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?

- Database Analyses
  - *Comparison of relational versus non-relational databases for speed and ease of use*
  - *SQL injection tools: jSQL vs. sqlamp*

- Machine Learning and Data analysis
  - *Predictive Activeness of Github Projects*
  - *Testing the effects of number of nodes and layers in an image tagging neural network using Tensorflow*
  - *Are tweets more commonly sent from iPhone or Android users*?

What did you guys learn (continued)?

- Computer Graphics
  - *Comparing OpenGL cross-platform performance*
- Bioinformatics
  - *Development of a tool to map transposable elements in the model organism* Medicago truncatula

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/

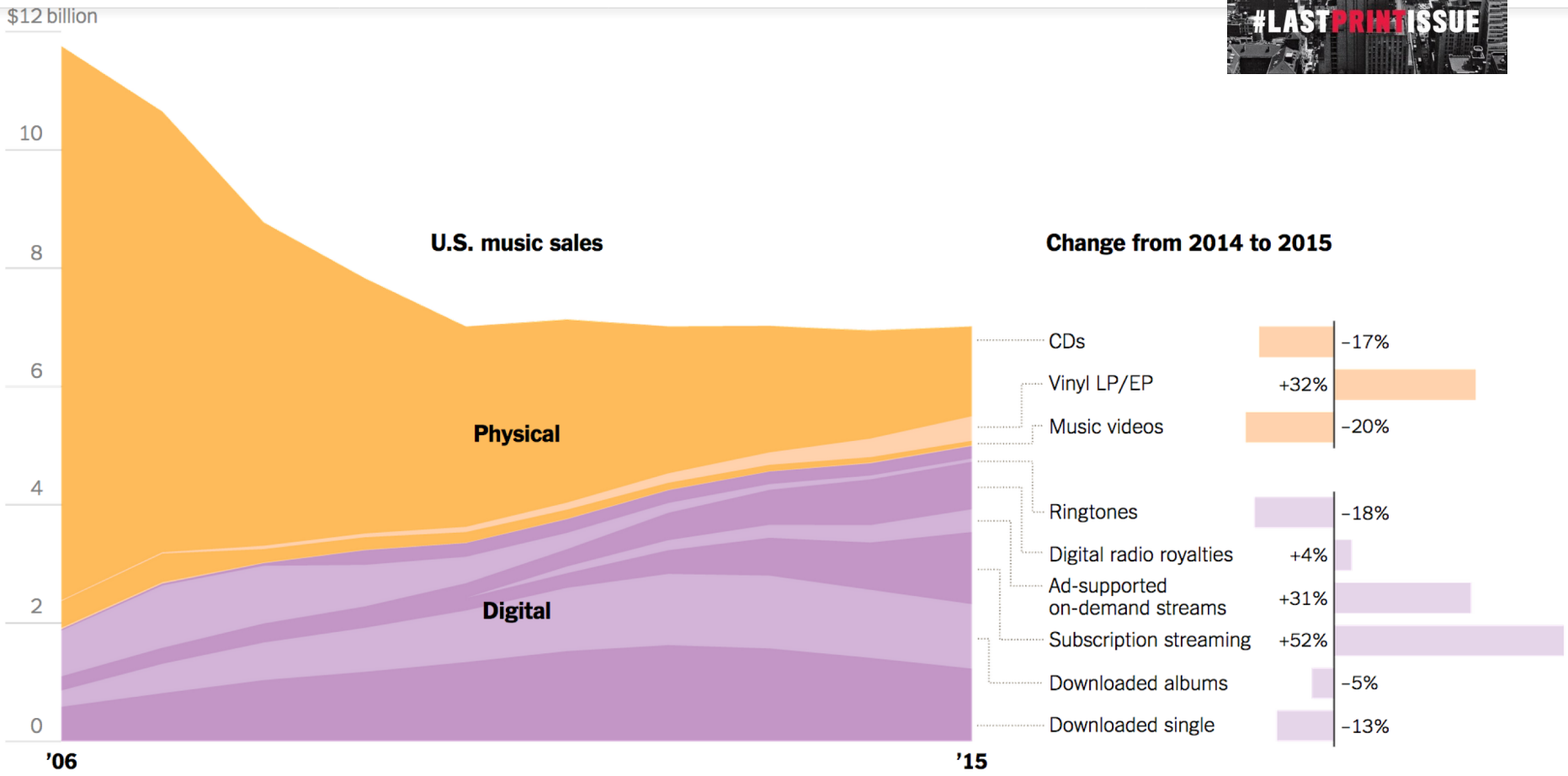
- The future of fake news?
  - http://futureoffakenews.com/videos.html

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
  - Does the government need a warrant to access cell phone location information (Carpenter v. U.S.) (will be decided this term)
    - https://www.npr.org/2017/11/29/567348000/justices-may-impose-new-limits-on-government-access-to-cellphone-data

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/