THE RECYCLING MACHINE
An Urban Intervention project
Who are we?

5th year students at AU in IT Product Development

Study group since 7th semester
Who are we?

Martin L. B. Jeppesen
• Student worker at LEGO System A/S

Interests:
• User-involvement and stakeholder management
• Products and technology
Who are we?

Jonathan E. Hansen

Interests:
• IoT
• Drones
Who are we?

Christoffer Ø. Skovgaard
• Student worker at LEGO System A/S

Interests:
• Domestic design and prototyping
• Playing music
Who are we?

Peter K. Christensen
• Student worker at LEGO System A/S

Interests:
• UX design and product development
• Weightlifting
Agenda

• Course: Urban Intervention
• Our approach: The Fun Theory
• Our intervention: The Recycling Machine
• Evaluation and results

Pause

• International Urban Design Conference
• 3 highlighted themes
  • smart city, transportation, population change
• Our experience with attending
Urban Intervention

**Theme:** Consumerism, Sustainability, Recycling

**Case:** How to reuse material, raising awareness, call to action, broaden horizons, perspectives..

→ Make people *think, reflect, act*

**Intervention:** Stage an intervention in a public space in Aarhus
Urban Intervention

Borassi, G. (2008). City 2.0:

“They [urban interventions] contribute to an erosion of some established notions of urban comfort; they undermine conventional wisdom but don’t necessarily confront it head on”

“What seems important here [...] is their capacity to trigger a “disturbance”, certain discomfort in the predefined system”

“[they] arise in a definite territory of friction and tension between the daily lives of urban residents and what would otherwise considered the norm proposed by the city.”
The Fun Theory
Initiative by Volkswagen

“A thought that something as simple as fun is the easiest way to change people’s behaviour for the better. Be it for yourself, for the environment, or for something entirely different, the only thing that matters is that it’s change for the better.”
VÄRLDENS DJUPASTE SÖPTUNNA
The Recycling Machine

A Thursday afternoon - Ryesgade (Strøget) - 2,5 hours
The Recycling Machine
The Recycling Machine

Inspired by Volkswagen’s The Fun Theory

Theme: Habit formation
- Positive Punishment (e.g. Trash in nature)
- Positive Reinforcement (our approach!)

The AELIA-model:
- Difficult evaluating Influence - Action
Results

Desired evaluation: Study over several months

Limitation: 7 week course
• Follow-up interview
• Effect of pictures and videos
Conference

Acceptance of our paper:

Paper Presented at the
9th International Urban Design Conference
Canberra, 7-8 November 2014
”Smart cities for 21st century Australia - how Urban Design Innovation can change our cities.”

9th International Urban Design Conference
7-9 November 2016
Conference overview

- Attendees: Practitioners, directors, academics
  - Urban Designers, Architects, City planners, landscape architects, engineers

- How to make a city smart?
- Population change and liveability
- City Infrastructure
- High density living
- Future of car dependant cities
- ...

“Be inspired by innovations and projects that are transforming cities. This conference is an opportunity for design professionals to exchange ideas and experiences, to be creative and visionary, and to contribute to redesigning our urban futures.”
Fun facts

- 180,000 people move into cities a day
- By 2050, 70% of the global population will live in cities
  - Up from 34% in 1960 to 54% today
- Frost and Sullivan predict that by 2020 the Smart Cities market will be worth $1.5 trillion
- 40% of traffic in city centres is caused by people looking for parking spaces
“A smart city is an urban development vision to integrate multiple information and communication technology (ICT) and Internet of Things (IoT) solutions in a secure fashion to manage a city's assets”.
What is a Smart City?

A smart city is one that...

... _dramatically increases the pace_ at which it improves its sustainability and resilience.

... by fundamentally improving how it _engages society_, how it applies _collaborative leadership_ methods, how it _works across disciplines and city systems_, and how it uses _data and integrated technologies_.

... in order to _transform services and quality of life_ to those in and involved with the city (residents, businesses, visitors).
Why have a Smart City?

“The goal of building a smart city is to improve quality of life by using urban informatics and technology to improve the efficiency of services and meet residents' needs”
How to build a Smart City?

- A simple answer: there’s an app for that!

DubaiNow Smartphone App

$1 billion saving
What a Smart City really is

1. Smart Energy
2. Smart Citizen
3. Smart Healthcare
4. Smart Governance
5. Smart Buildings
6. Smart Mobility
7. Smart Technology
IoT: More Connected Devices Than People

<table>
<thead>
<tr>
<th>Year</th>
<th>Connected Devices Per Person</th>
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<tbody>
<tr>
<td>2003</td>
<td>0.08</td>
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<tr>
<td>2010</td>
<td>1.84</td>
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<tr>
<td>2015</td>
<td>3.47</td>
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<tr>
<td>2020</td>
<td>6.58</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>World Population</th>
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<tbody>
<tr>
<td>2003</td>
<td>6.3 Billion</td>
</tr>
<tr>
<td>2010</td>
<td>6.8 Billion</td>
</tr>
<tr>
<td>2015</td>
<td>7.2 Billion</td>
</tr>
<tr>
<td>2020</td>
<td>7.6 Billion</td>
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</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Connected Devices Per Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>500 Million</td>
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<tr>
<td>2010</td>
<td>12.5 Billion</td>
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<tr>
<td>2015</td>
<td>25 Billion</td>
</tr>
<tr>
<td>2020</td>
<td>50 Billion</td>
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</table>
Example: Smart Parking

- Visibility into the availability of parking spaces across the city
- Reserve the closest available space
- Demand-based pricing.
More examples: Remote Sensing

- Water management
- Gas monitoring
- Power usage
- Air quality monitoring
Sensor Network Infrastructure

- Community based
- LoRaWAN network
- Available for anyone to use
Big Data is not Magic
Population change and liveability
Population change and liveability

Response to population change:

- High-rise living

Aspects of well-being:

- Belonging, attachments, identity
- Many of these aspects are not found in high-rise living

Problem:

- All human beings has the same basic needs, but yet we built in a way that treat them as if they don’t need certain things.
Population change and liveability
5 min break
Future of Transportation

4 technical disruptors to have a major impact on the future of private transportation:
1. Solar energy  
2. Electric (battery)  
3. Autonomous  
4. Ownership vs. service

Focus on driverless cars
Future of Transportation

4 technical disruptors to have a major impact on the future of private transportation:
1. Solar energy  2. Electric (battery)  3. Autonomous  4. Ownership vs. service

“We need to make solar panels as appealing as electric cars have become” – Elon Musk
Future of Transportation

4 technical disruptors to have a major impact on the future of private transportation:

1. Solar energy  
2. Electric (battery)  
3. Autonomous  
4. Ownership vs. service

Tesla Gigafactory for battery technology in Spark, Nevada

Expects to double current battery life time distance of 485 km within 1-2 years

Battery technology for your home

Works with Tesla’s solar energy
Future of Transportation

4 technical disruptors to have a major impact on the future of private transportation:
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2. Electric (battery)  
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4. Ownership vs. service

<table>
<thead>
<tr>
<th>SAE Level</th>
<th>Name</th>
<th>Narrative Definition</th>
<th>Execution of Steering and Acceleration/Deceleration</th>
<th>Monitoring of Driving Environment</th>
<th>Fallback Performance of Dynamic Driving Task</th>
<th>System Capability (Driving Modes)</th>
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<tbody>
<tr>
<td>0</td>
<td>No Automation</td>
<td>the human driver monitors the driving environment</td>
<td>Human driver</td>
<td>Human driver</td>
<td>Human driver</td>
<td>n/a</td>
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<td>1</td>
<td>Driver Assistance</td>
<td>the driver assists in steering, acceleration/deceleration</td>
<td>Human driver</td>
<td>Human driver</td>
<td>Human driver</td>
<td>Some driving modes</td>
</tr>
<tr>
<td>2</td>
<td>Partial Automation</td>
<td>the driver assists in steering, acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task</td>
<td>System</td>
<td>Human driver</td>
<td>Human driver</td>
<td>Some driving modes</td>
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<tr>
<td>3</td>
<td>Conditional Automation</td>
<td>the driver assists in steering, acceleration/deceleration using information about all aspects of the dynamic driving task and with the expectation that the human driver respond appropriately to a request to intervene</td>
<td>System</td>
<td>System</td>
<td>Human driver</td>
<td>Some driving modes</td>
</tr>
<tr>
<td>4</td>
<td>High Automation</td>
<td>the driver assists in steering, acceleration/deceleration using information about all aspects of the dynamic driving task and with the expectation that the human driver respond appropriately to a request to intervene</td>
<td>System</td>
<td>System</td>
<td>System</td>
<td>Some driving modes</td>
</tr>
<tr>
<td>5</td>
<td>Full Automation</td>
<td>the driver assists in steering, acceleration/deceleration using information about all aspects of the dynamic driving task and with the expectation that the human driver respond appropriately to a request to intervene</td>
<td>System</td>
<td>System</td>
<td>System</td>
<td>All driving modes</td>
</tr>
</tbody>
</table>
Future of Transportation

4 technical disruptors to have a major impact on the future of private transportation:
1. Solar energy  2. Electric (battery)  3. Autonomous  4. Ownership vs. service

- Google has had driverless cars driving over 2 million miles
- Singapore has launched its first driverless taxi
- Lyon has launched the world’s first driverless bus
- Uber has launched a driverless car in Pittsburg
Future of Transportation

4 technical disruptors to have a major impact on the future of private transportation:
1. Solar energy  2. Electric (battery)  3. Autonomous  **4. Ownership vs. service**

- 90% of the time, your car is parked
- 2 parking spots pr. person
- In US: 4 parking spots to every car
- In UK: on average, a person uses 106 days of a lifetime looking for parking spots
Future of Transportation

4 technical disruptors to have a major impact on the future of private transportation:
1. Solar energy  2. Electric (battery)  3. Autonomous  4. Ownership vs. service

People’s mindset will change - has it already started?
Future of Transportation

How will this impact cities?

Today, the city infrastructure is determined by roads

Parkings spots → Pick-up points?
Project Highlights

**MONA: Museum of Old and New Art**

Project to piss off academics: “art can be fun!”
Serve alcohol - people had to go to WC - toilets with mirrors
Community-driven: calling it “our museum”
- Completely changed the city of Hobart
- Festivals, visitors, transport, shops, tourists
Project Highlights

The Soofa Bench
Clever use of space:
- We have benches → added value

The Soofa Sign
Solar-powered display
Project Highlights

The “Humble Lamppost”

Rationale:
• We already have lampposts – they take up space
• So why not add functionalities that exceeds just light?
• E.g. Calling emergency, charging cars, speakers, alerts, display information, gathering point
Our experience with attending

Theory vs Practice

How practitioners involve theories in their work - and where they don’t!

• E.g. User Involvement

Cultural differences
”Urban Design”
”What is a Smart City?”
Our experience with attending

Experience in the field

Networking
Broadened practical scope
• What keeps the wheels turning?

Beyond 5 ECTS
What else did we do?
Thank you!

Martin Lykke - Jonathan Hansen
Christoffer Skovgaard - Peter Knøsgaard

The Recycling Machine
Aarhus Universitet