Behind the Smart World -
Analyzing 22 hard drives from a West African e-waste dump

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BEHIND THE SMART WORLD

Introduction

In today's smart world everything is saved, and growing datasets become increasingly hard to manage. Data that is not accessed or migrated is forgotten on old storage mediums. Once discarded, electronics start their journey as waste, still containing digital traces those who used them before. Electronic remains become landfill, some transform into toxic wastelands such as Agbogbloshie in Ghana. Here our forgotten data resurface. How sensitive is the content of 22 hard-drives bought at Agbogbloshie? Can such data breaches expose individuals, companies or states? How realistic are these fears?

Project framework

The 'Behind the Smart World' ArtLab is part of a series of planned 'research.radical-openness' ArtLabs that serve as an incubator, where artist groups are provided with resources for their research and artistic production. The ArtLabs are an addition to the program of the biennial AMRO (Art Meets Radical Openness) festival and organized by servus.at, a network-based initiative in Linz, Austria. Servus.at runs its own technical infrastructure and offers virtual and physical access opportunities for artists and cultural producers. As a first of its kind, the 'Behind the Smart World' ArtLab is curated by the artist group KairUs.

Acknowledgments

Agbogbloshie

In August 2014 KairUs art collective visited Agbogbloshie, the world's largest electronic waste dump. This e-waste dump, located in the center of Ghana's capital Accra, is ranked as one of the ten most polluted places on earth (1). We learned that e-waste is exported there from western first world countries and discarded in the third world. Though exporting e-waste is regulated by the Basel convention, traders use loopholes such as labeling non-functional consumer goods as "second hand" or "third world help", which implies the intention of helping to bridge the digital divide (2). We became interested in the location after reading several reports that journalists had recovered hard-drives at the e-waste dump containing sensitive data (3). Other reports claimed that local internet criminals were cashing in on e-waste dumping by abusing the data recovered from hard drives at Agbogbloshie (4). We were curious about whether it was true that we could buy hard-drives from the dump, as these articles claimed, and recover data from them. So we bought 22 hard-drives, aiming for diversity in brands, memory sizes and age.

Data recovery sessions

As preparation for the ArtLab we did a first test setup and the hard-drives were hooked up with an IDE/SATA cable to a laptop running Ubuntu 10.4. If data was still accessible, it was copied to a separate hard-drive. Together with experts from servus.at and with the help of the open source tools 'PhotoRec' and 'Partition Magic' we were able to recover additional files. The remaining hard-drives were given to a data rescue company with resources to change hardware parts and then access the data. The participating artists got online access to the recovered data three weeks prior to the ArtLab.

ArtLab

During the first 'research.radical-openness' ArtLab, called 'Behind The Smart World', we invited experts and artists explore the recovered data with us. Together with data recovery and forensic experts we discussed the value and sensitivity of data. We visited the local e-waste recycling facility 'Müller-Guttenbrunn Group' to understand the materiality of e-waste. Afterward the artists discussed the recovered data and topics such as privacy, ownership of data, data-detox, materiality and transformability (of data). In addition, the group experimented with how to use the hard-drives and the data on them as material for artistic expression in form of sonification of data and hardware, macro-photography and animation of browser cache.

Purchased at Agbogbloshie:
- 13 Desktop hard drives (3.5")
- 9 Laptop hard drives (2.5")
- 4x Hitachi
- 4x Fujitsu
- 4x Western Digital
- 3x Maxtor
- 3x Seagate
- 1x Samsung
- 1x HP
- 1x Toshiba
- 1x IBM
- Oldest production date: March 97
- Newest production date: March 08
- Ranging from 644MB to 160GB

From 22 hard-drives:
- Three were immediately accessible with data on them
- Two were recovered by us with open source tools
- One was (so far) recovered by technicians from Datenrettung ECS-Solutions

Questions & Discussion

- What is the value of disposed data?
- Can data found on e-waste dumps be exploited by criminals?
- What concerns do artists face when using data of others?
- What strategies can be applied to avoid data leaks?

Outlook

- Present the outcome of the ArtLab at the AMRO festival.
- Public performances in destroying hard-drives for broader engagement and raising awareness.
- Research trip to Indonesia to work with mobile phones.

Literature cited

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3. 'Cybercrime in West Africa as a Result of Transboundary E-Waste ', Jacquelynn Doyon-Martin, Journal of Applied Security Research, Vol. 10, Iss. 2, 2015.

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