

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?

- Learning and morality for autonomous vehicles
 - *Morality simulation for self-driving cars*
 - *Detecting police lights using computer vision and machine learning*
 - *Analyzing the accuracy and reliability of object detection*
- Human-computer interaction and student behavior
 - *Password practices among CS Seniors at ECSU*
 - *HCI improvement using NLP*
 - *Finding the perfect password composition against hacking*
- Education
 - *The Curse of Helia: Educating with Video Games*

What did you guys learn?

- Computer graphics
 - *A comparison of two procedural terrain generation methods*
 - *Comparison of Blender and OctaneRender for 3D imaging*
- Machine learning, AI, and data analysis
 - *Sentiment analysis of twitter data comparing NYC and LA*
 - *Exploring patent data collection tools for automated decision-making*
 - *AI and the effect on future society*
- Bioinformatics and computational biology
 - *Development of herd immunity simulation using agent modelling*
 - *A comparative analysis of viral genome sequencing algorithms*

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?
 - <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
 - 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>

Computer science vs. Coronavirus

- Social distancing scoreboard
 - <https://www.unacast.com/covid19/social-distancing-scoreboard>
- China's smartphone healthcard:
 - <https://time.com/5814724/china-health-code-smartphones-coronavirus/>
- Bluetooth contact tracing:
 - <https://www.nbcnews.com/tech/tech-news/how-contact-tracing-could-use-bluetooth-track-coronavirus-your-smartphone-n1187796>



How contact tracing could use Bluetooth to track coronavirus on your smartphone

When Bluetooth is turned on, your phone uses radio waves to figure out which other devices are nearby. This could be used to create an anonymous notification network.

PRO CYBER NEWS

Coronavirus Tracking Apps Raise Questions About Bluetooth Security

Hackers might seek to exploit devices if more people have Bluetooth permanently switched on; accuracy of Bluetooth location-tracking is limited

Several European governments plan to introduce contact-tracing apps that use Bluetooth. Pictured, a delivery man...

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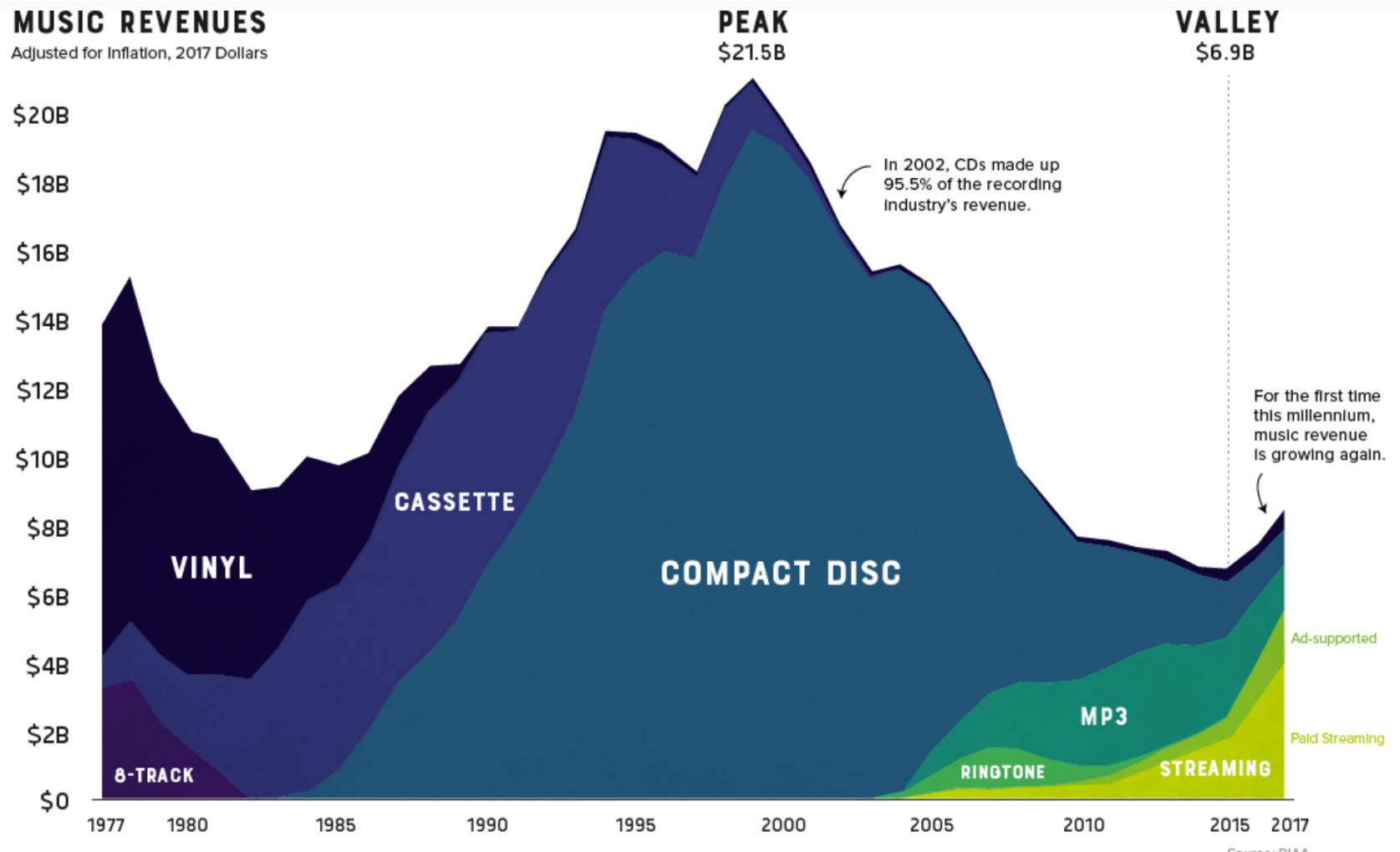
WATCH NOW

<https://www.wsj.com/articles/coronavirus-tracking-apps-raise-questions-about-bluetooth-security-11588239000>

Information wants to be free

MUSIC REVENUES

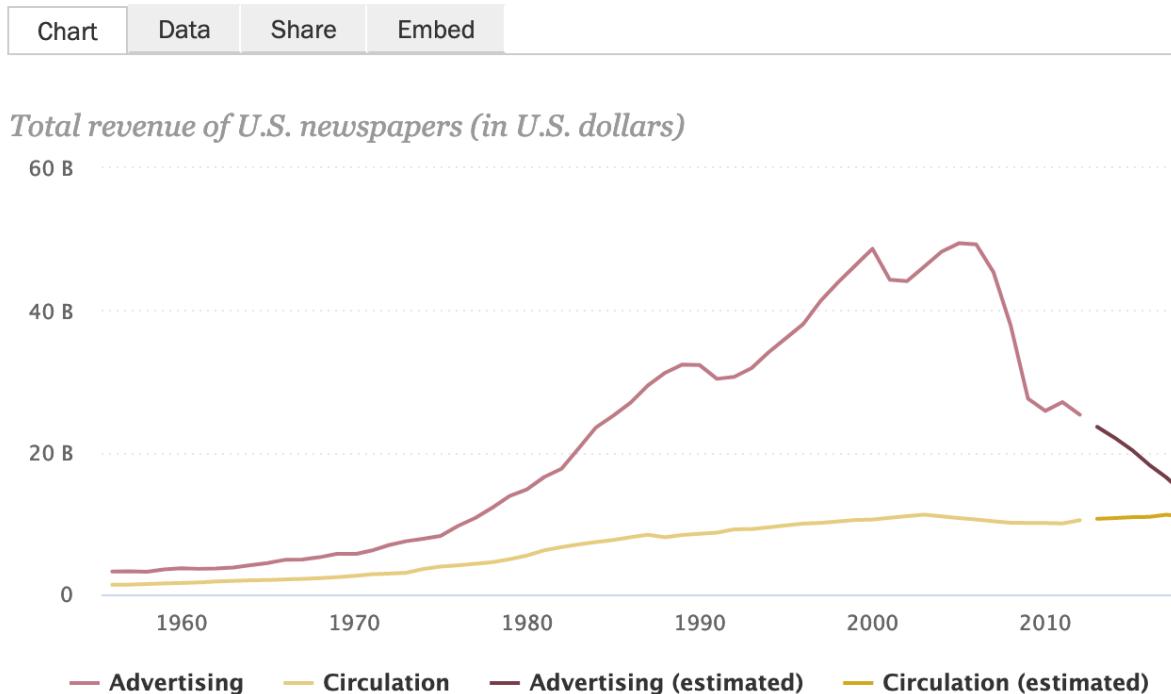
Adjusted for Inflation, 2017 Dollars



Source: <https://www.visualcapitalist.com/music-industry-sales/>

Information wants to be free

Estimated advertising and circulation revenue of the newspaper industry



Source: News Media Alliance, formerly Newspaper Association of America (through 2012); Pew Research Center analysis of year-end SEC filings of publicly traded newspaper companies (2013-2018).

Source: <https://www.journalism.org/fact-sheet/newspapers/>

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.