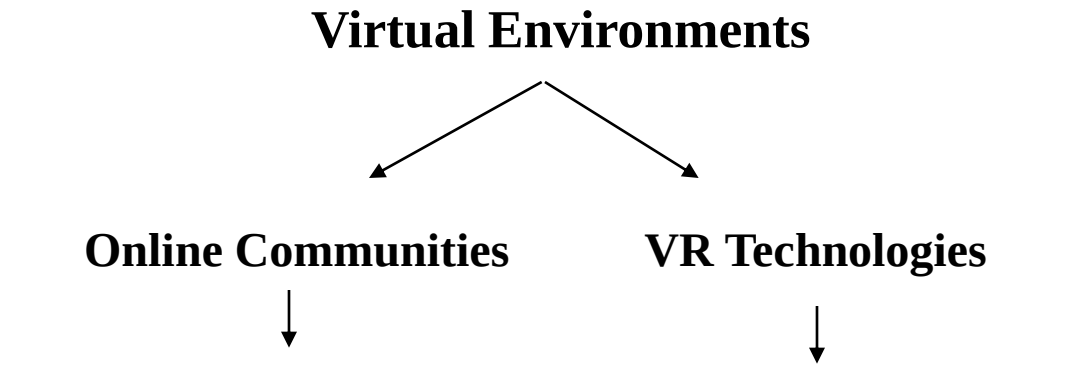
[Brey, 1999]

Brey's Definition of VR

- Three important features of VR technology include its use of:

1) *interactivity;*
2) *three-dimensional graphics;*
3) *a first-person perspective.*

Virtual Environments



Electronic forums, SNSs, etc. (can be 2D representations that are text-based)

VR games, VR applications/models, etc. (must be 3D graphical interfaces)

Multi-Player Video Games

- MMORPGs (Massively Multiplayer Online Role Playing Games)
- MMORPGs include games such as *Second Life* and *World of Warcraft*
- *Second Life* (designed by Linden Lab), which includes members called “Residents” was released in 2003, had approximately 13 million registered accounts as of 2008, 1 million regular users in 2013, is open source.
- *World of Warcraft (WOW)*, one of the most popular MMORPGs, was released in 2004, had 11 million paying subscribers as of 2009, peaked at 12 million subscriptions in October 2010 and Blizzard reported 5.5 million subscriptions in October 2015.

Ethical Aspects of Virtual Environments

- Is it wrong to perform acts in virtual environments that would be considered immoral in “real life”?
- We might think that since no one can be physically harmed in a virtual world, any harm caused in the virtual realm is not “real harm” but only *virtual harm*.

Violent and Sexually-Offensive Acts in MMORPGs

- Some critics claim that Second Life facilitates child pornography because virtual characters who are adults in real life can have sex with virtual characters who are children in that MMORPG (Singer, 2007).
- Cases of virtual prostitution on Second Life have also been reported – i.e., where some Residents were "paid to (use their avatar to) perform sex acts or to serve as escorts" (Brey, 2008).
- If these reports are correct, there are clearly some forms of sexually-offensive acts that take place in MMORPGs, which would not be tolerated outside these environments.

Violent and Sexually-Offensive Acts in MMORPGs

- While most people agree that murder is wrong, they do not seem to be bothered by virtual murder in MMORPGs.
- some might see the virtual murder of a character in a video game as no different from the “taking of a pawn in a chess game.”
- people have different intuitions about acts in virtual environments that involve morally-objectionable sexual behaviour, such as child pornography and paedophilia.
- the kind of reasoning used to defend virtual murder in games could, unwittingly, be extended to defend virtual paedophilia. [Luck, 2009]

Violent and Sexually-Offensive Acts in MMORPGs

- Luck believes that the following argument may unintentionally succeed in doing this:

1. Committing acts of virtual murder does not significantly raise the likelihood of committing actual murder.
2. Committing acts of virtual paedophilia does significantly raise the likelihood of actual paedophilia.
3. Therefore, it is immoral to commit virtual paedophilia, but it is not necessarily immoral to commit virtual murder.

- While this argument may appeal to many, Luck notes that it is also difficult to defend because of the lack of empirical evidence.

Ethical Aspects of Virtual Environments (Continued)

- Because harm caused in a virtual world might not result in physical harm to a person, does it follow that no real harm existed?
- if you receive an insulting e-mail message (in virtual space), is the harm you suffer any less real than the harm that would be caused by the same message written on paper in a letter sent to you via physical mail?

Arguments for Evaluating Harm in Virtual Environments

1. The *argument from moral development* reasons that the way we treat virtual characters can affect the way we treat real-life people.
2. The *argument from psychological harm* reasons that the way we interact with virtual characters can cause psychological harm to people in real-life situations who have suffered harm (e.g., as in the case of Lambda-Moo and real-life rape victims).

Virtual Economies and MMORPGs

- Some MMORPGs have their own monetary currencies.
- For example, Second Life uses the Linden Dollar (linden, or L$), which its Residents can both use in in-game transactions and exchange outside the game for real currencies such as the US dollar or the euro.
  - In 2015 alone, Second Life users had cashed out approximately $60,000,000 (60 million US dollars) and Second Life had an estimated GDP of $500,000,000 (500 million US dollars), higher than some small countries.[Wikipedia]
- As a result, virtual economies have emerged.
- the emergence of these economies can also increase the likelihood that moral controversies will arise in those virtual environments.

Virtual Economies and MMORPGs

- Virtual property, as in the case of virtual money, can be acquired and exchanged with players in MMORPGs
- It can also be sold and exchanged outside the game to interested parties (in the physical world)
- In some cases, the virtual property has become so desirable that it has led to violent acts in the real world
- In an incident in China, a person who had stolen some-one's virtual sword in a MMORPG was murdered in real life by the "sword's" owner
- So, virtual economies can have real-life implications and can result in physical harm to individuals in the real world

Ethical Concerns Affecting Misrepresentation, Bias, and Indecent Representations in VR Applications

- *representational* issues
- *mis*representations (that can cause harm by failing to uphold *standards of accuracy*)
- *biased* representations (that fail to uphold *standards of fairness*)
- *indecent* representations (that violate standards of decency and public morality).

Cyber-Identities and Cyber-Selves

- Does cyberspace make a difference for understanding the different kinds of identities that can emerge in different online communities?
- the Internet is a “powerful new force” for “the manufacture of identity,” which offers an unparalleled ability to create ourselves in our own image
- users have an unprecedented capacity to determine their initial presentations to others…[and this] …enables “users to be masters of their identity.”

Cyber Self

- the “the computer” can be viewed as a “medium” for self discovery/self expression
- Turkle (1984) noted that computers (many of which were stand-alone, or non-networked at that time) enabled people to try
  - new ways of expressing themselves;
  - new cognitive styles;
  - different methods of problem solving.

“MUD Selves” and Distributed Personal Identities

- Turkle notes that (early, stand-alone) computers had evolved from “calculators” to “simulators”
- online forums, called *MUDs* (MultiUser Dimensions), allowed users to have “distributed personal identities”
- that in MUDs, people can express “multiple identities” – e.g., a person can simultaneously be:
  - one’s actual self
  - some other persona (e.g., a young female, older male, etc.)
  - a non-human entity, such as a “furry rabbit”

MUD Selves (Continued)

- Turkle also points out that in MUDs, one's *self* is the sum of one's "distributed presence"
- So, in MUDS, people can have "parallel lives"
- note that in the physical world, one can only move in and out of roles by "stepping in and out of character"
- For example, consider the case of the film/ Broadway show *Victor, Victoria*, where the lead character could only act out one (of her three) identities at any given point in time.

The Impact of Cybertechnology for "Our Sense of Self"

- Cybertechnology has had an impact on our *sense of self*, as it affects our relationships with nature and the universe.
- Social scientists typically describe three major epochs in human civilization as the:

1. Agricultural Age;
2. Industrial Age;
3. Information Age.

- Each "age" has been characterized by revolutionary technological breakthroughs that involved humans gaining control over nature.

Our Sense of Self in the Cyber Era

- Mary B. Williams (1997) describes the impacts of three important “milestones” made possible by technological discoveries:

  M1: challenge to our sense of human beings as uniquely important, came when the Copernican revolution established that Earth, was not at the center of the universe.

  M2: Darwin's conclusion that emergence of Homo sapiens was...the result of evolution from lower species by the process of natural selection.

  M3: resulted from the work of Karl Marx and Sigmund Freud, which showed intellectual, social, and individual creativity to be the result of non-rational (unconscious) libidinal or economic forces – not as has been believed, the products of the almost god-like powers of the human mind.

Cybertechnology as a "Defining" Technology

- Bolter describes three ages or eras in Western culture via his notion of a *defining technology*:

1) the ancient Greek world (represented by "Plato's Man");
2) the Renaissance (represented "Descartes' Man");
3) the contemporary computer age (represented by "Turing's Man").

Cybertechnology as "Defining"

- 20th-century computer science pioneer Alan Turing articulated some of the interesting connections between the computer and the human mind
- Bolter uses the phrase “Turing’s man” to describe those who see the computer as the defining metaphor of our current era.
- “Turing’s man” sees nature as *information*, and humans (or human brains) as *information processing engines*.

AI and its Implications for What it Means to be Human

- What distinguishes humans from other kinds of creatures and entities – is it *rationality*?
- The view that only humans are rational is currently challenged on two separate fronts:

1) research in animal behaviour/intelligence suggests that many primates, dolphins, and whales are capable of demonstrating skills we typically count as rational;
2) developments in artificial intelligence (AI) have shown that certain forms of "rational activity" can also be attributed to computers.

AI Background and (Historical) Developments

- Early AI research focused on developing software programs that could play chess, do calculus, and “solve problems” that require a high level of human intelligence.
- The first AI programs were “problem solvers” comprising software code, but included little or no hardware.
- Many believed that AI could be achieved without having to copy “nature’s way of thinking” (i.e., via a physical brain).
- AI research in that era, which focused on constructing a kind of “disembodied intelligence,” is now typically referred to by expressions such as “classical AI,” “symbolic AI,” or “good old fashioned AI” (GOFAI).

AI Background/Developments

- AI research has aimed at building computer systems that can duplicate, or at least simulate, the kind of intelligent behaviour found in humans.
- Researchers working on the CYC Project, use an approach that builds on classical/symbolic AI by designing software programs that manipulate large databases of factual information.
- “Connectionists” have designed neural networks that aim at modeling the human brain, with its vast number of neurons and arrays of neural pathways, which exhibit varying degrees of “connection strengths.”

Can We build (Genuinely) *Intelligent* Machines? An Ongoing Debate

- We can ask whether it is possible, even in principal, to build "machines," i.e. either software programs or (physical) artificial entities, that are "genuinely intelligent" and whose intelligence could rival and possibly exceed that of humans.
- Some critics argue that, at best, AI researchers would be able to build machines that merely simulate, rather than replicate, human intelligence.
- But this is still an "open question"; the debate is ongoing.
- Each side has presented a series of arguments and "thought experiments" to defend its position.

The *Turing Test*

- In 1950 Alan Turing predicted that by the year 2000, a computing machine would be able to pass a test, which has come to be called the *Turing Test*, demonstrating machine intelligence.
- Turing envisioned a scenario in which a person engaged in a conversation with a computer (located in a room that was not visible to the human) was unable to tell – via a series of exchanges – whether he or she was conversing with another human or with a machine.
- He believed that if the person could not be sure that this entity was a human or a computer, then we would have to attribute some degree of intelligence to the computer.

The *Turing Test*, *Deep Blue*, and *Watson*

- While AI researchers would concede that Turing's prophecy has not yet been fully realized, they also point to the significant progress and achievements in AI.
- In 1997 an IBM computer program called *Deep Blue* defeated Gary Kasparov, then reigning champion, in the competition for the world chess title.
- In 2011, another IBM computer program, called *Watson*, defeated two human opponents in the TV game show *Jeopardy* in a championship match (a human-computer competition that was viewed by millions of people around the world.)

Watson, the Turing Test, and the Chinese Room Argument

- Was Watson's behavior in the *Jeopardy* game show analogous to that of the person in Searle's Chinese room?
- Did Watson actually "understand" the meaning of the symbols (in the questions and answers) involved?
- Or did Watson simply use a series of syntactic rules and cross-checking algorithms to manipulate the information stored in Watson's vast database to get the correct answers?

Watson, the Turing Test, and the Chinese Room Argument (Continued)

- It is not clear to what extent, if any, Watson could be said to have any understanding of natural language?
- So, even if Watson is capable of passing the Turing test (as it was originally posed), it would not necessarily follow, using Searle's argument, that Watson possesses human-like intelligence.

Watson, SIRI, and the Chinese Room Argument

- Some sceptics might argue that Watson is nothing more than a kind of (very broad) *expert system*, or perhaps some combination of expert systems, that behaves like a more sophisticated version of (Apple's Speech Interpretation and Recognition Interface) SIRI.
- Although SIRI is capable of responding to many questions posed to "her" with correct answers, it is doubtful that people would be willing to describe SIRI as possessing human-like intelligence…or would they?

Watson, SIRI, and the Chinese Room Argument (Continued)

- Just as we need not ascribe human-like intelligence to SIRI, one could argue that it is not necessary to attribute genuine (or human-like) intelligence to Watson.
- We can see why many humans would feel uneasy about the fact that a computer, or AI entity, had defeated two highly intelligent human beings in a championship match involving intelligence (even if it was only in a game show contest).

Cyborgs

Cyborgs and Human-Machine Relationships

- We next focus our analysis on questions regarding the nature of the human-machine relationship that can result from the development of cyborgs and related AI entities)?
- We have already seen how the prospect of machine intelligence in AI research can affect our sense of what it means to be human.
- The development of cyborgs (and related AI entities) may have a similar effect on us.

Cyborgs and Human-Machine Relationships (Continued)

- We examine this controversy via two distinct, but related, questions:

1. Are humans becoming more computer-like?

2. Are computers becoming more human-like?

Cyborgs and (AI-induced) Bionic Chip Implants: Are Humans Becoming More Computer-Like?

- Future chip plants made possible by AI could be designed to make a normal person “super human”
- “conventional” implants designed to “correct” deficiencies have been around and used for some time
- The purpose of conventional, or “therapeutic” implants, has been to assist patients in their goal of achieving “normal” states of vision, hearing, heartbeat, etc

AI and Chip Implants

- Because the human body has “natural functions,” some will argue that implanting chips in a body is acceptable as long as these implants maintain and restore the body’s “natural functions”
- while therapeutic implants will likely be accepted, “enhancement implants” may not be
- therapeutic chip implants such as pacemakers, defibulators, and bionic eyes that maintain and restore natural bodily functions will most likely be accepted;
- enhancement implants, such as giving patients added arms or infrared vision, will most likely be prohibited. (Moor, 2004)
- do you agree?

AI and Chip Implants (Moor)

- such a policy would likely endorse the use of chip implants that:
- reduced dyslexia;
- assist memory of Alzheimer patients.
- But would not endorse the implanting of either a:
- “deep blue” chip for superior chess play;
- miniature digital camera that would record and playback what a person had just seen.

AI, Chip Implants, and What it Means to Be Human

- Arguably, we need to assess now some of the advantages and disadvantages of bionic implants that AI will make possible.
- Weckert (2006) asks us whether we:

  Want to be 'superhuman' relative to our current abilities with implants that enhance our senses, our memories, and our reasoning ability?

  What would such implants do to our view of what it is to be human?

The Challenge in Distinguishing AI Entities from Humans: Are Computers Becoming More Human-Like?

- AI entities (i.e., “bots”) in the form of avatars already assist users in organizing their work schedules, reminding them of important scheduled meetings, arranging travel, ...
- Smart phones using voice-recognition programs (such as iPhone’s SIRI), now interact with humans on a daily basis.
- Virtual entities already exhibit human-like features when viewed on screens or when listened to on electronic devices.

Are Computers Becoming More Human-Like (Continued)?

- Confusion resulting from interacting with artificial entities may become more exacerbated as we move from virtual entities on screens (of computers/devices) to interacting more regularly with physical AI entities, such as robots.
- Sophisticated robots of the future may not only look more human-like, but may also exhibit sentient characteristics.
- These robots, like humans and animals, could (arguably) have some *sentience* (and thus be capable of simulating the experiences of sensation, feeling, and emotion).
- Robots and other kinds of AI entities of the near future may also exhibit, or appear to exhibit, consciousness.

Are Computers Becoming More Human-Like (Continued)?

- The movie *2001: A Space Odyssey* includes a computer named *HAL*, who exhibits higher-order thinking functions and behavior that also resembles human consciousness.
- In addition to carrying out his ordinary computational tasks, HAL engages in sophisticated conversations with members of the space ship's crew, plays chess, criticizes art, etc. – all of which seem to exhibit some human-like intelligence on HAL's part.

Do AI Entities Deserve Moral Consideration

- Three questions worth considering from the movie AI are:

1) Should the artificial boy (or any artificial creatures like "him") ever have been developed in the first place?
2) Is it morally permissible for the "boy's" adopted parents to discard "him" as they would some other kind of "computer resource"?
3) Does this "boy" deserve (at least some) *moral consideration* (especially from the human parents who adopted "him")?

Expanding Our Sphere of Moral Consideration

- Many humans, especially in the Western world, have viewed all of our "resources" simply as something to be used and disposed of as they saw fit.
- They also assumed that they had no moral obligations toward any of these "resources" (e.g., animals, plants, the environment/eco-sphere, etc.)
- Prior to the 20th century, we generally assumed (for whatever reasons) that *only* human beings deserved ethical consideration.
- All other entities—animals, trees, natural objects, etc.—were assumed to be mere *resources* for humans to use (and abuse) as they saw fit.

Expanding Our Sphere of Moral Consideration

- By the mid-twentieth century, the assumption that moral consideration should be granted only to humans was challenged by both:
- animal-rights activists/groups,
- environmentalists.

Expanding Our Sphere of Moral Consideration

- Animal-rights advocates point out that animals, like humans, are capable of feeling pain and suffering (i.e., they are *sentient*).
- Many of these advocates also argued that because animals can suffer, we should grant them moral consideration.

Expanding Our Sphere of Moral Consideration

- Will some AI entities eventually qualify as *moral agents*?
- Even if AI entities are unable to qualify as full-blown moral agents (as most adult humans do), they may nevertheless meet the threshold of what Floridi calls "moral patients."
- moral patients are "receivers of moral action" (while moral agents are the "sources of moral act- ion" – i.e., capable of causing moral harm or moral good).
- Like moral agents, moral patients enjoy moral consideration and thus have at least some moral standing.
- Unlike moral agents, however, moral patients cannot be held morally responsible for their actions.

When can Robots replace people?

- Robots replace people working on production lines
- Robots replace people in factories
- Robots replace people in spacecraft
- Autonomous cars? Trains? Planes?

References

- Tavani, Chapter 11, pages 342-367.

- Virtual Reality Explained:

https://www.youtube.com/watch?_v=i4Zt3JZejbg

- Second Life:

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- Neil Harbisson, cyborg:

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