

# Machine Learning:

## *Bridge from Education to Career*

Michael Soltys

March 3, 2022 @ AWS MLU



# University of Toronto



Geoffrey Hinton was pioneering deep learning (1990-2015)



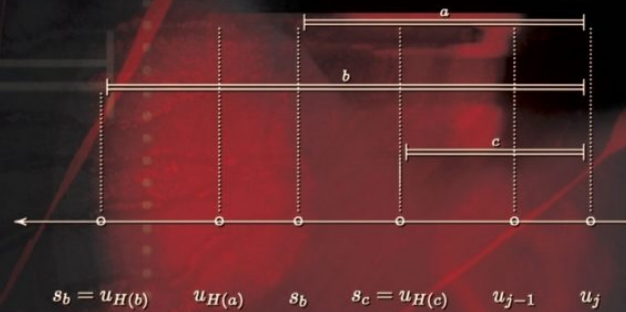


# Stephen Cook



# An Introduction to the Analysis of Algorithms

3rd Edition



Michael Soltys

 World Scientific



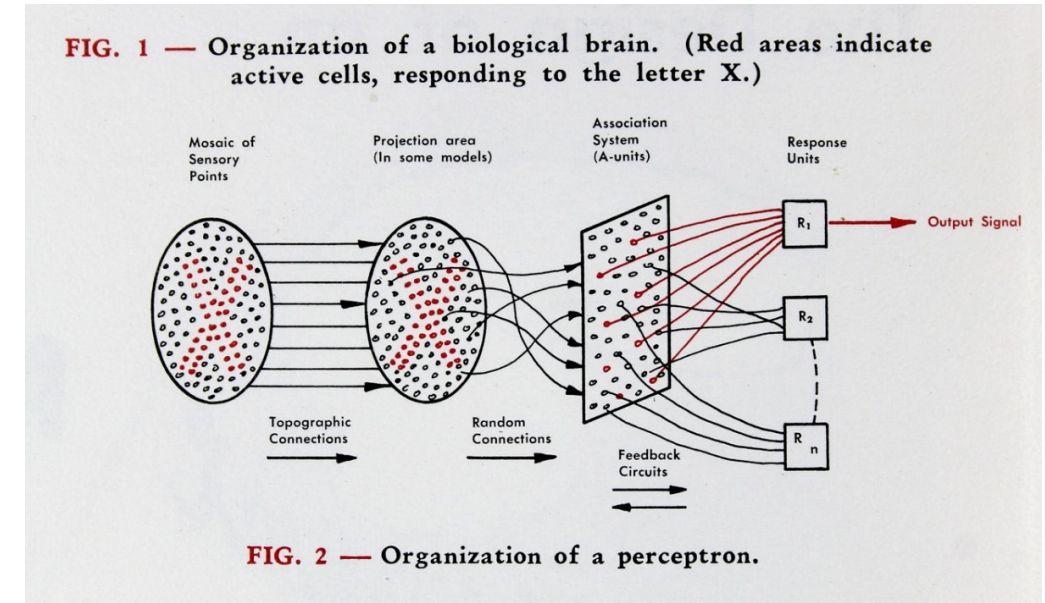
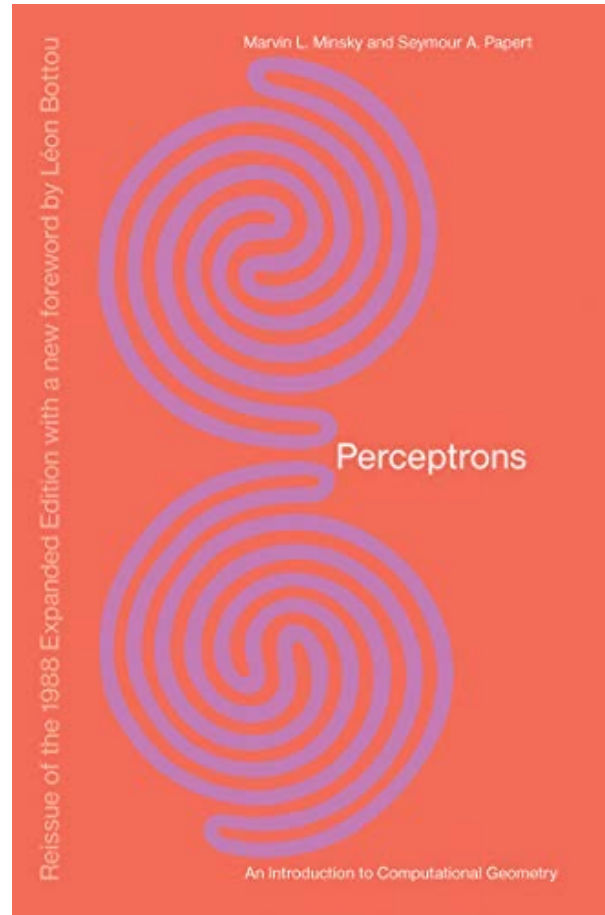
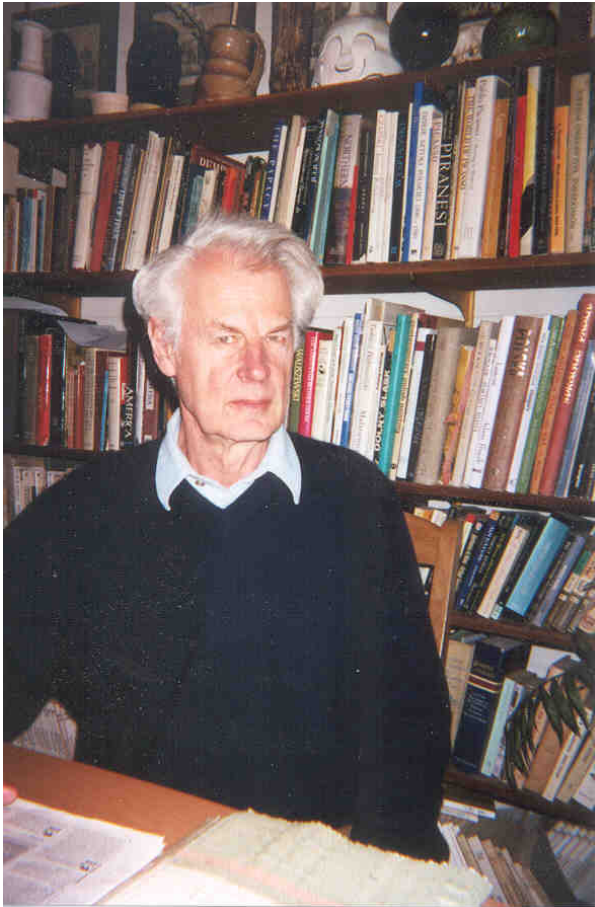
# McMaster University



Copy and paste is a design error.  
-David Parnas



# Jan Mycielski



***Perceptrons: an intro to computational geometry***  
by Marvin Minsky and Seymour Papert, 1969.  
An edition with handwritten corrections  
released in the early 1970s.



# California State Univ, Channel Islands campus



*7K students*  
*60% Hispanic, 65% first generation*



*In Santa Monica Mountains*  
*Close to the beach*



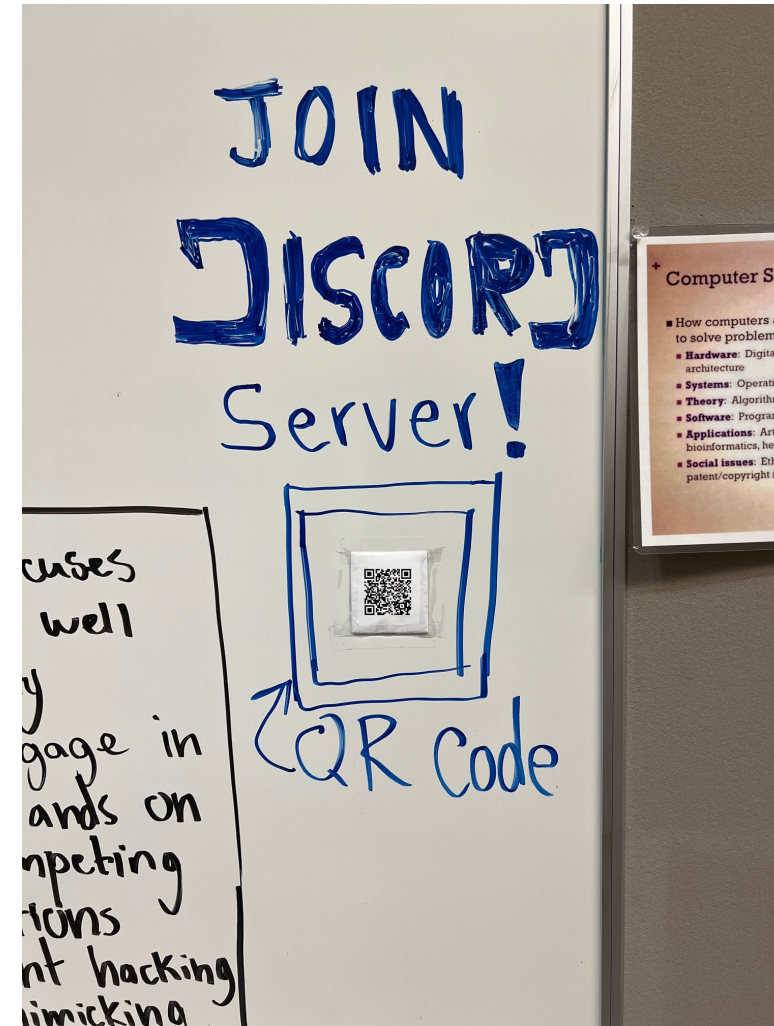
# GBL Systems Corporation



# Who are our students?

- Working jobs, with family obligations
- Family takes the burden of education, expects ROI
- 1<sup>st</sup> generation to go to college
- "Participation" has a different meaning (e.g., Discord)
- Learn through activity
- Cannot assume any background
- Material judged as "useful" or not
- Lonely

(see <https://www.quantamagazine.org/how-loneliness-resapes-the-brain-20230228>)





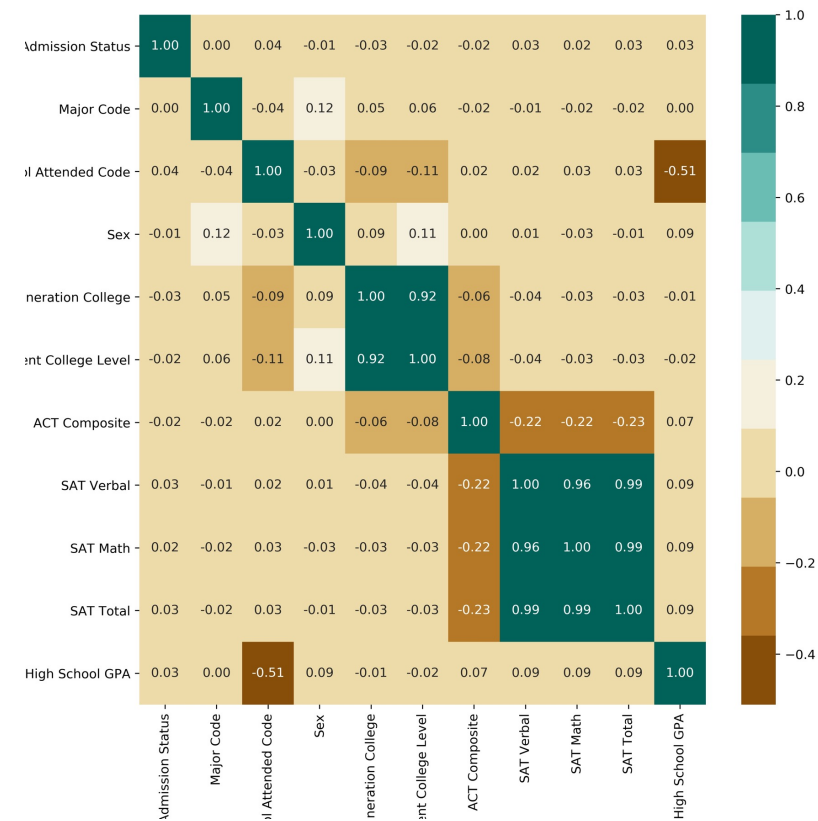
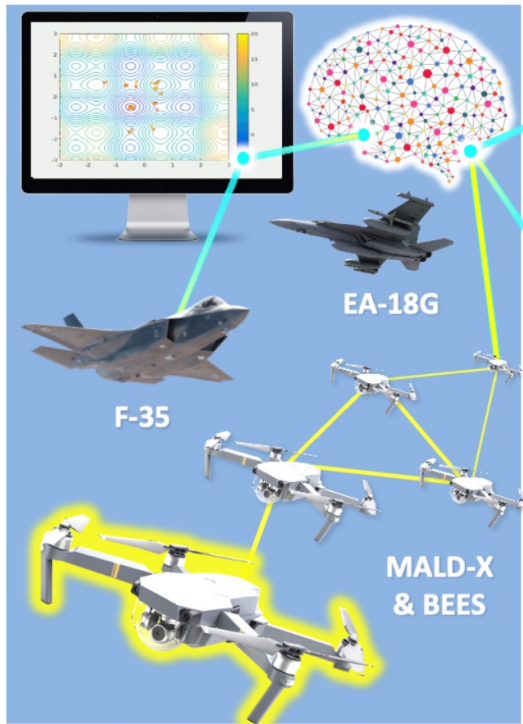
# So how do we teach ML to our students?

- To motivate:
  - Use notoriety of the field (e.g., ChatGPT)
  - Career opportunities: 40% market growth, 40% job automated by 2030s, LinkedIn listing .5M jobs worldwide in ML, etc.
- Visualizations: <https://t.co/bXJNGUHkdw>
- Start the process early because many threads are woven into ML:
  - Python (freshmen)
  - Jupyter Notebooks (sophomore) [prototype not deployment]
  - Algebra and Calculus (freshmen and sophomore)
- Emphasize ***doing ML*** and ***not understanding theory of ML***

# Example of work



AI/Machine Learning Technologies |



<https://github.com/michaelsoltys/sagemaker-enrollment>



# Important but not intellectually “elegant”

- CI/CD aspect of ML
  - In industry Git is one of the most important tools
  - Understanding the mathematical foundations is probably the least important
- Documentation has to be superb, and it seldom is
- It doesn't work for a long time ... , until it finally works a little bit
- Interpretation of data – what does 0.3 likelihood of coming to CI mean?
- Communications of methodology and findings – super important! Listen to customer, do not push your fav technology; what is business need?
- Politics of data:
  - No one wants to share their data, even within the same organization; negotiating for data and terms of usage (e.g., access) takes 50% of time of entire effort
  - Hard to reach agreement on “goodness” of data
  - Even harder to reach agreement on “conclusion” and how to craft policy based on the data

**AI  
SUPER-  
POWERS**

**CHINA,  
SILICON VALLEY,**

**AND THE**

**NEW WORLD ORDER**

**KAI-FU LEE**



# Weakness of organized knowledge: stovepipes

