Promise and Peril: A librarian's perspective on the internet of things

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What we talk about when we talk about the Internet of Things
An IOT device is...
An IOT device is...

- A thing.
An IOT device is...

► A thing. (Not a GPC.)
An IOT device is...

- A thing. (Not a GPC.)
- With inputs and/or outputs.
An IOT device is...

- A thing. (Not a GPC.)
- With inputs and/or outputs.
- Connected to a network.
Useful purposes!
Useful purposes!

- Remote sensing
Useful purposes!

- Remote sensing
- Remote/Autonomous control
Useful purposes!

- Remote sensing
- Remote/Autonomous control
- Machine learning
Useful purposes!

- Remote sensing
- Remote/Autonomous control
- Machine learning
- Network interaction
The Internet of Things is the name given to the computerization of everything in our lives. Already you can buy Internet-enabled thermostats, light bulbs, refrigerators, and cars. Soon everything will be on the Internet: the things we own, the things we interact with in public spaces, and the things we consider personal.
What we talk about when we talk about libraries
A library is...
A library is...

- Spaces.
A library is...

- Spaces.
- Services.
A library is...

- Spaces.
- Services.
- Collections.
SPACES
Search, find and connect with iBeacon

iBeacon locates app and bookshelves through bluetooth
Internet of Things

"The Internet of Things (IoT) is a blending of software and hardware, introducing intelligence and connectedness to objects and adding physical endpoints to software. Radical changes in the hardware development process have made the IoT—and its vast possibility—accessible to anyone." — Jon Bruner & Mike Loukides, O'Reilly Media

You can use the tools of the IoT for all sorts of projects, such as designing products like smart watches and door locks, logging data for field research, prototyping "smart home" lighting or energy monitoring, and much, much more.

Radically affordable WiFi modules like the ESP8266 and modular, easy-to-set-up web services like IFTTT (see below) make this exciting development in technology available to all.

IOT WIFI ACCESS ON CAMPUS

For an on-campus solution, the Libraries has partnered with NCSU's Office of Information Technology (OIT) to create MakerspaceOIT, a more open network for experimenting with the Internet of Things in the D.H. Hill Makerpace. Off campus, you should be able to set
Makerspace at Hill

The D. H. Hill Library Makerspace is now open! This space gives hands-on access to the emerging technologies of making, and will enable many more students and faculty to work with 3D printing, 3D scanning, electronics prototyping, and other Maker tools.

The tools listed below as Available to borrow can be checked out at the D. H. Hill Ask Us desk. Those under Use in the library are available in the D. H. Hill Makerspace for users who have been through our Orientation.

HOURS

<table>
<thead>
<tr>
<th>Date</th>
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<tr>
<td>Today</td>
<td>10am - 10pm</td>
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<tr>
<td>Nov 23</td>
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Makerspace hours: Hill | Hunt

NEED HELP?

Request a technology consultation ➔

Email us ➔

UPCOMING WORKSHOPS

DEC 1
D.H. Hill Makerspace Orientation
2:00 pm to 2:45 pm

Library Stories

Threading the Needle: Fostering Student Success Through Making

Remaking Teaching: Prototyping New Technologies for the Classroom

All stories ➔
The Internet of Things with Buzzfeed’s Christine Sunu

WHEN
September 19, 2016
6:00pm - 9:00pm

WHERE
• D. H. Hill Makerspace at the D. H. Hill Library

WORKSHOP DESCRIPTION
Join Christine Sunu, Buzzfeed’s GE Internet of Things Fellow at the Open Lab for Journalism, Technology, and the Arts, in this interactive workshop that explores IoT technologies with a focus on internet-connected toys and the potential available in connecting emotions and technology.

Christine Sunu is the GE Internet of Things Fellow in BuzzFeed’s Open Lab for Journalism, Technology, and the Arts. Her research is focused on the links between emotion, design, media, and IoT. She writes and speaks widely about the importance of human

Coding for Wearables I

WHEN
September 23, 2016
9:30am - 11:00am

WHERE
• D. H. Hill Makerspace at the D. H. Hill Library

WORKSHOP DESCRIPTION
In this session you’ll learn how to program the Arduino Gemma, a microcontroller designed for...
Occipital Structure 3D Scanner
Senses 3D data for many applications. Checks out with an iPad Air 2 for handheld 3D...
Walk Up.
1 Week

Intel Galileo Kit
The Galileo is a single-board computer that runs a Linux-based operating system. The...
Walk Up.
2 Weeks

Moog Werkstatt-01 Analog Synthesizer
The Moog Werkstatt-01 is a patchable, completely analog synthesizer. Excellent...
Walk Up.
1 Week

LightBlue Bean
The LightBlue Bean is a Bluetooth Arduino microcontroller. Using Bluetooth 4.0, it is...
Walk Up.
1 Week

NeuroSky MindWave Mobile
Brainwave Starter Kit
Learn about how your brain responds to various stimulus with the MindWave Mobile...
Walk Up.

Muse Brain Sensing Headband
This brain sensing headband is a brain fitness tool that measures brain signals much...
Walk Up.

iRobot Create 2 Programmable Robot
Create 2 has a variety of programming methods to grasp the fundamentals of robotics,...
Walk Up.

Sphero SPRK Robotic Ball
The Sphero SPRK Edition is Sphero’s robotic ball platform designed to give orders to...
Walk Up.
Enhanced library services
that help users to help themselves

The research showed that people need help with navigating the library.

The app assists in the most complex tasks of the user journey:
Searching, finding, and connecting to the library’s knowledge base.

By giving users a tool to help themselves in these instances, the library can use its resources for content curation and extended opening hours.
COLLECTIONS
Occipital Structure 3D Scanner
Senses 3D data for many applications. Checks out with an iPad Air 2 for handheld 3D...
Walk Up.
1 Week

Intel Galileo Kit
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CHAPTER I

THE year 1896 was signalised by a remarkable incident, a mysterious and puzzling phenomenon, which doubtless no one has yet forgotten. Not to mention rumours which agitated the maritime population and excited the public mind, even in the interior of continents, scaring men were particularly excited. Merchants, common sailors, captains of vessels, skippers, both of Europe and America, naval officers of all countries, and the Governments of several States on the two continents, were deeply interested in the matter.

For some time past vessels had been met by "an enormous thing," a long object, spindle-shaped, occasionally phosphorescent, and infinitely larger.
Challenges
Challenges

- Vendor vs. Homebrew
Challenges

- Vendor vs. Homebrew
- Create ⇒ Maintain
Challenges

- Vendor vs. Homebrew
- Create ⇒ Maintain
- Managed account woes
What we talk about when we talk about librarianship
Librarians believe in...
Librarians believe in...

- Knowledge discovery.
Librarians believe in...

- Knowledge discovery.
- Universal access.
Librarians believe in...

- Knowledge discovery.
- Universal access.
- Intellectual freedom.
KNOWLEDGE

DISCOVERY
HAVE YOUR EMBEDDED SYSTEMS BEEN EXPLOITED?

HOW DO YOU KNOW FOR SURE?
US DMCA rules updated to give security experts legal backing to research

It’s taken years, but finally, cybersecurity professionals have been given license to reverse engineer technology.

By Charlie Osborne for Zero Day | October 31, 2016 -- 10:56 GMT (03:56 PDT) | Topic: Security
Kindle Unlimited

Freedom to explore over 1 million titles and thousands of audiobooks on any device.
Stay connected no matter where you are.

Keep up on the latest tweets from everyone you follow.
NEW HIGH-TECH FARM EQUIPMENT IS A NIGHTMARE FOR FARMERS
Walmart – the second largest retailer of downloadable music in the U.S. after iTunes – are switching off their DRM servers; a move that will leave many customers unable to access their legally-purchased music.

In an email to customers, Walmart explains:

As the final stage of our transition to a full DRM-free MP3 download store, Walmart will be shutting down our digital rights management system that supports protected songs and albums purchased from our site. If you have purchased protected WMA music files from our site prior to Feb 2008, we strongly recommend that you back up your songs by burning them to a recordable audio CD. By backing up your songs, you will be able to access them from any personal computer.
Big Brother: Amazon Remotely Deletes 1984 From Kindles

Ever bought a book from Barnes and Noble, then turned around to find it missing from your bookshelf and replaced with a voucher? Bizarre though it may seem, that’s exactly what’s happened to hundreds of owners of George Orwell’s 1984 and Animal Farm
This is, unfortunately, becoming one of the most predictable stories of the early 21st century. It goes something like this: new tech product comes on the market. Consumers, finding product solves their problem, eagerly buy. Then the company that made the product turns off the server that made the thing “smart,” and suddenly early adopters are up a creek with no recourse.

This time around, the story is about lightbulbs.
INTELLECTUAL FREEDOM
Library Bill of Rights

The American Library Association affirms that all libraries are forums for information and ideas, and that the following basic policies should guide their services.

I. Books and other library resources should be provided for the interest, information, and enlightenment of all people of the community the library serves. Materials should not be excluded because of the origin, background, or views of those contributing to their creation.

II. Libraries should provide materials and information presenting all points of view on current and historical issues. Materials should not be proscribed or removed because of partisan or doctrinal disapproval.

III. Libraries should challenge censorship in the fulfillment of their responsibility to provide information and enlightenment.

IV. Libraries should cooperate with all persons and groups concerned with resisting abridgment of free expression and free access to ideas.

V. A person's right to use a library should not be denied or abridged because of origin, age, background, or views.

VI. Libraries which make exhibit spaces and meeting rooms available to the public they serve should make such facilities available on an equitable basis, regardless of the beliefs or affiliations of individuals or groups requesting their use.


The FBI has not been here

(watch very closely for removal of this sign)
Sockets Are Mucous Membranes

Your house

YOUR HOUSE ON THE INTERNET OF THINGS
Peep show: inside the world of unsecured IP security cameras

Want to peer into businesses around the world, look through red light cameras ...

TOM CONNOR - 1/12/2011, 12:10 AM

If you're in public, you're on camera. If you walk into a coffee shop, the owner gets you at the register. Visit a larger store, and chances are they have your face as soon as you cross the threshold. At least one or two of your neighbors catch you on camera when you walk around your neighborhood, and many cities monitor traffic using red light cameras at major intersections. The question is no longer if you're on camera, but rather how many different angles you were caught on while going about your day.

With so much monitoring taking place, and with surveillance systems gaining more online functionality every year, it's natural that securing these systems would become... complicated. And that many many are secured incorrectly or not at all. Because so many cameras and surveillance systems are completely open, it's possible for anyone with Internet access to watch literally thousands of cameras online using only Google and a kindergartener's understanding of the Net. With a little time and patience, almost any given system, from a set of residential cameras to those used by your local police, can be accessed, viewed, and even reset if not properly secured. Of course, if you can do this, it means that anyone can do it.
Using a Samsung smart fridge could leave your Gmail account vulnerable to hackers

Hackers have found a way to exploit a Samsung smart fridge in order to access the owner's Gmail credentials, according to The Register.

Pen Test Partners, a firm that specialises in finding exploits, discovered a man-in-the-middle vulnerability in Samsung smart fridges. A man in the middle attack is where a hacker intercepts a piece of data as it passes between a server and the device, in this instance a fridge.

The hack was discovered in Samsung's RF28HMELBSR fridge which has a Wi-Fi capability that allows a user to show their Gmail calendar on the display. While Samsung has implemented a Secure Sockets Layer (SSL), the fridge fails to validate the certificates that come as part of the SSL protocol, leaving the device vulnerable to attack. For an SSL certificate to be valid, the browser must receive a valid code back from the website host, something Samsung failed to do.
The Internet of Things Will Turn Large-Scale Hacks into Real World Disasters

July 25, 2016 // 09:30 AM EST

Disaster stories involving the Internet of Things are all the rage. They feature cars (both driven and driverless), the power grid, dams, and tunnel ventilation systems. A particularly vivid and realistic one, near-future fiction published last month in New Scientist, features an increasingly dangerous honeypot.
A massive botnet of hacked Internet of Things devices has been implicated in the cyberattack that caused a significant internet outage on Friday.
KrebsOnSecurity Hit With Record DDoS

On Tuesday evening, KrebsOnSecurity.com was the target of an extremely large and unusual distributed denial-of-service (DDoS) attack designed to knock the site offline. The attack did not succeed thanks to the hard work of the engineers at Akamai, the company that protects my site from such digital sieges. But according to Akamai, it was nearly double the size of the largest attack they'd seen previously, and was among the biggest assaults the Internet has ever witnessed.
Johnson & Johnson Warns Patients Insulin Pump Is Hackable But “Low Risk” Of Attack

Tech can be pretty great, and smart, connected tech can be really great. Miniaturization and the ability to control devices remotely has led to some fantastic advances in, for example, health care. But today in “wow, our glorious tech-driven future is so strange and dystopic some days,” we are reminded that anything that can be networked is vulnerable, and can be hacked.

Reuters reports this morning that Johnson & Johnson has found that one of its medical devices has a bug in it that can leave it vulnerable to remote intrusion — i.e., hacking.
CATS: ALL YOUR BASE ARE BELONG TO US.
What's a librarian to do?
What you can do
What you can do

- Promote research
What you can do

- Promote research
- Increase awareness
What you can do

- Promote research
- Increase awareness
- Establish standards
I FIGHT
FOR THE USERS
Thanks!

Andreas K. Orphanides
akorphan@ncsu.edu

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Linked data: Max Schmachtenberg, Christian Bizer, Anja Jentzsch and Richard Cyganiak. CC-BY-SA 3.0
Smart buoys: NOAA (1) (2)
Pink and blue hacking: Electronic Frontier Foundation
Kindle Unlimited: Amazon
Nest app: AVLogix
Warrant canary: Jessamyn West. CC-BY 2.0
Compubody Sock: Becky Stern. CC-BY-SA 2.0
All your base: Zero Wing (Mega Drive), Sega (via Albino Black Sheep)
Fight for the users: Tron, Walt Disney Productions (via Pinterest)
Device images belong to their respective manufacturers
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All other images NCSU Libraries and North Carolina State University
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