CMPS 10 Lecture Notes: Lecture 10 (2-4-2016)

Clicker Question: I'm not quite sure how I will be evaluated in this class: A YES B NO (about 90 percent say Yes)

- Majority of Evaluation is going to be based on Snap
- The questions won't be tricky or technical
- Aim will be to test whether you get the gist of what is being discussed during lecture time

Next question: lecture topics have been jumping around in topics

- How many have heard the term ascii
- Some people have heard it. But how useful would this be to us
- Instead teacher is trying to convey some sense as to what computers find easy to do, and what computers find hard to do.
- This seems infinitely more valuable than getting us to understand the nitty gritty of how computers work
- This is kind of akin to how cars work
- Car in 1930s, you DID have to know how it worked, but nowadays it doesn't matter.
- Same with computers now.

Next Question: A: I would like to be asked questions I can easily be tested on (i.e. I want things to change) B: I am happy with the current set up of jumping around.
There is an election in the past where the poll said that Republican guy should win, but it turned out that he didn't, why? Everything about the experiment was perfect! How could it go wrong?

- It turns out that it is because the survey was conducted by phone, and only rich people had phones, which leaned towards republican.

Video of "The Revenant by Tarkovsky"

- Left is the Revenant.
- Right is scenes from different Tarkovsky movies
- We see that there is definitely a correspondence in the framing and types of shots of many of these scenes.
- So in many scenes, the "flattery" was very obvious.
- But there is a language if cinema, and so it makes sense that two filmmakers would use the same language.
- Connection to class: in a year from now, Google will be able to do procedurally do what was done by hand in this case.
  - We've reached a point where people can create things that up until this point we've reached a point that before this point we've thought were uniquely human.
    - But it turns out computers are getting pretty good at this as well.
    - Computer ONLY saw the picture, but it was able to create captions for it.
      - As we scroll down, we see that the captions do begin to fall apart a little bit.

Facebook is starting to get into the world of telepresence (i.e. being able to be in a meeting without being physically present).

- Teacher's friend's project is kind of nice. We want to create a good, automated director. Receives different audio feeds from different sources, but automatically switches the focus of the feed.
  - They give him 150,000 dollars a year.
  - Hire a film editor, and get him to do it with as many actual meetings with data as possible.
  - Then hopefully he will be able to do it with enough such films, that they could then feed it to a machine, and the machine would learn.
    - In current systems, someone drops a pen, and camera switches. But this is likely just an accidental noise that doesn't need our focus.
    - If someone is focused, maybe you do want camera to focus on them. If someone is distracted, you probably don't want the camera to go to them.
  - There are rather dramatic economic implications if we get to this point. Teacher was to show us a video.

        * Teacher hopes that we don't hate him for showing us this.

"Humans Need Not Apply"

- Essentially no one needs to make food now. We've built tools to reduce physical labor. Mechanical brains make human intelligence less in demand.
- When we think of automation, we probably think of this as like, machines that make cars
- But "Baxter" is the first example of a general purpose robot.
- 1/10th of the speed is still cost effective when it is 1/100th of the price.
- Luddite horses. One worries that cars will replace horses. The other says that cars make lives cushy and will lead to more.better jobs for horses. This of course isn't true. But humans think that this applies to us.
- Self Driving Cars: Autos. Calling them cars limits our ability to perceive what they can do.
- When we order something off of Amazon, most of the movement is done by these little robots that move things around. Amazon is launching its own GPS.
- Transportation industry in US is 3 million people, world wide it is probably 70 million. And these jobs are OVER. Economics always win, humans, even with with unions behind them, lose against the economy.
- The shape of things to come: incentive to automate white collar workers, as they are the most numerous and most expensive.
- New York Sock Exchange is largely a tv set now to film folks talking about finance; people don't actually do much finance there any more.
- The bulk of lawyering is largely paperwork. Discovery is a big thing finding documents with facts they need. Perfect for bot. Do it faster, cheapter and more accurately (i.e. BETTER).
- Autos don't need to be perfect; they just need to be better than humans. Same with doctors (like Watson)
- So professionals, white collar workers, and low skill workers will all go away.
- Maybe we think that just as mechanical muscles let us free open our mind, maybe free us to creative work but this is unlikely since media at present mainly only has a few people who can sustain themselves.
- Great depression was 25 percent unemployment rate. We are at risk of losing 45 percent if all replaced by work. If large sections of the work force become unemployable through no fault of their own (just like horses).

This video made me uncomfortable, A for Yes, B for No

- about 60/40 split for A and B respectively.

Among people who were not made uncomfortable:

- I believe this video was truthful and accurate (A)
- I doubt whether the conclusions of this video end up holding (B)
- 82 percent yes, 18 percent B.
- So a third of the class found the video to be truthful, but it did not make them uncomfortable.
  - Teacher's wife just finished law school, and is having a hard time finding a job.
  - Because lawyer today can do the work of three lawyers of the past, expectations are so high.
    * Vast majority of documents she brings home come from a database.
    * Doesn't seem to be that hard, in the next five years, to teach computers how to find out if a particular case is relevant or not relevant and favorable or not favorable.
      · So the one part of the job that seems hard to replace: is the part that involves TALKING with people.
      · So don't become a civil lawyer (business and money) become a criminal lawyer, as that involves more talking.
      · So it is a shrinking of the enterprise.
    * Law students are suing universities because they aren't being given the nice jobs they were promised.
      · Teacher is saddened by video. Is looking to students for hope.
- What about non profit jobs?
  - The people participating still need to be paid, they need to live someplace, they need to eat, etc.
    * Non profits get money through philanthropy, which means that the money came from other people who did work someplace and earn it through "normal" ways.

            - The fact that we have to actually *think* about a job that can't be replaced by computers implies that it is the minority.

- Teacher ultimately costs the university 300K a year (not all of that is salary of course)
  - Thinks that the research is the thing that he does that deserves money
    - Even classes that he does a really good job of teaching, he teaches from a book! He views the book as being better!
  - Would it change things if we knew that teacher was a hologram.
    - It feels like it would be. It feels like it is something important about being human.
      - It might be that teacher is just sufficient old, and sufficiently deep into pipeline, that he can play the union card.
    - Well you wouldn't want to go get coffee with a robot, right?
      - But have you seen the movie Her? People can develop an emotional connection with their technology.
      - So maybe as time goes by, this becomes more accepted by norms.
    - Maybe there is going to be the idea of respect
      - It feels good knowing that a human has taken time out of their day.
    - Maybe teacher is the one who can lay down the law
      - Well, teacher controls grades for sure, but computer could do that.
      - Maybe dystopian future, computer tells a human (paid minimum wage) to beat disruptive students up.
    - Maybe there is the idea that it is bad to hurt another human which maybe would be absent with a hologram.
  - The answer that the teacher came up with is drama.
    - It doesn't change the idea that there is the drama of someone is suffering for your sins. Teacher is suffering for the students sin of ignorance.
      - That is the best that the teacher has come up with. That is the reason.
      - Technical part of the problem will just get better and better and better.
      - And if we were doing an 'online' or canned program it would be way better
  - Where else are we paying money for drama without realizing it? Teacher is proud of himself for thinking of this.
    - Teacher argues that farmers market is exactly this: farmer's markets are super expensive, and primarily what we are paying for is the good feeling that we are buying good food from the right people. It is primarily an aesthetic concern. To some extent it is already happening.
      - teacher has nothing against farmer's market. But the main people you see there are professionals, as they are the only ones who can afford that stuff. Normal people can't afford to buy things from there.
      - Its possible to say that in the future, "normal" people would only be able to afford the hologram, wouldn't be able to afford the drama.
  - What about the networking aspect of going to college.
    - Eh, but LinkedIn is doing the same thing. Or at least a similar enough thing.
      - Teacher thinks that in 20 years from now there will be a linked in for kids in elementary school.
  - One of the goals of a teacher is to INSPIRE however! That is one of the main goals!
    - a computer wouldn't feel the need to inspire humans to be like them, whereas we get inspired by watching/learning from our teachers.

Video is completely consistent with a fun future where we just sit around and not do anything.

- But this has already happened in history.
- There is the feeling that when new wealth is created, the distribution is not ideal.
- Are you confident that if all that stuff actually ends up working, all of us just get to play volleyball and frisbee and eat nice food.

  - But there would probably be more separation from class.
- But one thing that we can take comfort in, what would the people in the upper classes of society want?
  - Right now, we let half the planet die simply because they do not contribute to our economy.

Let's pick a significant problem.

- Infant mortality in US is only comparable to african nations.
- Everywhere else is way better than us.
- And if you look into demographics of infant mortality, it is an incredibly ugly racist picture.
  - This would easily go away if we had Universal health care. We don't want to open this up because it is a hot debate.
    * But we can agree that 95 percent of Americans don't all clamor for it.
    * There is push back for it.
    * But lots of other countries have it and it works reasonably well.
    * So where does the push back happen?
      · The American Medical Association with love Universal health care.
    * But 40 percent of Americans don't want universal health care. They think it is a bad idea. What drives that thought?
- Universal Health Care is about breaking the link between employment and health care.
  - Why do people want this link to be there?
    * Because they fear that if the link is broken, people will take advantage of the system.
      · Because who pays for it? Taxes. So the people paying it are not the recipient of the care.
      · And healthcare affects you directly and immediately, so it makes for a good incentive.
  - Health care is tightly linked to employment and it is hard to unlink.
    * so what hope do we have to unlink *everything* from your job.

The question, of course, is what do we do with all of the people who don't have jobs.

- There will always be some people working.
- And if only 2 percent are working, the other 98 percent will win, of course.
- But what if it is more of a 30 or 70 split.

Seems like the main message is, it used to be that machines were competing with our muscles.

- We lost that battle, but we were happy to lose.
- But now computers are competing with our brains, but our brains is what defines us. What happens if/when we lose that battle.

Today, Teacher is going to a nice conference in San Diego

- Recipies for different plates are coming from Watson. Computer is figuring out flavor combinations.
  - Suggested in actual recipes, but never happened in actual dishes. Computer synthesized for flavor.
  - Having new dishes created entirely by computer.
    * Let's hope the food tonight is bad.

So what are computers bad at?

- You make a new e mail account and you have to solve a captcha! Those things are jokes for us, but computers find them hard!
  - There are a ton of things that computers find super hard to do.
    * But in recent years, computers are creeping up on human activities that we felt completely out of reach for the foreseeable future.
      · For a long time humans wanted to fly. Took inspiration from birds. Today we know that our capacity to manipulate mass is nowhere good enough to move like birds. But we DO have flying machines that are remarkably UNbirdlike, but that in some ways are more impressive than birds.

- And what enables it is something that the vast majority of people wouldn't have paid attention to: fuel density. There exist configurations of mass, mainly jet fuel, whose density in energy makes it worth carrying. The only way we know how to fly is to disturb air. That's what turbines do. That's the one trick. To create a speed differential in air between above the wing and below the wing.
- The amount of lift you need is proportional to the amount of mass that you have to help carry.
- You can ask tons of smart people throughout history (daVinci, Newton) how to fly, none of them thought of fuel density.