COMPUTER SCIENCE UNIT I WEEK 2, TUESDAY MAY 1ST + THURSDAY MAY 3RD

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THIS WEEK IN CS AND STEM

• Keeping pig brains alive – but not conscious

• <u>https://futurism.com/pig-brains-alive-outside-body/</u>

• An unwanted "import"

<u>https://futurism.com/e-waste-europe-illegal-electronics-nigeria/</u>

UPCOMING PUBLIC LECTURES

- AstroTours, Thursday Mat 3rd 8pm (http://www.astro.utoronto.ca/astrotours/)
- Climate, Energy, and Policy, ROM SPEAKS Tuesday May 8th 7pm (<u>https://www.rom.on.ca/en/whats-on/climate-energy-and-policy</u>)

FINAL PROJECTS

- 3 different project descriptions, you need to:
 - Complete the coding, using all of the skills we've learned
 - Write user documentation
 - Write a report
 - Give a 10 minute presentation showcasing your work (last day of classes, June 5th)
- Due dates:
 - Pick your project (1 of the 3 given): April 3rd tell me in person or in email!
 - Update your github account regularly as you add sources, make changes, and code.
 - Submit Report, code, supporting documents: June 4th at midnight
 - Give presentation: June 5th in class

STUDENT-LED LESSONS

- The last 2-3 classes will be based on what YOU want to learn about relating to Computer Science.
- Aim for $1/3 \frac{1}{2}$ class per student, maximum of 2 topics per student.
- Send your topics to me by May 15th. Looking at May 24, 29 for topic discussions.

MACHINE LEARNING

- We've heard a few phrases that seem to mean the same thing, namely machine learning, deep learning, and artificial intelligence. Are these different things? What makes them different?
- What are these things useful for? Are they becoming more or less relevant?

BRIEF HISTORY OF AI

- 1920: R.U.R
- 1950: Turing Test
- 1956: Dartmouth Conference
- 1960-1974: Al winter
- 1981: SID and expert systems
- 1985-1995: Al winter
- 1997: Deep Blue

TYPES OF MACHINE LEARNING

- Supervised
- Unsupervised
- Semi-supervised
- Reinforced learning

MACHINE LEARNING



input and output data

CLASSIFICATION

REGRESSION

SUPERVISED MACHINE LEARNING TECHINQUES

 Classification: support vector machine (SVM), boosted and bagged decision trees, k-nearest neighbour, naive bayes, discriminant analysis, logistic regression, neural networks.

 Regression: linear model, nonlinear model, regularization, stepwise regression, boosted and bagged decision trees, neural networks, adaptive neuro-fuzzy learning.

UNSUPERVISED MACHINE LEARNING TECHNIQUES

 Clustering: k-means and k-mediods, hierarchical clustering, Gaussian misture models, hidden Markov models, self-organizing maps, fuzzy c-means clustering, subtractive clustering

REFERENCES

- https://www.digitalocean.com/community/tutorials/an-introduction-to-machine-learning
- <u>https://www.datacamp.com/tracks/machine-learning-with-python</u>
- <u>http://www.expertsystem.com/machine-learning-definition/</u>
- <u>https://www.investopedia.com/terms/d/deep-learning.asp</u>
- https://www.sas.com/en_ca/insights/big-data/what-is-big-data.html
- <u>https://www.forbes.com/sites/bernardmarr/2018/02/14/the-key-definitions-of-artificial-intelligence-ai-that-explain-its-importance/#10b66c2b4f5d</u>
- <u>https://aitopics.org/misc/brief-history</u>
- <u>https://towardsdatascience.com/ai-writes-the-history-of-artificial-intelligence-</u> <u>4d585b537498</u> - this is a little weird, click to find out why!
- <u>https://medium.com/bloombench/history-of-machine-learning-7c9dc67857a5</u>
- <u>https://towardsdatascience.com/supervised-vs-unsupervised-learning-14f68e32ea8d</u>
- https://www.mathworks.com/discovery/machine-learning.html
- https://www.toptal.com/machine-learning/machine-learning-theory-an-introductory-primer