SENIOR RESEARCH: SOME FINAL THOUGHTS

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How to read a research article

- What is the research problem, motivation, significance?

- What are the main findings?

- How do the authors try to convince you that these findings are valid? Experiments? Observational studies? Proofs?

- How does this work fit in the broader discipline?

- How can the work be followed up on?

- What are limitations of the work?

Writing a research paper, proposal, etc.

- Write with specificity and clarity
  - Background
  - Significance
  - Objective (may be explicitly stated)
  - Results
  - Discussion
  - Etc
- Follow instructions and do not make any spelling or grammatical mistakes!

What did you guys learn?

- User Experience and Computers / Human Behavior
  - *Association Between College Students' Social Media Usage and Their Fatigue*
  - *Smartphone Interfaces: Overlooked*
  - *Surveying how Users Interact and have Experiences with the Zoom Application*
  - *UX/UI Design Study of Blackboard's Mobile Application*

What did you guys learn?

- Networking and Cybersecurity
  - *Testing the Effectiveness Between Two Signature Based IPS Software Against SQL Injection*
  - *Attempting to crack the 20 most common passwords*
  - *Comparing Residential Hall Internet Connection Speeds at Eastern Connecticut State University*
- Computer simulation and software engineering
  - *Creating a Traffic Simulation Using Repast Simphony*
  - *Comparison Analysis of Ruby on Rails and Python with Django Web Frameworks regarding Performance Metrics*
  - *Stress Test of CPU Scheduling Algorithms*

What did you guys learn?

- Artificial Intelligence and Data Mining
  - *Twitter Data Analysis: Technique to Measure and Compare Large IT Companies Apple and Google's Successful Marketing Strategies*
  - *A Comparative Study of Effectiveness Between Classical Classification Machine Learning Algorithms and Neural Networks*
  - *Comparison between Amazon Rekognition and Google Cloud Vision*
  - *Tic-Tac-Toe Minimax AI Depth Efficiency*
  - *Comparison of Common Pathfinding Algorithms using a Maze Solving Robot*
  - *Picklr – A Job Scraping tool for Data Analytics of Programming Related Jobs*
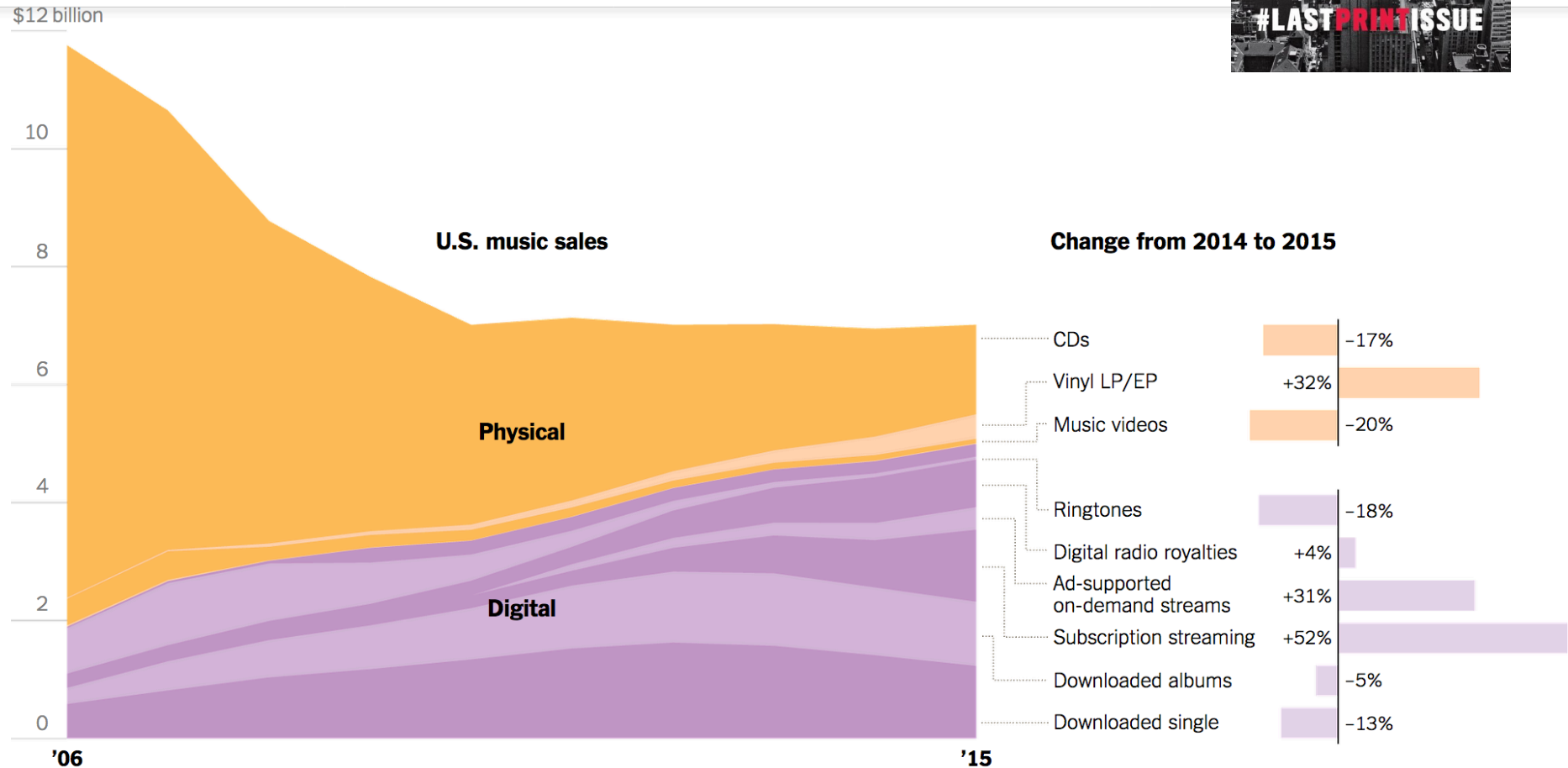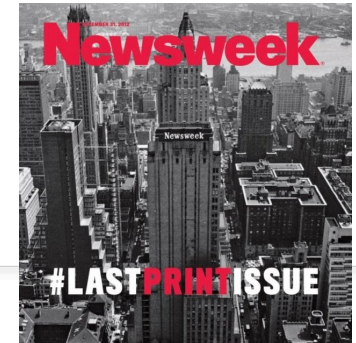
CS and the Future: Random Thoughts

- How will facial recognition technology and self-driving cars impact our society?
  - http://www.npr.org/sections/alltechconsidered/2013/07/21/203273764/high-end-stores-use-facial-recognition-tools-to-spot-vips
  - http://www.citylab.com/tech/2012/03/what-intersections-would-look-world-driverless-cars/1377/
  - Video: https://www.youtube.com/watch?v=4pbAI40dK0A

- Deep fakes and the future of fake news?
  - https://www.youtube.com/watch?v=AmUC4m6w1wo
  - https://www.businessinsider.com/dangerous-deepfake-technology-spreading-cannot-be-stopped-2019-7

CS and the Future: Random Thoughts

- What digital privacy rights do we have?
  - Do we have the "right to be forgotten?"
    - http://www.theguardian.com/technology/2015/feb/19/google-acknowledges-some-people-want-right-to-be-forgotten
    - https://www.theguardian.com/world/2019/nov/28/german-court-backs-murderers-right-to-be-forgotten-online

- Supreme Court cases:
  - Cell phone searches require a warrant (Riley vs. California)
    - http://www.cnn.com/2014/06/25/justice/supreme-court-cell-phones/
  - GPS tracking requires a warrant (U.S. vs. Jones)
    - http://www.washingtonpost.com/politics/supreme-court-warrants-needed-in-gps-tracking/2012/01/23/gIQAx7qGLQ_story.html
  - A warrant is needed to access cell phone location information (Carpenter v. U.S.)
    - https://www.newyorker.com/news/daily-comment/in-carpenter-the-supreme-court-rules-narrowly-for-privacy

Information wants to be free

The end of code?

In traditional programming, an engineer writes explicit, step-by-step instructions for the computer to follow.

With machine learning, programmers don't encode computers with instructions. They *train* them.

If you want to teach a neural network to recognize a cat, for instance, you don't tell it to look for whiskers, ears, fur, and eyes. You simply show it thousands and thousands of photos of cats, and eventually it works things out.

If it keeps misclassifying foxes as cats, you don't rewrite the code. You just keep coaching it.

Above excerpt from: https://www.wired.com/2016/05/the-end-of-code/

The end of programmers?

- GPT-3 is a neural network language trained on Common Crawl (over 3.25 billion web pages), and all of English language Wikipedia. The model has 175 billion parameters
  - https://arxiv.org/abs/2005.14165
- It has many applications, including Q&A, language translation, and code generation
  - https://openai.com/blog/gpt-3-apps/
- SQL generation
  - https://blog.seekwell.io/gpt3
- HTML/CSS generation
  - https://twitter.com/sharifshameem/status/1282676454690451457?s=20