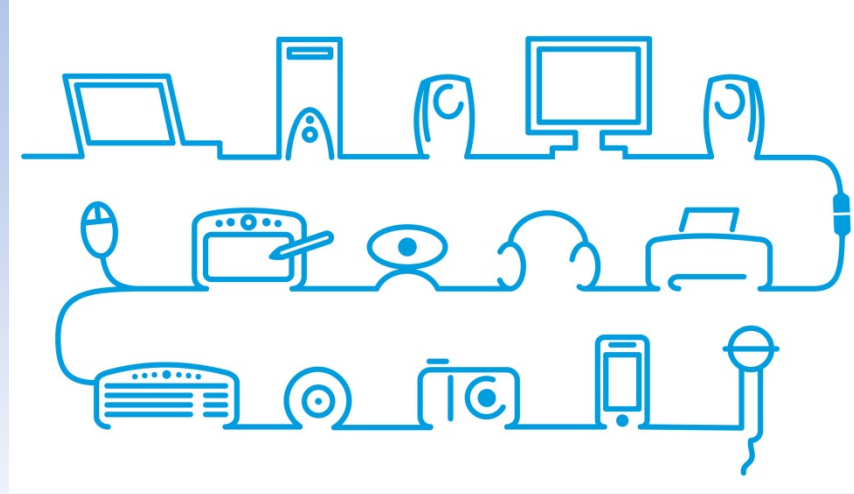


TO LOG OR NOT TO LOG?



Risks and benefits of emerging life-logging applications

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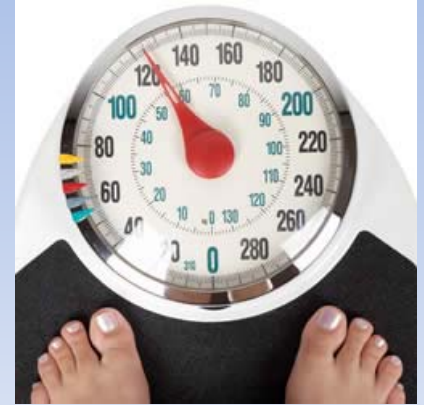
Editor: **Barbara Daskala**, ENISA

Talk Outline

- Motivation and Background
- Technical Assumptions
- Scenario, A Day In The Life, 5 Years from now...
- Benefits
- Risks
- Recommendations
- Questions? Comments? Lunch?

What is Life-logging?

- Why should I care?
- Who is a life-logger?
- Some Examples...



Some More Mundane Examples...

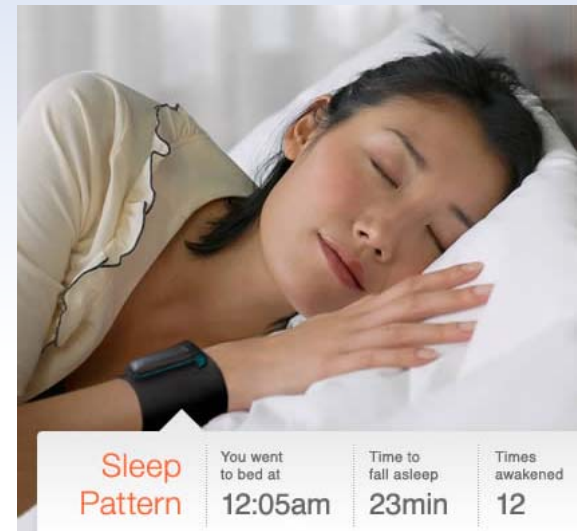


Everyone is a Life-logger (to some degree)

Technology is just making it all easier



Less common lifelogging today...



Sleep Pattern	You went to bed at	Time to fall asleep	Times awakened
	12:05am	23min	12

Methodology

- 12 experts from Academia and Industry
- Write assumptions about technology changes
- Write a motivating scenario for people using projected technology
- Identify tangible and intangible Assets from scenario
- Map Threats to each of the vulnerabilities for each Asset
- Calculate **Risk = f(Asset, Vulnerability, Threat)**
- Priority sort Risks, make Recommendations

Scenario Technical Assumptions 1

- Network infrastructure expands to blur distinctions between being offline or online
- seamless interaction between devices, at home, at work and while mobile
- Powerful new data, video and image-mining technologies will emerge
- Continued developments in "green" ICTs promote new services
- There will be significant advances in battery storage and energy optimisation in devices

Scenario Assumptions 2

- Smart devices (e.g. Cameras, mobile phones) continue to evolve, increased storage, processing & networking.
- Self-locating will be integral part of an ever-increasing range of devices and applications.
- New smart networked devices, such as bio-sensors, will emerge and will enable the collection of more and new personal data individuals, such as:
 - Biometric sensors for identification, health management and mood sensing, creating new ways of interacting with devices
 - Sensors built into every-day objects, such as mirrors, bicycles, automobiles which will be integrated into life-logging applications.

Some near future or emerging technologies...

- Automatic location updates for
 - health, (child) safety, smart traffic/vehicle management
 - Infrastructure planning
- Automatic biomedical monitoring (e.g. Breathing, heartrate, stress levels)
 - Crowd sourcing health/pollution data, vehicles or responding in context of driver's emotional state
- Automatic computer work monitoring for office workers
 - Improved working practices, e.g. Understanding time inefficiencies with e-mail, meetings, etc.

Scenario Family

A day in the life of a family in Malmo, Sweden, 5 years from now...

- Annika, a professional mum, normally office based
 - subscribes to company work monitoring program to improve her productivity
 - drives a car that self locates for traffic congestion sharing and helps road infrastructure planning
 - has a Lifelog Jewellery pendant with a small bluetooth camera
 - monitors her children's online activities
- Bent, a self-employed dad, works from home,
 - cycles into town to meet clients, cycle has location/pollution sensors
 - Has asthma, wears biosensor patches monitoring his status, sharing with doctors and his medical insurance company
 - Uses smartphone for all transactions, automatically sends paperless receipts to tax office for which he receives a discount on his tax

Scenario continued

- Dana, 14-year old daughter, high school student
 - Has location tracking phone but hides true location from parents
 - Posts fake Facebook messages, has really joined a darknet social net to get closer to 16-year old boy
- Christer, 12-year old son, high school student
 - Uses knowledge of social network tracking technology to “accidentally” meet a girl he fancies
 - Mother tracks him playing too many online games with overseas friends and cuts off his gaming access

Benefits for Individuals

- Individuals benefit at personal & society level
- Strengthen family/friend ties, longer, at a distance
- Enhance communication, get advice, links with colleagues, reputation management
- Government has better data to provide services
- Grass roots online democracy influences government
- Automatic effortless logging of personal activity + tools allow people to better understand themselves

Commercial & State Benefits

- People generated data underpins new business models
- Low cost sensor/storage technology provide opportunity to embed in traditional goods (Internet of Things)
- Homes & devices will consume less energy as they regulate themselves based on data from neighbouring sensors
- States can allocate resources more effectively with better data
- Future historians will have a more complete record to understand and learn from the past

Risks to Individuals

- Privacy is at risk from unwanted disclosures
 - Betrayed by data from own devices
 - Accidental or intentional data from others' devices
 - Erroneous data leads to bad decisions
- Reputation (personal and professional)
 - Damaged by data aggregation revealing embarrassing facts
 - Collateral Damage from actions of others

Commercial/Economic/State Risks

- Breaches or data protection failures could lead to financial/reputation/trust loss
 - The Internet of Things opens up many more opportunities for things to go wrong
- States need a balanced regulatory environment
 - Effect of regulatory lag is more pronounced with life-logging technologies
 - Citizens need more protection faster due to pervasiveness, invisibility and persistence of data

Recommendations

- Education: Individuals must take responsibility for their own privacy and that of others
 - Data Protection is a two-way street
- Commercial: build privacy by default, consider privacy and security at design phase
 - e.g. Privacy Impact Assessments
 - Exceed baseline compliance-> more appealing?
- State: data protection, competition, interoperability, choice friendly

Summary

- Transparency and User Control
 - Both tools and legal requirements for users to see where data is going
- Security and Privacy by Default
 - User interface nudges towards privacy
 - Right to be forgotten
- Competition
 - Data portability and interoperability