Big Data and Internet of Things for Sustainable Living in the Future City

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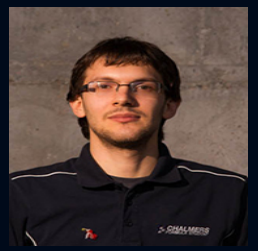
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IoT and Big Data combined: key enabler for sustainable living

Sustainable, Future City

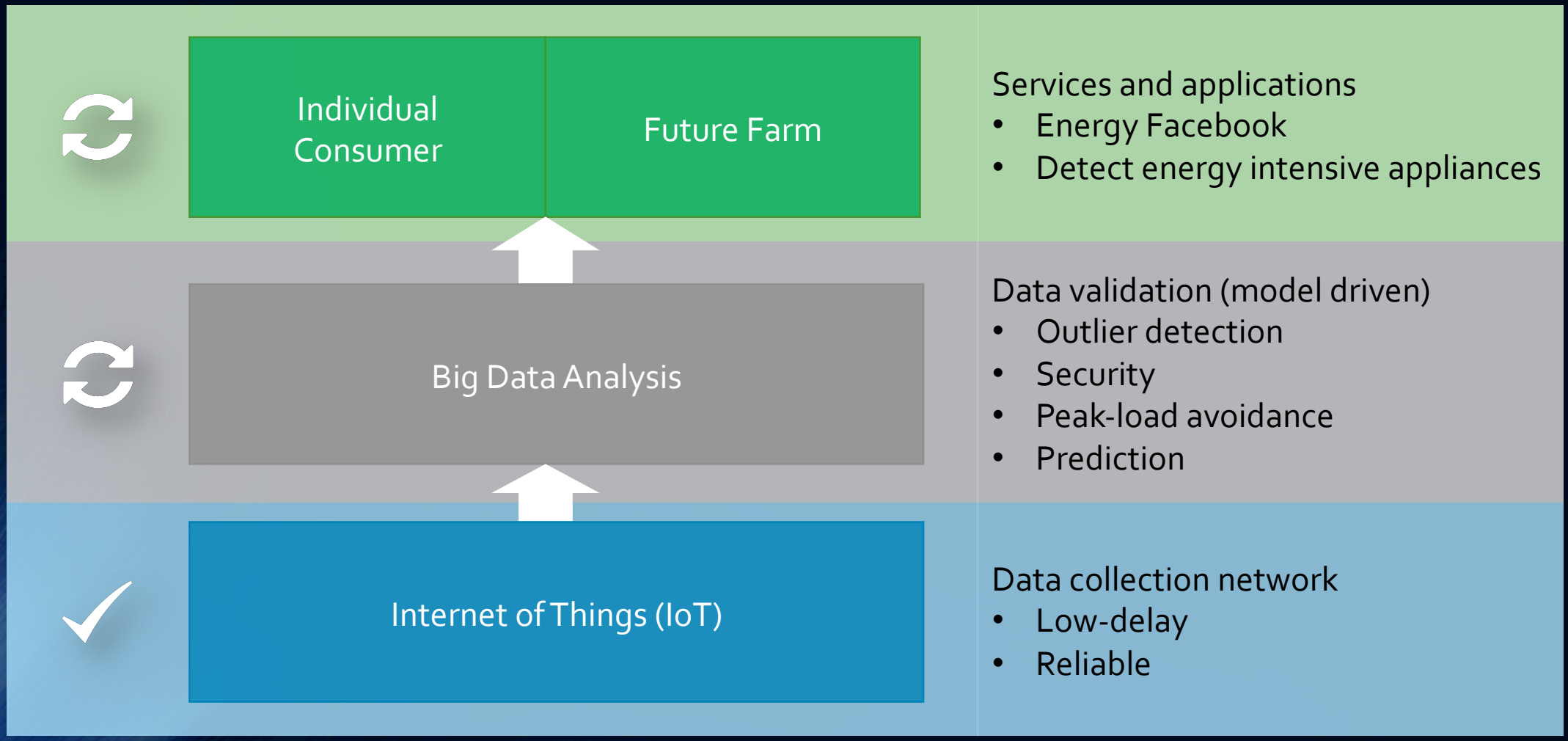
- Energy efficient IoT
- Metropolitan scale IoT operation

Internet of Things

- IoT results in large amounts of data
- key insights for sustainable living

Big Data

Project Outline



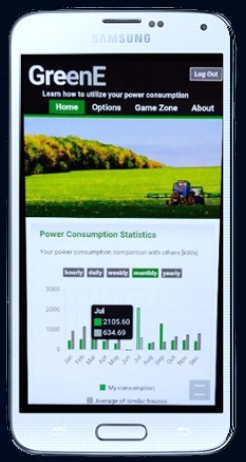
Services and Applications

DETECTING ENERGY INEFFICIENT APPLIANCES

- Load monitoring
- Decomposition (NILM)

GREENE ("ENERGY FACEBOOK"): FEEDBACK TO CONSUMERS

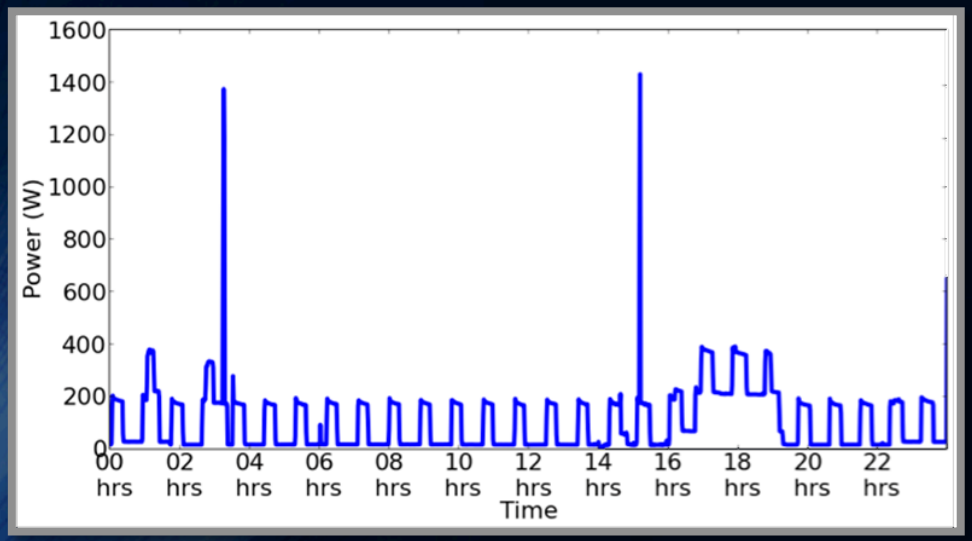
- Consumer awareness
- Social media
- Gamification

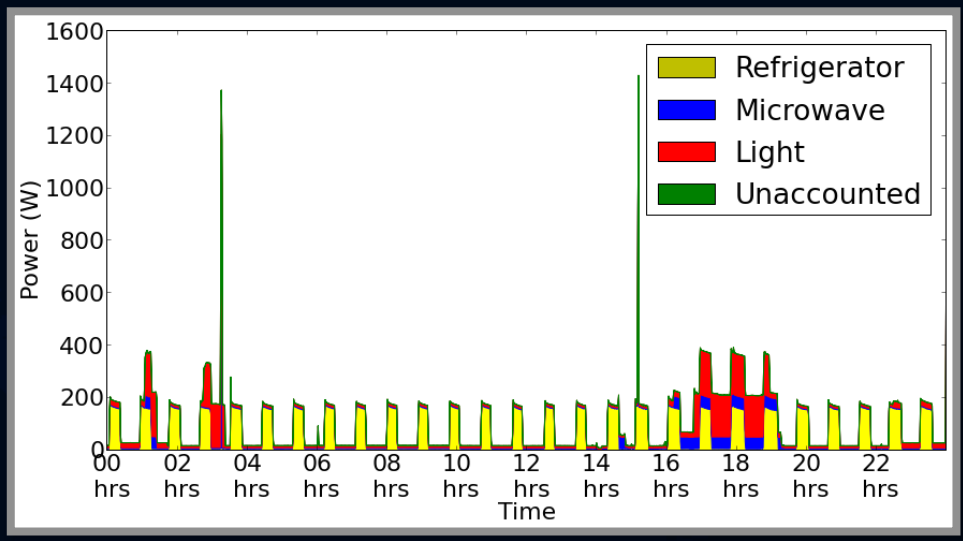


Detecting Energy Inefficient Appliances

NON INTRUSIVE LOAD MONITORING AND DECOMPOSITION

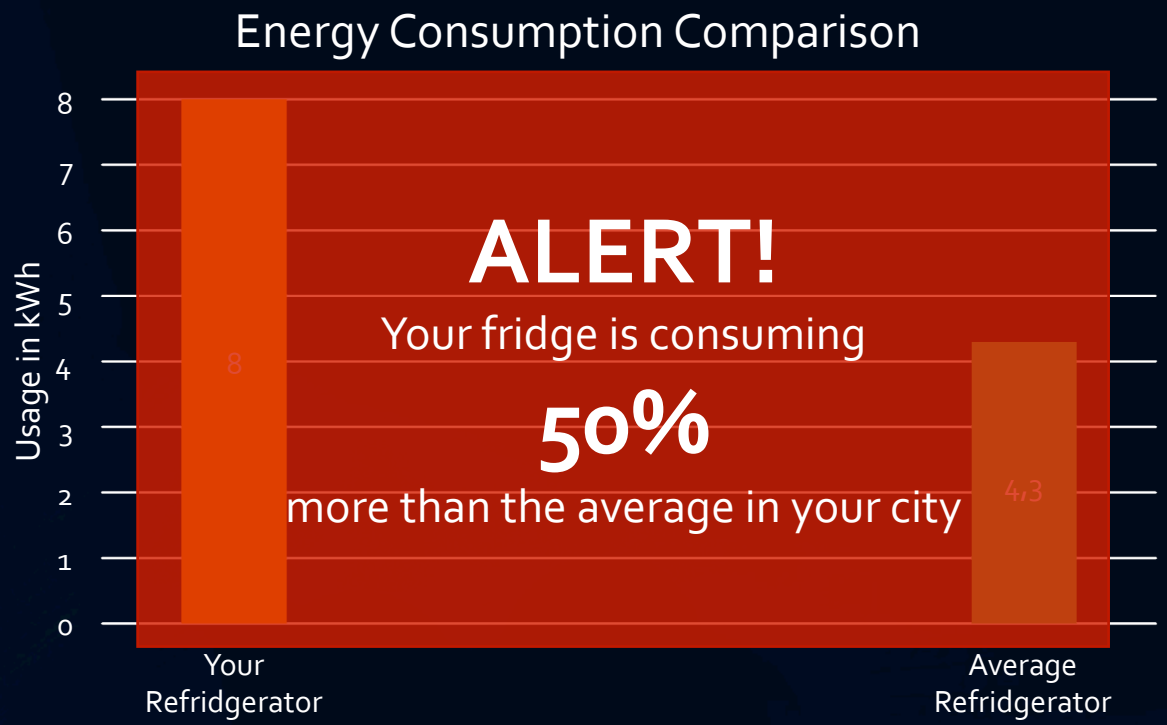
- Studying raw meter traces
- Decomposition into main power consuming appliances





Detecting Energy Inefficient Appliances

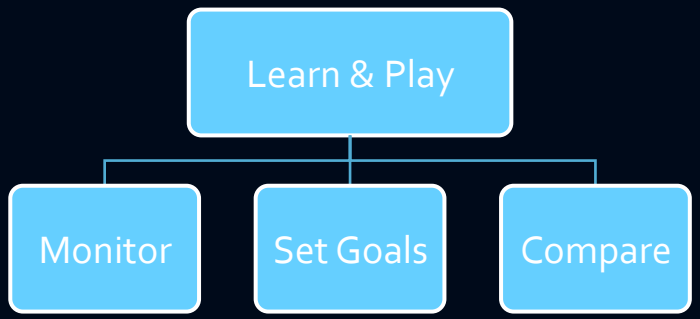
GOAL: COMPARE EACH DEVICE TO THE "AVERAGE" DEVICE

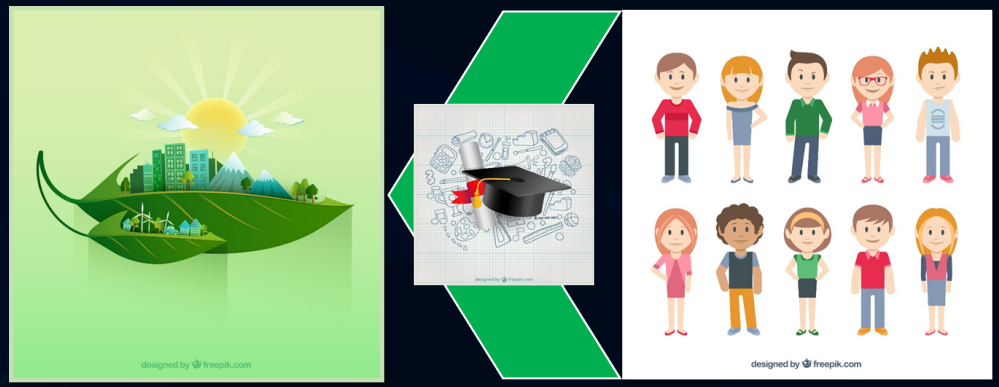


GreenE – "Energy Facebook"

CONSUMER AWARENESS

- Aim: Sustainable Society
- How: Feedback, education and gamification
- For: Environment and their impact





GreenE – "Energy Facebook"

GAMIFICATION – HOW IT WORKS?

Thomas

Goes to a date

Forgets lights ON

GreenE – "Energy Facebook"

GAMIFICATION – HOW IT WORKS?

Beatrice

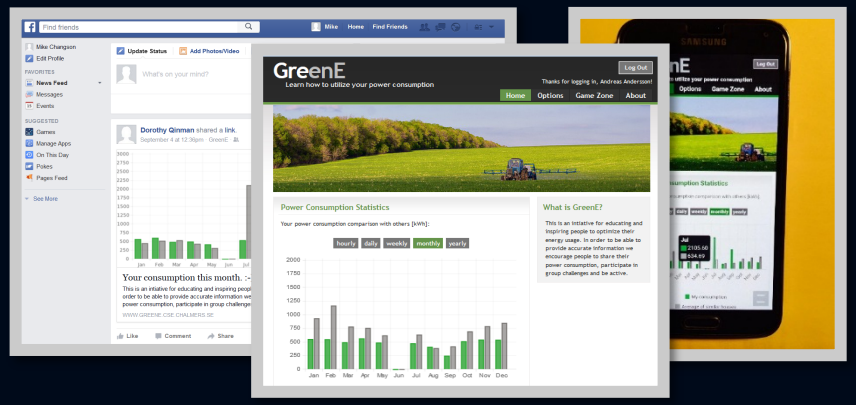
Goes to a party

Everything is OFF
in the house

GreenE – "Energy Facebook"

WHERE WE ARE

- System is up and running
- Video Guide
  https://www.greene.cse.chalmers.se/demo



- Collaboration with Naturbruksskolan Sötåsen in Töreboda
- Open for future collaborations

QUESTIONS?

THANK YOU!

PUBLICATIONS:

1. "Online and Scalable Data Validation in Advanced Metering Infrastructures "
   V. Gulisano, M. Almgren, M. Papatriantafilou; ISGT 2014

2. "METIS: a Two-Tier Intrusion Detection System for Advanced Metering Infrastructures"
   V. Gulisano, M. Almgren, M. Papatriantafilou; SecureComm 2014

3. "Managing your Trees: Insights from a Metropolitan-Scale Low-Power Wireless Network"
   Zhang Fu, Olaf Landsiedel, Magnus Almgren, Marina Papatriantafilou; CCSES / INFOCOM, 2014.

4. "Towards Energy Efficient, High-speed Communication in WSNs"
   Attila Nagy, Olaf Landsiedel; ASCoMS / SafeComp, 2014

5. "Online Temporal-Spatial Analysis for Detection of Critical Events in Cyber-Physical Systems"
   Zhang Fu, Magnus Almgren, Olaf Landsiedel, Marina Papatriantafilou; IEEE BigData 2014

6. "LibReplay: Deterministic Replay for Bug Hunting in Sensor Networks"
   Olaf Landsiedel, Elad Michael Schiller, Salvatore Tomaselli; EWSN 2015

7. "A Study on Data De-pseudonymization in the Smart Grid"
   Valentin Tudor, Magnus Almgren, Marina Papatriantafilou; EuroSec 2015

8. "Harnessing the Unknown in Advanced Metering Infrastructure Traffic"
   Valentin Tudor, Magnus Almgren, Marina Papatriantafilou; SAC '15

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