SENIOR RESEARCH: SOME FINAL THOUGHTS

Dr. Garrett Dancik

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 (can specifically state)
  - Results
  - Discussion
  - Etc
- Follow instructions and do not make any spelling or grammatical mistakes!
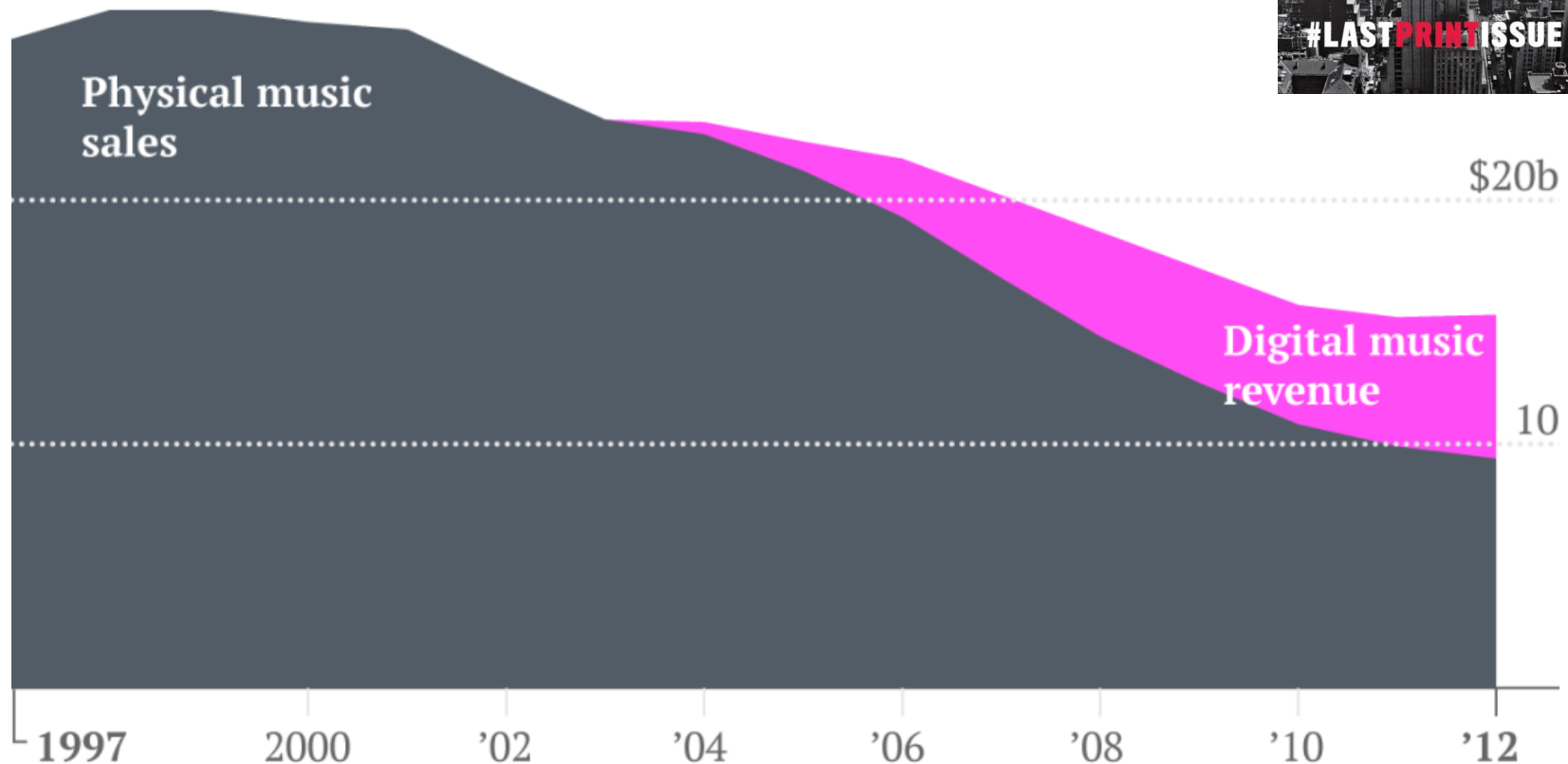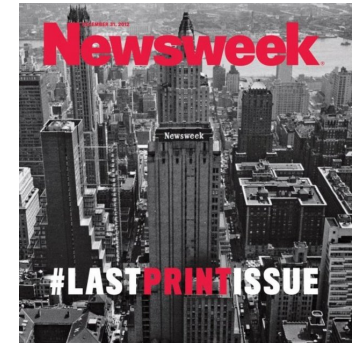
What did you guys learn?

- Gamification
  - Gamifying the sport of HEMA
  - Gamification in education
  - Learning programming concepts through gaming

- Data analysis
  - Observing computer science industry demand
  - Data scaling with SciKit Learn
  - Identifying the public college with the best value
  - Predicting baseball salaries from statistics
  - Predicting price change in the Warcraft Auction House

- Methodological and hardware comparisons
  - Comparing Types of Sensors in Unmanned Aircraft to Improve Sense and Avoid Systems
  - Comparing SQL and MongoDB
  - Comparing Ternary vs. Binary Addition
  - SHA-1 SHA-256, and MD5 hashing algorithms
  - Comparing QWERTY and DVORAK keyboard layouts

- Surveys
  - Facebook privacy and you
  - Understanding C++, Java, and Python
  - Programming language preference

- Software development
  - jcom: A JavaScript Object Shell

CS and the Future: Random Thoughts

- How will facial recognition technology and self-driving cars impact our society?
  - http://www.citylab.com/tech/2012/03/what-intersections-would-look-world-driverless-cars/1377/

- The digital privacy debate has begun…What 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

- Recent 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

Information wants to be free

Physical music sales

Digital music revenue

$20b

10

1997 2000 '02 '04 '06 '08 '10 '12

Note: Digital music revenue incldues downloads, subscription services, and advertisting revenue from free media-hosting sites such as YouTube. Revenue from concerts not included. All values in 2012 US dollars.

Ritchie King | Quartz

Data: International Federation of the Phonographic Industry

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