

# 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?

- **Twitter analysis**

- *Using Twitter Analytics to Predict Stock Prices*
- *Data Mining NASA's Twitter*
- *Using Bots To Influence Hashtags on Twitter*

- **Bioinformatics and Machine Learning**

- *Text Classification to Identify Diseases in Biomedical Literature*
- *Genomic Analysis of Cancer Cells using R*
- *Using Machine Learning Algorithms to Determine the Optimal Approach for Classifying Cars with Weka*

# What did you guys learn (continued)?

- Education

- *The Effect of Different Adaptive Learning Techniques on Students' Engagement*
- *Bitcoin: An Educational – Analytical Approach*
- *Music Practice Aid Software*

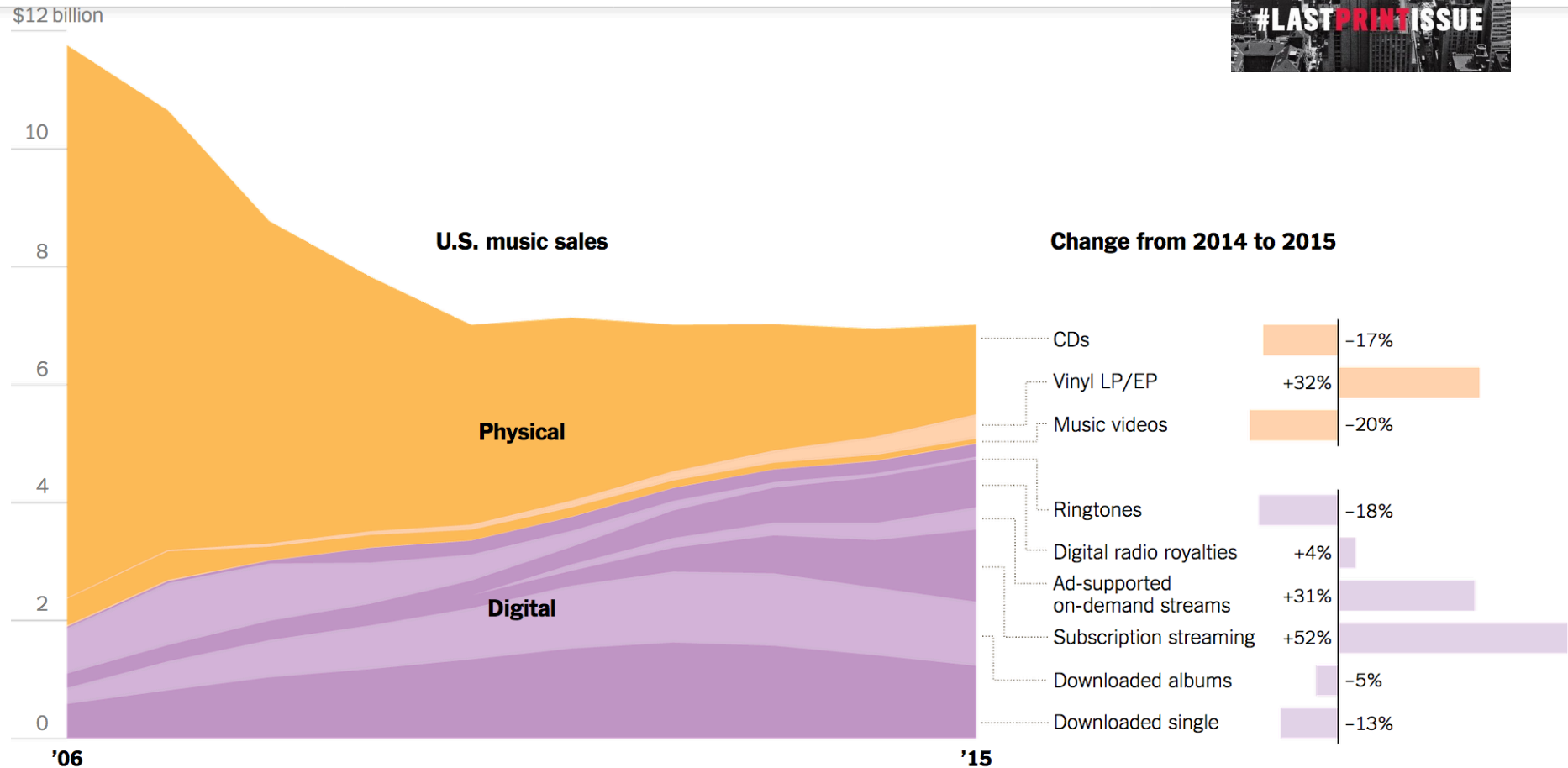
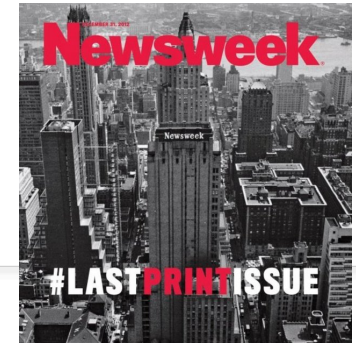
# CS and the Future: Random Thoughts

- 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=4pbAl40dK0A>
- Deep fakes and the future of fake news?
  - <http://futureoffakenews.com/videos.html>
  - <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](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.