Ethical Foundations for Information Security

Davi Ottenheimer

flyingpenguin
"Good vs. evil," stated as a kind of equation, makes for *lame drama*, because if the choice is so clear, *nothing is at stake*.

https://np.reddit.com/r/television/comments/2hrntm/last_week_tonight_with_john_oliver_drones_hbo/ckvmq7m?context=3
Pop Quiz

You find root pwd, curve, key...

– Before could be tracked
– Now can erase tracks and hide

Do you do bad things because... you can?
Who Refuses to Sign a Code-of-Ethics?

“In an open letter we approached nearly 100 US-based cryptographers and found that just over half were willing to sign on to the letter after many rounds of changes. The people who did not want to sign on had a variety of reasons, but the most common was that they didn't feel they were somehow experts in this domain, or they thought that engaging in something ostensibly political they would somehow weaken their standing as academic cryptographers.”

http://www.radionz.co.nz/national/programmes/ninetonoon/audio/201780914/the-ethics-of-mass-surveillance
Who Refuses to Sign a Code-of-Ethics?

“A new *scientific truth does not triumph* by convincing its opponents and making them see the light, but rather because its *opponents eventually die*, and a new generation grows up that is familiar with it.”

-- Max Planck

Does Science Advance One Funeral at a Time?  
Pop Quiz

A group claims new truth...
   – Before just a hypothesis
   – Now action taken without any scientific proof

Do you wait to respond because... you can?
What is an Engineer in IT?

“...undermines a long tradition of designing and building infrastructure in the public interest.

...explicit responsibility to public safety and reliability...the title ‘engineer’ is cheapened by tech industry.”

1996 Ariane 5 Launch Review

“software should be assumed to be faulty”

“concern software exception is allowed, or even required, to cause processor halt on mission-critical equipment”

A Few Philosophers

• Socrates 400s BCE
• Hobbes 1600s
• Kant & Wollstonecraft 1700s
• Bentham early 1800s
• Mill mid 1800s
• Nietzsche late 1800s

“You have logic, I have Roscoe.”
Socrates 400s BCE

• If everyone treated equally regardless of color, creed, religion, sex...who decides morality?
• Morality from just one God? Many Gods?
• What if there is a Universal Condition?
  – Right, Fair or Just
  – Common Good
  – Virtue

Students Plato & Aristotle: Our social instinct is to succumb to authority
<table>
<thead>
<tr>
<th>Inherent right/wrong</th>
<th>Controlled right/wrong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority follows and can be good.</td>
<td>Authority can not be good or bad.</td>
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</tbody>
</table>
... the life of man solitary, poor, nasty, brutish, and short. ...
The condition of man ... is a condition of war of everyone against everyone.

Thomas Hobbes
Thomas Hobbes 1600s

• Yes! Do as you like when root
• Life is nasty, short and brutish
  (although he was pampered and lived 1588–1679: 91 years)
• Everyone maximizes self-benefit
• Only way to stop someone else benefiting is to oppose with your self-benefit (e.g. band together to support mutual interests)
Morality is not, strictly speaking, the doctrine which teaches us how we should make ourselves happy, but how we make ourselves worthy of happiness.

Immanuel Kant
Immanuel Kant 1700s

• No! Do only good, absolutely (Deontology)
  – Right and wrong inherent
  – Categorical Imperative

• Humans always must be treated as an end, dignity respected, and not as a means

• Negative Rights: Privacy...

• Positive (welfare) Rights: Health, Education...
I do not wish [women] to have power over men; but over themselves.

Mary Wollstonecraft
Mary Wollstonecraft 1700s

• No! Do only *rational* good
• A Vindication of the Rights of Man (1790)
  – Unequal society founded on passivity of women
  – Rationality, unlike ancestral traditions, abolishes slavery
• A Vindication of the Rights of Woman (1792)
  – Human limitations are a result of deficient education
  – Middle-class “most natural state”
  – Equality of sexes
The question is not can they reason, nor can they talk, but can they suffer.

Jeremy Bentham
Bentham early 1800s

- Math! We can calculate consequences
- Consequentialism
  - Intensity
  - Duration
  - Propinquity (how direct)
  - Fecundity (how lasting)
  - Purity (side-effects)
  - Extent (number affected)

“You want the usual stuff, or this thing?”
The only freedom which deserves the name is that of pursuing our own good, in our own way, so long as we do not attempt to deprive others of theirs, or impede their efforts to obtain it.

John Stuart Mill
John Stuart Mill mid 1800s

- Math! Consequences can be generalized despite being unpredictable
  - Good intentions turn out bad
  - Bad intentions turn out good

- Calculation simplified by utility (Utilitarianism)
Battle not with monsters, lest you become a monster, and if you gaze into the abyss, the abyss gazes also into you.

Friedrich Nietzsche
Friedrich Nietzsche late 1800s

• Nature!
• Basic human instinct should not be denied by the human moralist
• Forced morality, wipes out nature of our being, poorly regulates right/wrong
Recap of A Few Philosophers

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• Hobbes 1600s
• Kant & Wollstonecraft 1700s
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• Nietzsche late 1800s

“There can be no peace until they renounce their Rabbit God and accept our Duck God.”
100,000 boilers by 1890

1890—The period from 1880 to 1890 was one of rapid expansion. More than 70,300 miles of new lines were opened in that decade, bringing the total network up to 163,597 miles. By 1890, several trunk line railroads extended to the Pacific. In thirty years from 1860 to 1890, the total mileage of the region west of the Mississippi River increased from 2,175 to 72,389, and the population of that area increased fourfold.
Over 2000 explosions 1880 - 1890
Tech Boom 15 Years Later: Grover Shoe Disaster

https://books.google.com/books?id=dCQAAAAAMAAJ&pg=RA1-PA3#v=onepage&q&f=false
West Texas Fertilizer

Claimed Loss: $100 million
FEMA Rebuild Grant: $35 million
Estimated *Prevention* Cost: $40,000

15 Killed (10 firefighters)
80 Homes Destroyed

Quiz: Knowledge v Privacy

How best *engineer* for safety, when given...

- Reduced Control of Perimeters
- Reduced Control of End Points
I refused to invest in security until the worms of 2001 hit. I even ignored 2 years of internal warnings from SWI. Don’t do what I did.

https://twitter.com/daviottenheimer/status/581172997815279616
Quiz: Knowledge v Privacy

Intel Gaps, Executive Failures or Both?

– May 10th 1940, Maginot Line
  “Enigma was SSLv2 of the 1930s”

– June 6th 1944, D-Day Landings
I’m nothing, and yet, I’m all I can think about
Quiz: “Fairness” in ML

• Computer Code is Reduced Set of Human Code
• Encryption Makes Knowledge More Expensive
• From Where Comes Algorithm Accountability?
  – Induction Fallacies (Hume)
  – “Acceptability” of a Percentage Safe or Accurate
  – Training, Choices, Discrimination, Stereotyping
Further Research Areas

- Sources – Variety of raw data
- Streams – Near real-time processing (in-mem)
- Stores – Large-scale distribution
- Analysis – ML, SQL, Statistics
- Actions – Apply new value
## Further Research Areas

### 5 PHASES OF BIG DATA RISK

<table>
<thead>
<tr>
<th>Net &amp; System Security</th>
<th>SOURCES</th>
<th>STREAMS</th>
<th>STORES</th>
<th>ANALYSIS</th>
<th>ACTIONS</th>
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<tbody>
<tr>
<td>Data Protection</td>
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<td>Vulnerability</td>
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WHO GETS THE SLOW TICKET?

- LiDAR 360 scans for objects
- Processor calculates behavior based on data
- Motion and balance sensors detect orientation
- Hub rotation sensor calculates distances
- Radar measures speed relative to others

Public sentiment?
- Passenger throws hands up in air like they just don’t care

Ethical Foundations for Information Security 2015 flyingpenguin
How It Works

This simplified diagram shows Chang's speech prosthetic in action.

1. Subject tries to say something.
2. The ventral sensory motor cortex receives the message and attempts to send the proper commands to speech organs, but the signal is lost.
3. Surgically implanted electrodes intercept the original signals.
4. The signals are sent to a computer for analysis.
5. Software matches the brain patterns to an associated sound.
6. Synthesizer "speaks" the intended speech.

http://discovermagazine.com/2014/april/9-whats-on-your-mind
“her brain will learn how to interpret the new optical signals it's receiving”

Sentiment, Storytelling & Plato’s Cave
“That's the Holy Grail — the ability of sensors to continuously track you so if it looks like there's been a change in your health, you're notified before the event.”

Sentiment, Storytelling & Plato's Cave

What Do You See?

Lepse Avenue, Kiev, Ukraine: https://www.jwt.com/en/ukraine/work/pedestrianghost/
What Do You See?

Hint: UNICEF radio interviews with Islamic leaders helped end vaccine resistance, eliminate Somalia's Polio

http://www.bbc.co.uk/mediaaction/publications-and-resources/research/summaries/africa/somalia/can-radio-improve-polio-vaccination-campaigns

http://dovfriedman.com/
“Without science, democracy is impossible”

Bertrand Russell 1926

It is only through imagination that we become aware of what the world might be; without it, ‘progress’ would become mechanical and trivial.

Without physics and physiology and psychology, we cannot build the new world.


1. The Road Not Taken

TWO roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth;

Then took the other, as just as fair,
And having perhaps the better claim,
Because it was grassy and wanted wear;
Though as for that the passing there
Had worn them really about the same,

And both that morning equally lay
In leaves no step had trodden black.
Oh, I kept the first for another day!
Yet knowing how way leads on to way,
I doubted if I should ever come back.

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.
With public sentiment, nothing can fail; without it nothing can succeed. Consequently, he who moulds public sentiment goes deeper than he who enacts statutes or pronounces decisions. He makes statutes and decisions possible or impossible to be executed.

Abraham Lincoln 1858

http://www.bartleby.com/251/pages/page152.html
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