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ETHICS FOR APP MAKERS

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MARKKULA CENTER FOR APPLIED ETHICS

An Introduction to Software Engineering Ethics

by Shannon Vallor, Associate Professor of Philosophy,
Santa Clara University
special contributor, Arvind Narayanan, Assistant Professor of Computer Science,
Princeton University



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Notes for Instructors

Module

This ethics module for software engineering courses includes a reading, homework assignments, case studies, and classroom exercises, all designed to spark a conversation about ethical issues that students will face in their lives as software engineers. No training in ethical theory, applied ethics, or philosophy is required for either the instructor or the students as they tackle these materials. The module is provided at no cost (with written permission for class use) by the Markkula Center for Applied Ethics at Santa Clara University.



Irina Raicu

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Irina Raicu is Internet Ethics Program manager at the Markkula Center for applied Ethics at Santa Clara University. She was formerly an attorney for a private practice. As a teenager, Raicu immigrated to the U.S. from Romania; her background informs her interest in the Internet as a vehicle for international communication as well as commerce, and as a tool whose use has profound ethical implications for all those who are impacted by it -- whether or not they ever personally access the Web.

Blog Entries by Irina Raicu

Friends, Sensors, and Anticipated Needs

(1) Comments | Posted March 5, 2013 | 11:59 AM

Do your best friends know where you are in space and time, continuously? If not, apparently they haven't been doing their job.

At the recent Consumer Electronics Show, *InformationWeek's* Michael Endler interviewed the chief technology officer of a large tech company. The CTO described a future rich in...

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Computer Scientist

BY KIM ZETTER 06.18.12 6:30 AM



ARVIND NARAYANAN

ARVIND NARAYANAN JOINS PRINCETON CITP AND COMPUTER SCIENCE DEPARTMENT



The Center for Information Technology Policy (CITP) is delighted to welcome Arvind Narayanan as an Assistant Professor in Computer Science, and an affiliated faculty member in CIS. Narayanan is a computer scientist and privacy researcher. His work focuses on privacy and security research in digital privacy, data anonymization, and technology policy. His work has been published in top journals and conferences, and includes a paper with CITP co-authors Ed Felten and Joseph Calafoutis. Narayanan is currently engaged in active research projects such as DoNotTrack.us, and is sought as an expert in the increasingly complex field of privacy and technology. He was recently profiled on Wired.com as the "World's Most Wired Computer Scientist".

Should All Software Engineers Be Required to Take an Ethics Course?

BY LAUREN ZUMBACH • September 06, 2013 • 8:00 AM



(PHOTO: ISAK55/SHUTTERSTOCK)



Facebook outing students. Google collecting personal information from wireless networks. A dating app used for stalking. The creators of a new three-day ethics program believe these incidents could have been avoided.

When Irina Raicu first read about a [new software program](#) designed to take just a few details about a person, such as gender and hair color, whether or not the person has tattoos, and the number of minor offenses they've committed, and accurately predict how likely he or she would be to commit a felony, she got worried.

V viewpoints

DOI:10.1145/2566966

Arvind Narayanan and Shannon Vallor

Computing Ethics Why Software Engineering Courses Should Include Ethics Coverage

Encouraging students to become comfortable exercising ethical discernment in a professional context with their peers.

SOFTWARE DEVELOPERS CREATE the architectures that govern our online and increasingly our offline lives—from software-controlled cars and medical systems to digital content consumption and behavioral advertising. In fact, software helps shape, not just reflect, our societal values.^a Are the creators of code aware of this power and the responsibilities that go with it? How, and to what extent, are they trained in the ethics of their discipline?

Like medical, legal, and business ethics, engineering ethics is a well-developed area of professional ethics. In 2000, the organization that accredits university programs and degrees in engineering (ABET) began to formally require the study of engineering ethics in all accredited programs.^b

Yet most engineering ethics textbooks focus primarily on ethical issues faced by civil, mechanical, or electrical engineers. The case studies they typically include—the Challenger explosion, the Ford Pinto fires, the Union Carbide/Bhopal disaster—depict harms caused by ethical lapses in those fields. Of course, the cars and rockets and bridges built today depend

upon critical software for their safe operation, and failure of these software systems can result in death or grievous injury. However, the distinctive ethical dilemmas that arise in the software engineering context are not yet being sufficiently addressed.

In the Internet era, the software development and deployment process has some peculiarities that exacerbate the ethical issues for software

engineers. First, the shortened life cycle has weakened and in some cases obliterated software review by management and legal teams. So software engineers may deploy code directly to end users—in stark contrast to, say, a civil engineering project with a years- or decades-long life cycle and multiple layers of oversight. For Web applications such as Facebook, individual engineers or small groups of

CREDIT LINE
a See <http://www.nyu.edu/projects/nissenbaum/vid/about.html>
b See <http://www.abet.org/engineering-change/>

Software Engineering/ Developer Ethics (SEDE)

○ SEDE as Professional Ethics

- Why do professions involve **ethical** duties?
- Professions (Law, Medicine, Education, Military) secure important **public goods** (e.g., **justice**, **health**, **knowledge**, **security**); this entails a moral responsibility to the public.
- Today **all** these public goods flow through channels designed, built and maintained by software engineers.
Plus others, e.g.: **privacy**, **wealth** & **social capital**.
- Professional ethics show us how general moral standards (such as: **integrity**, **honesty**, **courage**, **wisdom**, **care**) look when applied to the specific contexts in which we work.

◎ SEDE as Personal Ethics

- Work is a core part of our moral lives and **character**.
- A **basic moral norm** is the desire to make ‘an honest living’; (compare with notions of ‘right livelihood’ in Buddhism, etc.)
- We hope our children, parents, etc. will always be **proud** rather than ashamed when they describe our work.
- Personal ethics help us **think through** work situations for which our professional codes of ethics have not prepared us.
- They also help us to **integrate** the different aspects of our character/roles/self-image.

○ Software, Ethics and Society

- Ethics is fundamentally about ‘the **good** life.’
- Software developers/marketers sell a particular *image* of the good life: (**mobile, social, smart, shareable, trackable, on demand**, etc.)
- If developers fail to think about ethics, that is, whether their products are **actually** good for users and society, this image will come to be seen as unattractive, a marketing lie or gimmick.

◎ Software, Ethics and Society

- No industry is **immune** from ethical judgments:
 - Consider the reputation of tobacco companies, ads & products (from 1950's to today)
 - Googlebus protests/demonizing of urban tech workers in the media: is this the canary in the coal mine?
 - Tech consumers are notoriously fickle: they demand products they believe help them to live well and reject those that don't (Example: teen Facebook exodus)
 - People **want** to live in an ethical world. Even dishonest, antisocial narcissists want the world **around** them to be honest, and attentive to their needs. Are your apps shaping a world that people will want to live in?

◎ Apps and Ethics

- Often **fewer failsafes**/levels of oversight – code may be deployed without much institutional review.
- Developers often in the best position to know how the technology may affect users; ethical reflection can't just be handed off to 'ethics specialists,' **engineers must stay in the loop**.
- Apps are a **moving ethical target**; features change, users change, platforms change, contexts change. A benign app can become ethically problematic with a single bug fix or update.
- Ethical issues cannot be fully anticipated; ethics is about **responsiveness**, not just foresight & prediction.
- Ethics **≠** Legal Compliance. Ethics isn't law, and it isn't compliance. You can't just check off boxes and forget about it.
- Ethics is a **cultivated habit** of thinking and acting.

Questions about Ethics and App Development

- ◉ How can an app maker set appropriate limits on the amount & kinds of information collected about users?
 - First, by **asking** the question (vs. ‘let’s just collect and store everything, in case we need it later’).
 - Consider user **expectations**: actual, ordinary users, not ideally knowledgeable/prudent ones.
 - Consider questions of **context**: *why* it’s being collected, for *whom*, and *how* it might get used. Context really matters.
 - Consider potential **harms**; who could be hurt? How seriously?
 - Consider **third parties** – those who could be indirectly affected, *also* third parties who might gain/purchase access to the information later.

- ◎ If an app can make money by appealing to people's natural desires and tendencies, why limit that?
 - Most of the time you wouldn't. That's part of good design.
 - BUT: avoid the 'naturalistic fallacy.' Natural ≠ Good. Also: Legal ≠ Good.
 - Example: *Meth dealers* appeal to our natural desires. If meth were legalized tomorrow, would selling it be ethical?
 - A key question: is this app contributing to **human flourishing**, or its opposite?

- ◉ If people are left out of my audience because they can't afford the equipment & services, is that my problem?
 - It depends. How **critical/basic** are the goods your app provides?
 - Are these goods **accessible** by other, more affordable means?
 - Are any measures being taken to **expand** affordability of the product?
 - Does the unequal access **magnify** existing social/economic inequalities, or contribute to the further marginalization of those without access?

- ⦿ If other people aren't making apps because they lack the background and opportunity, why shouldn't I profit from my advantage?
 - You can **profit** from an unearned advantage without choosing to **perpetuate** it.
 - Are you making the participation of others **easier**? Or more difficult?
 - Example: who do you **mentor**? Who do you **encourage** to enter the field?
 - How do you treat **new** developers with atypical backgrounds?

- ◎ If I am developing apps on a platform belonging to a big company, can I be blamed for its actions?
 - You **can** be blamed for anything. Whether you **earned** the blame is a separate question in principle (but **not** always in practice.)
 - Did you consciously or negligently **enable** those actions?
 - Could you have reasonably **foreseen** the actions? Did you take any available steps to **prevent** them?
 - Did you **communicate** any ethical concerns up the corporate chain, before, during or after?

◎ Five Key Questions *(Thanks to Tim Burks!)

- How can an app maker set appropriate limits on the amount & kinds of information collected about the app's users?
- If an app can make money by appealing to people's natural desires and tendencies, why limit that?
- If people are left out of my audience because they can't afford the equipment and services, is that my problem?
- If other people aren't making apps because they lack the background and opportunity, why shouldn't I profit from my advantage?
- If I am developing apps on a platform belonging to a big company, can I be blamed for that big company's actions?

○ Final Thoughts/Questions for the Audience:

- What are the greatest **obstacles** to ethical app development, from the *developer perspective*?
- What **useful parallels/important differences** exist between SEE and more robust/ingrained cultures of professional ethics (medical ethics, legal ethics, academic research ethics, military ethics, etc.?)
- What **changes to engineering education** would be most effective in building a robust culture of software engineering ethics?
- What can trained ethicists do to better **engage** the software community?

Thank You.

Comments? New Questions?

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