Admin Notes
March 8, 2018

- Reminder: Project proposal resubmissions due Friday
- Reminder: Midterm next Tuesday (March 13)
  - Testable material will include anything assigned, discussed, or completed in lab, lecture, and for pre-readings
  - Sample midterms and exercises are released on the Exercises page
- Bring your student ID
- Seating chart will be released at 12PM on Monday March 12
Admin Notes
March 8, 2018

• Did you join an In the News group?
  • Canvas does the grade assignment for a whole group automatically once the group’s submission is marked

• If you and your team submitted something for In the News but you see a 0 as a grade in Canvas, this may be a mistake!
  • Email Daphne at blissroz@alumni.ubc.ca with your team number and the full names of your other team members by March 15th @ 5PM
    • Notifications received after that time may not be acknowledged and you may end up with a 0
Admin Notes
March 8, 2018

• Lab next week will be **mandatory**
• We want to make sure everyone is enjoying their project and happy
• Your project TA will meet with you and your team to discuss your project and current questions/progress you have made
• Be sure to let your TAs know as soon as you can if problems arise— the likelihood of us being able to help is much greater earlier than later!
Artificial Intelligence
Learning Goals

- CT Application: Students will be able to describe what AI is currently capable of.
- CT Application: Students will be able to describe the difference between Strong and Weak AI.
- CT Impact: Students will be able to describe the gulf that exists between state-of-the-art AI and AI in science fiction.
- CT Application: Students will be able to define machine learning, natural language processing, and information retrieval and give examples of each.
- CT Impact: Students will be able to evaluate a job and say whether or not a computer is likely to be able to do that job in the next 20 years.
- CT Impact: Students will be able to argue whether they believe that AI is a threat using arguments that show an understanding of CT building blocks.
Quick clicker question

Have you watched enough Star Trek: The Next Generation to have an opinion on whether the android Data is intelligent?

A. Yes
B. No
C. I have no idea what you’re talking about
When is a machine intelligent?

Commander Data from Star Trek: The Next Generation is an android from the Star Trek series. Is Commander Data intelligent?
https://www.youtube.com/watch?v=fTA5Y4UwwBk&t=1m56s

*Someone is trying to whistle 'Pop goes the Weasel'*
Group Exercise

Is Data intelligent? Discuss with your neighbours and write down three reasons why you think/don’t think Commander Data is intelligent. Use your common sense, not a strict definition.

- He knows what he doesn’t know
- He seems to have his own sets of beliefs/desires (he thinks he is superior but he still wants to be human)
- He doesn’t understand
  - The joke is bad
  - Type of intelligence required to understand the joke is different from knowing things
Clicker question

So, is Data intelligent?

A. Yes
B. No
Let's try a more structured approach

- In order to answer this question fully, we need to define **intelligence**
- There are two main different ideas of **Artificial Intelligence (AI)**
  - **Weak AI** – is epitomized by Turing’s approach – the computer just has to **APPEAR** intelligent
  - **Strong AI** – is epitomized by the Chinese Room (Section 6 of the reading) – the computer has to be able to **THINK**
Alan Turing (1912-1954)
AI founder and Code Breaker

In addition to the Turing Test, we saw him when we discussed how Turing led the British to break German war codes as covered in “The Imitation Game”
The Turing Test: a great example of weak AI

- Weak AI doesn't care whether a machine is intelligent or not; it cares whether a machine acts like it's intelligent.
- "I propose to consider the question, "Can machines think?" The problem can be described in terms of the ‘imitation game’.
- "I believe that in about fifty years' time it will be possible to programme computers to make them play the imitation game so well that an average interrogator will not have more than 70 percent chance of making the right identification after five minutes of questioning." – Alan Turing, 1950.
Alan Turing (1912-1954)  
But wait! There’s more!

- He’s also considered the father of theoretical Computer Science for his work done before WWII
- He showed that it’s impossible to prove if an arbitrary algorithm will ever stop

This used a “universal (Turing) machine”

[Link to Wikipedia article on Alan Turing](http://en.wikipedia.org/wiki/Alan_Turing)
Alan Turing (1912-1954)

- Committed suicide at age 41 after being prosecuted for homosexuality (pardoned by Queen Elizabeth II in 2013)
- The equivalent of the Nobel Prize for computer scientists is called the Turing Award

http://en.wikipedia.org/wiki/Alan_Turing
Group exercise

Which of the three main accomplishments of Alan Turing’s: Turing Machine (halting of algorithms), code breaking, and Turing Test (AI) do you think is the most impressive of his accomplishments and why?

- Code breaking- most mental effort and the Germans were changing the code every day so it would have been a real grind
- Turing machine and Turing test could have been thought of in a flash of brilliance (maybe thought of by others later on?)
Clicker Question

Which of Turing’s accomplishments was the most impressive?

A. Turing Machine (halting of algorithms)
B. Code Breaking
C. Turing Test (AI)
The Turing Test: a great example of weak AI

- Weak AI doesn't care whether a machine *is* intelligent or not; it cares whether a machine *acts* like it's intelligent.
- "I propose to consider the question, "Can machines think?" The problem can be described in terms of the ‘imitation game’.
- "I believe that in about fifty years' time it will be possible to programme computers to make them play the imitation game so well that an average interrogator will not have more than 70 percent chance of making the right identification after five minutes of questioning." – Alan Turing, 1950.
CAPTCHAs

- You know those annoying pictures that you have to use to enter some websites?
- CAPTCHA stands for Completely Automated Public Turing test to tell Computers and Humans Apart
- Increasingly computers are able to solve them: [http://www.wired.co.uk/article/captcha-automation-broken-history-fix](http://www.wired.co.uk/article/captcha-automation-broken-history-fix)
In lab, you'll start by using Eliza from 1966 – basically the first chatbot.

```
ELIZA > (PLEASE TYPE IN ALL CAPS) WHAT'S YOUR NAME DEAR?
AMIT
ELIZA > HI, I'M ELIZA. WHAT DO YOU WANT TO TALK ABOUT?
AMIT > CAN I TALK ABOUT MY PROBLEM?
ELIZA > SURE...
AMIT > DUE TO ONGOING EXAMS IN COLLEGE, I HAVE A LOT OF STRESS.
ELIZA > PLEASE RELAX A LITTLE. SLEEP WELL.
AMIT > THANKS FOR YOUR ADVICE.
ELIZA > NO MENTION.
AMIT > BYE
ELIZA > BYE AND KEEP IN TOUCH...
```
Since then, things have gotten closer to passing the TT, but not THAT close.

"Cleverbot was voted to be human 59.3% of the time. Real humans did only slightly better and were assumed to be humans 63.3% of the time. That being the case, Cleverbot’s success in conning people into thinking it was human is greater than chance, and therefore, one could argue that it has technically passed the Turing test."

- September 2011

You’ll get to play with Cleverbot in lab, too

http://www.geekosystem.com/cleverbot-passes-turing-test/
User: Should I show you to my class?

Cleverbot: If you think you need to.

User: Would my students learn anything from it?

Cleverbot: Sure!

User: What do you think they'd like best?

Cleverbot: About what?

User: About my showing you to them.

Cleverbot: What is the problem anyway?

User: Well, I'm already showing them Eliza; I thought they might like to see something a bit more sophisticated.

Cleverbot: I might or I might not.
Even when programs say things, it’s not clear they “understand” it and really “believe” it.

In March 2016, Microsoft put a bot on Twitter. They pulled it less than 24 hours later after it started making tweets so racist that I’m not comfortable showing them in class.

Did it understand what it was saying?

A. Yes
B. No
What does it mean to understand?
E.g., how do you know when you understand something?

- Explain something in your own words
Get back into the same group and consider your reasons for why Data is or is not intelligent. Would Turing/weak AI consider your reasons to be signs of intelligence? Why or why not?
Clicker question

Would Turing/weak AI consider your reasons to be signs of intelligence? Why or why not?

A. Yes
B. No
Strong AI and the Chinese room argument

If you see this shape, "什麼" followed by this shape, "帶來" followed by this shape, "快樂"

then produce this shape, "為天" followed by this shape, "下式".
Strong AI argues that an intelligent machine must think and understand

"... Partisans of strong AI claim [...]  
1) that the machine literally understand the story and provide the answers to questions, and  
2) that what the machine does explains the human ability to understand the story...

Get back into the same group and consider your reasons why Data is or is not intelligent. Would Strong AI consider your reasons to be signs of intelligence? Why or why not?
Clicker question

Would Strong AI consider your reasons to be signs of intelligence?

A. Yes
B. No
Later, Data and a Klingon officer, Worf, have a heart to heart:
Group exercise (same group)

Based on yet more data, would Turing/Weak AI consider Data to be intelligent? What about Strong AI? Why or why not?
Clicker exercise

Based on more data, would Turing/Weak AI consider Data to be intelligent? What about Strong AI?

A. Turing/Weak AI: Yes  Strong AI: Yes
B. Turing/Weak AI: Yes  Strong AI: No
C. Turing/Weak AI: No   Strong AI: Yes
D. Turing/Weak AI: No   Strong AI: No
That’s Science Fiction. How close to that are we today?

In a group, discuss what of Data’s capabilities you believe we are able to get computers/robots to do today.

• Soccer robots
• Roombas
• Siri
• Alexa
Meet Watson: Going from Sci-Fi to reality!

https://www.youtube.com/watch?v=P0Obm0DBvwI&t=1m21s
Group Exercise

How complex was the language that Watson had to “understand” and produce? Compared to Data, what did Watson NOT have to do?

- Watson had more scripted input
- Didn’t have to do speech recognition
Let’s take a look at how Watson “learned”
We’ll look at some aspects of this in more detail later
While Watson won, it did make an embarrassing mistake. It clearly didn’t fully understand.
Is Watson intelligent by Strong AI criteria?  
Clicker question

A. Yes
B. No

Reminder: Strong AI – is epitomized by the Chinese Room (Section 6 of the reading) – the computer has to be able to THINK
Is Watson intelligent by Turing/weak AI criteria? Clicker question

A. Yes
B. No

Reminder: Weak AI is epitomized by Turing’s approach – the computer just has to APPEAR intelligent – fool a person for 5 minutes that it’s human