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 specifically stated)
  - Results
  - Discussion
  - Etc
- Follow instructions and do not make any spelling or grammatical mistakes!

What did you guys learn?

- Predictive modeling
  - *Predicting the future trend of penny stocks*
  - *Mining data: modeling box office revenue predictions*
  - *Twitter sentiment as a predictor/indicator of the S&P 500*
  - *Analyzing Google search results for indication of ideological bias*
  - *Predicting the flight price from JFK (NY) to PVG (SHA) on Christmas*

What did you guys learn (continued)?

- Gamification
  - *Development of a text-based Android app to teach print statements in Java*
  - *Game theory applied to education*
  - *Teaching introductory programming concepts using gamification*

- Web development / human computer-interaction
  - *Developing websites for accessibility*

What did you guys learn (continued)?

- Bioinformatics and health applications
  - *Development of a citation analysis tool*
  - *A painkiller risk assessment tool*
  - *DNA translation tool*

- Computer security
  - *Stealth port scanning and detection methods*
  - *MD5 vs. Bcrypt*

CS and the Future: Random Thoughts

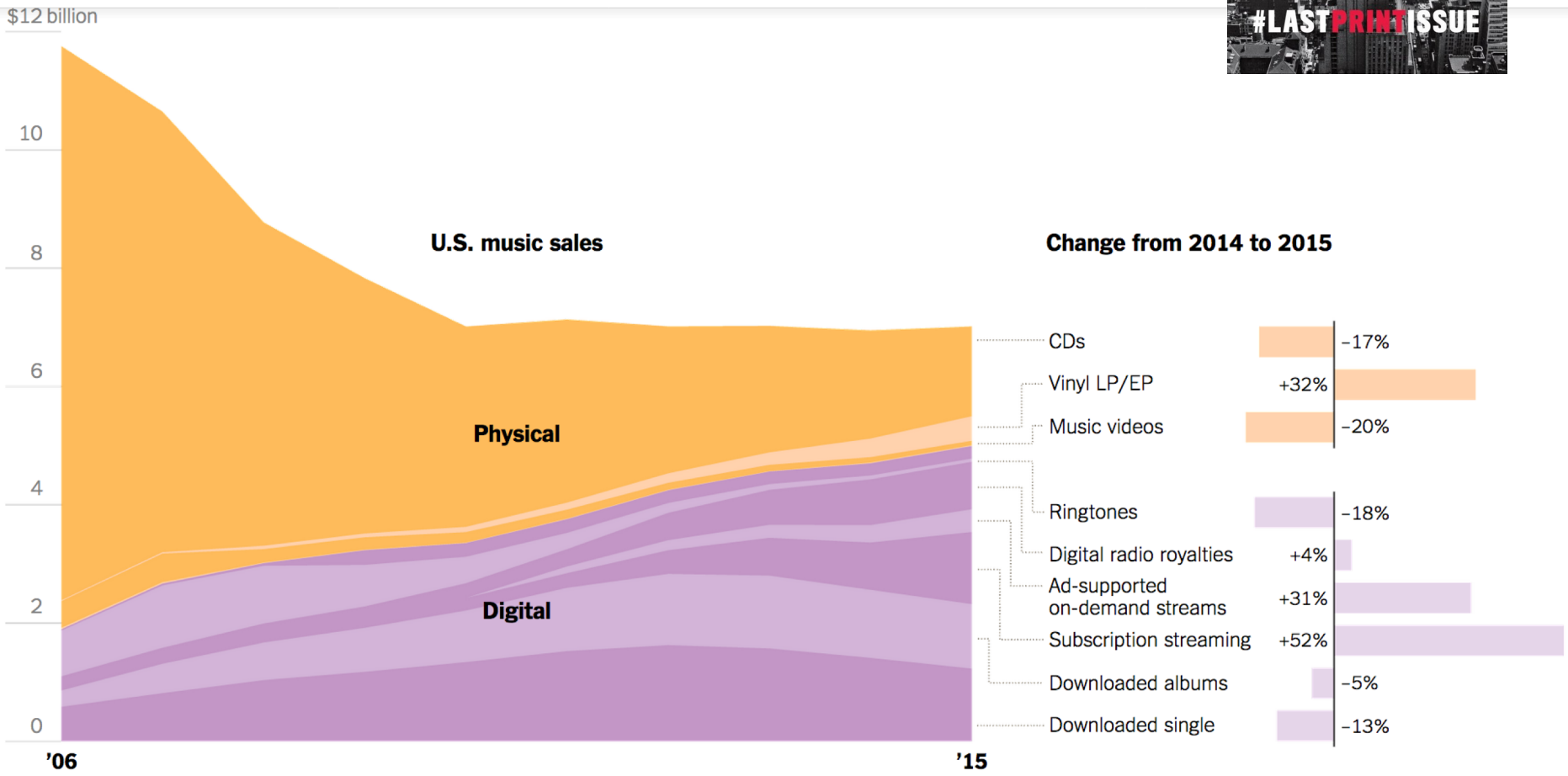
- How will facial recognition technology and self-driving cars impact our society?
  - http://www.npr.org/sections/alltechconsidered/2013/07/21/203273764/high-end-stores-use-facial-recognition-tools-to-spot-vips
  - http://www.citylab.com/tech/2012/03/what-intersections-would-look-world-driverless-cars/1377/
- The future of fake news?
  - http://futureoffakenews.com/videos.html

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

- 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.lawfareblog.com/summary-supreme-court-rules-carpenter-v-united-states

Information wants to be free



Source: https://www.nytimes.com/2016/03/25/business/media/music-sales-remain-steady-but-lucrative-cd-sales-decline.html

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/