Smart Lighting
Problem description

- Effective street lighting systems provide inhabitants with safety and comfort during dark time

Problem:
- Static lighting
  - Most of the time light remained unclaimed
  - Energy is wasted uselessly
  - Light pollution
Possible solutions

- Turning off lights
  - Not solution at all
  - Safety and comfort impact

- Using motion detector sensor
  - Narrow coverage of motion sensor
  - Allow to see only near field
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How to do this

- Streetlights are driven by controllers
- Controllers interconnected in common network
- Light state depend not only state of local sensors, but also on states of all nearby sensors
- Based on information system decides which set of lights should be turned on
Strugles

- Very large network
  - ~1000 light poles in town like Köthen
- Autoconfiguration
  - Manual configuration of each node will lead to enormous deployment costs and could be impossible
- Connectivity
- Control algorithm
**Light controller**

- ARM board + Linux OS
  - Low costs
  - Low power consumption
  - Flexible

![Diagram of light controller system]

- IR Motion Sensor
- ARM Board
- Wireless Communication Module
- Light
Sensor network

- Wireless mesh networks
  - Easy to deploy
  - Mature technology
- Using IPv6 stack
  - Compatibility with existing networks
Autoconfiguration and Control Algorithm

- Combine information acquired by wireless network
  - Near by-standing controllers can see each other in network directly
- Using Machine Learning techniques to discover behaviour patterns
  - Gathering data from sensors into on storage
  - Analyze and create model of pedestrians movement
  - Apply model
Benefits

- Energy saving
- Increase comfort and safety
- Lower energy requirements during night could benefit in case of use solar energy

- Side effects