Review of
Blown to Bits: Your Life, Liberty, and Happiness after the Digital Explosion[1]
Authors: Hal Abelson, Ken Ledeen, Harry Lewis, and Wendy Seltzer
Publisher: Addison Wesley, 2021
$25.95, 300 pages, Softcover

Reviewer: William Gasarch (gasarch@umd.edu)

1 Disclosure

Harry Lewis, one of the authors of the book under review, was my PhD adviser.

2 Overview

I reviewed the first edition of this book in 2009. Here is a link to the entire column which includes reviews of other books as well: `https://www.cs.umd.edu/users/gasarch/bookrev/40-1.pdf`

If you are reading this as an online pdf you can probably click on he above line and get to my old review. (Is that illegal on your part? On my part? I have no idea.) Some of this review will overlap with some of that review.

I begin with the first paragraph of my old review just to show how one issue seems to have been solved.
BEGIN EXCERPT

The Music industry has the following valid complaint: **People who download music illegally are ripping off the artists! That's an outrage! That's our job!**
END EXCERPT

In their attempt to rein in Napster and other file sharing services, the record companies acted very badly— suing people who had nothing to do with downloading music. Weird Al has a great song about it, available for free on YouTube, with a neat video, here:
$$\texttt{https://www.youtube.com/watch?v=zGM8PT1eAvY}$$

At one time downloading music was a big issue. This issue has been solved (somewhat) by changing the business model in several ways:

1. itunes are cheap and easy to use, so its easier and perhaps cheaper than pirating.

2. There are subscription services which give you unlimited access to LOTS of music.

3. Some groups have their music available for free and ask you to give a donation to them.

4. Some creators (not many) make money off YouTube by posting there and having advertisements in their videos. This may explain how I can listen to the entire score of *Hamilton* on YouTube for free. I'm still waiting for my song, *Muffin Math*, which is here:
$$\texttt{https://www.youtube.com/watch?v=4xQFlsK7jKg}$$

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to make the big bucks. It has 16 likes and 0 dislikes. (My proofreader Emily tells me that the only way *Muffin Math* will make money is if it is put into a cringe compilation. She may be right.)

5. View your free-to-all songs on YouTube as advertisements for you concerts or show. This is an alternative explanation as to why I can listen to the score of *Hamilton* for free.

The movie business and the book business have the same problem (pirating) but does not seem to have found a new business model for a solution yet. Some of the above might work.

The book under review is about the changes to society caused by the electronic age. My impression is that they started out wanting to do an intelligent and unbiased view, and that they succeeded. However business look immoral and the government looks incompetent. As Stephan Colbert might say *The truth has an anti-business agenda*. My impression is that while writing the second edition they wanted to say what got better, but, alas, most things got worse.

The book is not just about business and government. Its about virtually all aspects of the electronic age. Much of what the book says is obvious *once you see it written down* but not obvious before that point. This is quite valuable.

3 Summary of Contents

3.1 Chapter 1: Digital Explosion—Why is it happening and what is at Stake?

The first chapter drives home the point that the world really has changed. It states 7 Koans about the modern world which are obvious once they are stated, but worth stating. I give one example:

Koan 7: Bits move faster than thought.

A father gets a condolence card that his daughter is dead—before he knows she died.

A family gets coupons for maternity products—before they know their teenage daughter is pregnant.

Protests spring up via the internet in countries by people demanding freedom very quickly. Yeah!

Authorities shut down the internet just as fast. Boo!

Within 2 weeks of the first story saying how serious COVID was there were 45 funny songs about it on YouTube:

http://www.cs.umd.edu/~gasarch/FUN//funnysongs.html

(As a collector of novelty songs I found this both thrilling and exhausting.)

Within two days of the Jan 6 insurrection there was already a funny song on YouTube about it:

https://www.youtube.com/watch?v=wT5kafhG3Qw

You get the idea.

3.2 Chapter 2: Naked in the Sunlight—Privacy Lost, Privacy Abandoned

and

3.3   Chapter 3: Who Owns Your Privacy?

In my review of the first edition I noted that they used the phrase **little brother is watching**. That is, the government was no longer the biggest threat to privacy, your neighbors cell phone was. While your neighbors cell phone is still *a* threat to privacy, it is not clear what is the biggest threat: your Facebook friends, your enemies, strangers-with-cell phones, government, corporations, or some combination as in this link:

https://www.youtube.com/watch?v=cqggW08BWO0

The Snowden files (sneaked out of the NSA in his pocket) revealed how much the government is tracking you. This may be a needed component for the war on terrorism but one wonders what else they are using the information for.

Corporations are also tracking you, though they claim they just want to know your habits so they can market to you better. Does that make it harmless?

1. They may be subpoenaed to give their information about you to the government. In writing that last sentence notice I used the phrase *their information about you.* That is really odd. Isn't it your information?

2. General privacy. I do not want others to know that I have a taste for European Kit Kat bars as they will make the leap to thinking I am a Europhile who likes the French.

3. They can use this information to manipulate you into (a) buying their product, or (b) voting for a political candidate. This is not a speculation. The book discusses what Cambridge Analytical did to help Trump win the presidency.

4. They may be breached and hence criminals get your credit card and other information. This is not hypothetical.

3.4   Chapter 4: Gatekeeper—Whose in Charge Here?

If a tree falls in a forest and there is no video of it on the web, did it make a sound?

There are gatekeepers on what you can find, and what you can say, on the web. The issues raised are so pervasive that they appear in this chapter and other chapters. Here are a few they bring up, and a personal one.

1. If you do not want something you did x years ago to still be on the web, can you force Google to no longer find it? Can Google do this? Europe has a *Right to be forgotten* law. America does not. Google is trying to abide by it but it may be difficult in some cases.

2. A hypothetical conundrum:

   (a) If someone on Twitter urges Americans to commit violent acts to change an election, that tweet will be blocked.

   (b) If the President tweets something, then it is newsworthy, so it won't be blocked.

   (c) If the president goes on Twitter and urges Americans to commit violent acts to change an election, that tweet .... We have here a contradiction. Which rule applies?

   (d) Fortunately this could never happen in America, but it's a good thought experiment and points to how hard it is for Facebook or Twitter to get things just right.

3. If people post false information about COVID (the book is up to date enough to include material on COVID) that could cause a public health hazard, is Facebook forced to take it down? Free Speech versus Public Health concerns versus Facebook's fear of losing users.

4. There was a proof I needed for a blog post. I could not find it anywhere on the web, so I wrote it up myself and posted it, along with two point: (1) is this proof well known? (2) it was not on the web, and now it is. One of the comments claimed that it was well known since it was in the Arora-Barak Complexity textbook, which is widely used. So here is the question: if a result is in a standard textbook but not on the web, is it well known? I honestly do not know.

   Here is the post:
   `https://blog.computationalcomplexity.org/2020/09/a-well-known-theorem-that-has-not-been.html`

3.5 Chapter 5: Secret Bits—How Codes become Unbreakable

The good news: with modern crypto we can have privacy. The bad news: few people use it, and there are ways around it. The other bad news is that terrorists use it. Should the government force companies to have secret keys (backdoors)? Would that even work? No and no. This issue was unresolved in the first edition and still is. The chapter is a good read of where we have been and where we are now.

3.6 Chapter 6: Balance Toppled—Who Owns the Bits?

Copyright is a very odd concept since (Koan 2) Perfection is normal. That is, we can make perfect copies. But even when copies were imperfect there were issues. Here is an excerpt from the pre-internet copyright law:

   You can't make a public performance of a musical work unless you're an agricultural society at an agricultural fair.

   Glad they cleared that up.

   This chapter discusses copyright in the modern era as it relates to the internet. The story goes back to lawsuits about VCR's that foreshadow lawsuits about Napster and other services (I wonder if painters sued photographers who took pictures of their paintings and sold them). Even though the book is written factually (unbiased), the companies look awful and the Government looks incompetent.

   I give an example of just how broken copyright law is:

   The book *Ideas that created the future: Classic Papers in Computer Science* is a collection of 46 great papers in computer science with introductions to all of them. It was edited by Harry Lewis (same Harry Lewis!) which is reviewed in this column by William Gasarch (same William Gasarch!). Their publisher had to pay to reprint some of the papers. One of them was Alan Turing's 1936 paper *On Computable Numbers, with an Application to the Entscheidungsproblem.*

1. The publisher had to pay over $3000.

2. The paper can be found at the following places for free:

   `https://www.cs.virginia.edu/~robins/Turing_Paper_1936.pdf`

   `https://academic.oup.com/plms/article/s2-42/1/230/1491926?login=true`

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http://www.turingarchive.org/browse.php/b/12
```

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https://www.wolframscience.com/prizes/tm23/images/Turing.pdf
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3. Did I find these versions of the paper in some dark corner of the dark web. No. Did I buy the web addresses in a dark alley from suspicious people. No. I Googled

<div align="center">Alan Turing's 1936 paper</div>

4. Why did I give you all four links instead of just one? Because link-rot is a big problem. For the people reading this review in 2031 (the review is on the web so this is plausible) some of those links will no longer work.

5. It is quite likely that Alan Turing, if he was alive, would be quite happy to have his paper free online. (He would be 109 years old. I found that on Wikipedia. Imagine how hard that would have been to find 30 years ago.)

6. I suspect all of the papers in the book are online for free.(The book is still worth getting. Read the review to see why.)

Clearly copyright law is not working here.

3.7 Chapter 7: You Can't Say That on the Internet: Guarding the Frontiers of Digital Expression

What can and can't one say on radio? TV? the Internet? This chapter gives a nice history of what has happened here, Much like the last chapter, some of the laws being debated here have been looked at before in other contexts. It is good to know their origins.

If Alice made a child porn movie and Bob's company distributed it, they would both be breaking the law. If Carol's trucking company takes the DVDs of the movie from point A to point B, then Carol is probably not breaking the law[2]. Is Facebook a publisher or a trucking company? Are they liable for what people post? These are hard questions to sort out. The law has not caught up to the reality; however, in this case there may be no easy answers.

Child porn and sedition are easy calls in that most reasonable people will agree they are bad and have to be dealt with. Long past are the days when an isolated utterance of *shit* or *fuck* caused a problem

That last paragraph was bullshit. The following happened to the first edition of this book. The chapter *Bits on the air* had the following quote which they talked about in terms of the FCC possibly imposing a fine over the use of the word *shit*:

They (Bush (W) and Blair) were discussing what the UN might do to quell the conflict between Israel and militant forces in Lebanon. "See the irony is," said Bush, "what they need to do is get Syria to get Hezbollah to stop doing this shit and it's over.

The first edition was heavily used in high schools. The Texas school authorities threatened to stop using it the authors did not remove the word *shit*. The authors ended up making a version available that used *s**t*.

1. I am surprised (but pleased) that they accepted *s**t*. Everyone will know what it means.

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[2]This may depend on if Carol knows that she is delivering child porn DVDs. IANAL.

2. Do the Texas authorities know the irony of censoring the chapter on censorship? Do they know that George Carlin's routine *7 words you can't say on TV* is available, uncensored, on YouTube: `https://www.youtube.com/watch?v=kyBH5oNQOSO`

3. The story is absolutely true: you can't make this shit up.

So we are trying to grapple with the complex issues of Free Speech vs Hate Speech vs Dangerous-to-society-speech (e.g., anti-vaxers) in the electronic age, when we have not even solved more mundane issues.

The opening part of *Bits in the air* in the second edition is about President Trump's fondness for... hmmm, oh shit, there are some words I do not want to write down. Just Google *Donald Trump Access Hollywood Tape*. The book uses dashes to avoid spelling out the bad words.

3.8 Chapter 8: Bits in the Air—Old Metaphors, New Technologies, and Free Speech

At one time the radio spectrum needed the government to referee it so that stations would not interfere with each other. This is no longer true. Yet our laws still operate as though it is true and entrenched interests are resistant to change. This chapter tells that story. And more.

3.9 The Next Frontier

There is a lot in this chapter, but I will just talk about an issue that is not in any other chapters and was not in the first edition: AI decision making.

1. There are Machine Learning programs that are making decisions about college admissions, sentencing recommendations, and hiring. Since no human is involved there is no bias. Yeah!

2. There are Machine Learning programs that are making decisions about college admissions, sentencing recommendations, and hiring. Since they use past data, they reinforce past bias. Boo!

Which one of these is true? There have been many cases of clearly unfair and racist decisions made by an ML program. Why?

1. The programmers were overt racists who coded it in.

2. The programmers used past data which reflected racism of the time.

To figure out which one is true would be a simple matter of looking at the code. That last line was bullshit for two reasons:

1. The companies won't let you see the code.

2. An ML program learns on its own. It is quite likely that nobody, not even the people who write the code, know what its doing or why.

4   Opinion

The one word that describes this book is *intelligent.* For every issue they give history, context, relevancy, and current status. If this ends up making certain people or organizations look bad, that's fine. The second edition is depressing in that things have not gotten better, and in some ways have gotten worse, since the first edition.

Who should read this book? People who technology affects should read this book. Who should not read this book: ∅.

So now the elephant in the room: Should you buy the second edition if you already have the first? I give two answers, though both are yes.

1. F**k yes! Some of the chapters are new, and some of the chapters are updated versions with new examples.

2. The first edition is available for free download at `www.bitsbook.com`. The second edition will be available for free Creative Commons download at some point. These are legal downloads (if you care). Do with that information what you will.

   I asked Harry Lewis what their business model was. He says that printing it out is more expensive than buying it, and the fact that its online will create buzz. The first edition did sell pretty well, so this alternative business model seems to be working.