How can we embed internet stewardship into the making of meaningful connected things?

The Open IoT Studio

@openiotstudio

The internet is evolving. Today we live in a network of physical objects and services that continuously gather data and exchange it over the internet. These connected systems are increasingly invisible, inaccessible and immutable to us.

Building on years of service in internet stewardship, Mozilla and our allies are committed to ensuring the internet remains a global, public resource accessible to all.

The Open IoT Studio is a new programme by Mozilla that collaborates with Internet of Things professionals to understand how to make connected objects in a meaningful and sustainable way. We want to build things that are made locally and locally relevant.

What is internet stewardship?

Internet stewardship

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Internet stewardship expresses Mozilla's commitment to the open internet.

We believe that the internet is a global public resource that must remain open and accessible. It enriches the lives of human beings. Individuals' security and privacy on the internet are fundamental and must not be treated as optional.

Free and open source software promotes the development of the internet as a public resource. Commercial involvement in the development of the internet brings many benefits; a balance between commercial profit and public benefit is critical.

As the internet takes new forms, the Open IoT Studio seeks to serve individuals and local communities by embedding the values of internet stewardship into the making of meaningful, internet-connected things.

Read more in Mozilla's manifesto:
https://www.mozilla.org/en-US/about/manifesto/

What do we mean by Making?

Making “Jugaad”

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Making is a philosophy as much as it is a process. In the Internet of Things, it’s about physical as well as digital objects and services. It is in the space between the two that it gets exciting.

Our definition of making includes all aspects of bringing life into objects. This process involves the invention of new things, but also the repurposing, repairing and and re-making of existing things. We love the Hindi word “jugaad” to describe simple work-arounds and ‘rule bending’ in order to fix something. Many cultures have similar terms, such as the British bodgers, American kludge or French bricolage.

We also love intentional, slower versions of making that consider local traditions, materials and practices. We take inspiration from craft and local manufacturing, as well as open source software development.

More about jugaad:
https://en.wikipedia.org/wiki/Jugaad

What are meaningful connected things?

Meaningful Connected Things

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The Open IoT Studio seeks to make things that have purpose and embody open values. We believe they should be made sustainably and designed to last.

The Internet of Things industry is quite problematic right now. There is a lack of consideration about the limited resources on the planet and the importance of people being able to control their digital and physical lives.

This disregard results in superfluous products or worse, dangerous ones. For example, connected things can be 'bricked' without warning. You can lose your data or not have control of what is collected about you and how it's used. Things might be installed without your consent or without you needing them.

Find more inspiration in the IoT Design Manifesto: http://iotmanifesto.org/

How can open innovation help us make meaningful connected things?

Open Innovation

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People everywhere make things that are meaningful to them. And they make them in different ways. We want to understand and enhance making that is in tune with its context. At times this can look really messy, reflecting the messiness that life and the world around really is.

Local crafts are highly adapted to local contexts, such as language and local materials. We want to celebrate this diversity and support others in using local approaches to create meaningful things and share them openly.

We are exploring how open innovation happens across the Internet of Things ecosystem. We're not fully sure where this is heading right now, but one thing we are sure of is that it's good to start with actionable insights drawn from local contexts and test designs through lived experiences.

How can individuals' security and privacy be treated as fundamental, not optional, in IoT?

Privacy and Security

IoT will significantly amplify the security and privacy challenges we currently face. One reason for this is because IoT brings computing power much closer to us—physically. There are already examples of how this physical proximity and digital control of physical resources can result in life-threatening scenarios, such as a car being hacked or a pacemaker compromised.

IoT also collects more and different data than previous eras of the internet. This includes our physical location, appearance, and even emotional state.

As we build meaningful connected things, we must ensure that they put agency in their users' hands. People must be able to understand and control their digital lives. And control depends on context. This is another reason why we build for specific contexts and with specific people, so that we can address these nuances.

How can making things in a decentralised way increase a community's resilience?

Decentralisation

Currently, several large corporate players are shaping IoT. Their power is quite centralised, even though they compete against each other. Centralised power means there is a single point of failure. And it means that individual agency is limited, especially at the edges of a network.

For this reason, we are committed to making meaningful things in local contexts. Open innovation at the edges can shift centralised power, leading to products that are locally relevant and adapted. We can break horrendously short cradle-to-grave lifecycle that the digital technology industry has artificially generated.

In this way, when the inevitable stresses and shocks occur, local communities are more resilient. They can repair their tools, they can repurpose them, and they will benefit for having meaningful things that last and make sense in their context.

How can we contribute to a collaborative, diverse ecosystem to make meaningful IoT?

Digital Inclusion

When IoT is made by just a few power players, then the interests of some people might be overlooked or deemed not profitable enough to cater to. By innovating openly and making meaningful things locally, more people can have a voice and shape the technology environment around them.

We want to contribute to an ecosystem that is diverse and collaborative. That means championing things made by different people in different contexts to address different needs.

Through inclusive practices, we want to futher challenge the centralisation of power and advocate for digital equity, ensuring that the internet remains a global, public resource that is open and accessible to all.

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How can the making of meaningful IoT contribute to new learning opportunities?

Web Literacy

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We learn to make and make to learn. The process of making reveals insights that will help us grow and improve. These reflections can be shared with others and support them as they learn as well.

We are keen to collaborate with educators on learning opportunities and curriculum that empowers people in making meaningful IoT, especially professional practitioners seeking to improve their craft.

Through improved professional practice that embeds internet stewardship and local context, we believe that the connected products we make will support more people to have agency in their online lives. They will be able to read, write and participate fully with technology.

How can the Internet of Things enhance the sense of self in retail environments?

SelfReflector

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The SelfReflector is an internet connected mirror that uses online artificial intellegience to guess your age and play music from when it thinks you were a teenager. Through this work, we wanted to explore what this experience would mean to people. We wanted to play with the sense of trust, the sense of reflection, and the sense that a simple reflective surface opens up so much about who we are and what we think of ourselves.

We further wanted to reflect on what happens when technology comes into our lives in very personal ways. In this case, we looked at a camera that connects to an existing online cloud services which provides artificially intelligent recognition of faces, clothing brands, moods, race, gender and movement behaviours. This project explores what information we would be surprised yet delighted to share versus what data we would not like to keep private.

How can we start a conversation about security and the privacy of data in our homes?

Wayback Machine

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The Wayback Machine is a prototype product which carefully controls the availability of technologies and services within a connected home.

Connected homes are becoming increasingly autonomous and can make decisions of increasing importance on our behalf, for example who to let in the front door or when to stream cctv cameras. With more and more reliance on programmed behaviours, AI and machine learning, how can we take back control of our own homes on our terms.

Once a technology is widely used, we rarely stop to question the way it is affecting our lives and whether this is for better or worse. The Wayback Machine has a rotary dial on the front that allows you to wind back time and turn off digital services and connections. Services and particular signals would be turned off through a combination of jamming technology and filtering web addresses.

How can we create rich digital experiences in remote and disconnected spaces?

Bubble

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How can we find out about the physical spaces around us, even when we have no internet access? How can disconnected communities share information, experiences and files with themselves and visitors?

Bubble does this by creating a local wi-fi access point with a captive portal that is a jumping-off point for hyperlocal digital experiences.

Imagine an augmented reality view of your immediate surroundings with messages from locals describing what you're seeing. Or perhaps a messaging board where the nomadic communities can asynchronously communicate with each other. Or maybe a VR viewer hanging off it, which loads a virtual story of the history of the temple you're standing in front of.

Bubble is a simple and portable way for adding rich digital experiences to disconnected physical spaces.

How can we learn from historical ways of navigating ‘data’?

Invisible Bearing

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Invisible Bearing takes a centuries old navigation technique for ships and lets visitors to the Fisheries Museum Anstruther navigate online data of ships that can't be seen with the naked eye on the Firth of Forth.

Advances in GPS technology have made it compulsory for ships to broadcast their location with a GPS beacon which improves safety for ships at sea but has also made the skill of lining up to a harbour's entrance by illuminated navigation poles a sometimes forgotten way of doing things.

Invisible Bearing celebrates this old tradition and allows visitors to the museum to move around two poles to get the bearings of invisible vessels. A journal log is printed that provides visitors with a take-away of the ships' data that silently passes by the museum every day.

Can we find new ways of producing IoT that celebrate local forms of making and craft?

Absorbing Experiences

Making can be a way of absorbing experiences in the same way drawing is a way of creating visuals that can feel different from photography. We have made objects that suggest ways in which diyas (traditional Indian lamps) could be incorporated into a western aesthetic.

It was a way for us to think through how these traditional objects from one place could take on a series of new roles back in our lives. We have made pieces that we would like to live with and use in that way they have meanings to us beyond referencing this visit and our respect for the cultural ways that diyas are used in India.

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Can connectivity provide new forms of verification for paper contracts?

Conductive Contracts

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In India, it's common to draw up a contract using stamp paper. This paper is watermarked and has various monetary denominations. To obtain our stamp paper, we went to the courthouse, where a legal clerk logged our transaction in a ledger and wrote the contract on a typewriter. Traditionally, Indian contracts are signed by thumbprints. We designed a circuit that would light up when the contract was signed by both parties and then stamped by the notary.

Through this project, we explored how conductive ink and a circuit embedded in the paper may provide new forms of interaction and verification.

How can we use existing infrastructure to provide new platforms for teenagers in low-connectivity environments to collaborate, play games and share stories?

ATLIN

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Anstruther mobile data signal is patchy, which presents a problem to teenagers whilst they are out and about.

Using a Raspberry Pi and wifi router we created a community-driven service: ATLIN - Anstruther Teenagers Local Information Network. ATLIN lives in red telephone boxes and is a local network designed by and for teenagers. It is accessible via wifi, although it is intentionally not connected to the internet.

Teenagers can connect to a hidden wifi network with their laptop or mobile device to share stories, news, games and read content others have shared. This content is only accessible within a ~2 meter radius of the telephone box, so it also encourages face-to-face encounters and collaboration.

Can the internet breathe new life into public spaces and community resources that have been left to rot?

The Internet of Forgotten Things

Open IoT Studio

The Internet of Forgotten Things is an attempt to hook up physical spaces and community infrastructure that currently serve no purpose and use the internet to try and breathe a new lease of life into them.

Using the iconic British phonebox as its starting point, this project reimagines a series of typically ‘online’ services and offers them instead through the phone booth. These include a text-to-speech reading of a localised Twitter feed and a messaging service that broadcasts back to Twitter. There is also a phonebooth-roulette and a small connected object that signals the status of the booth.