Bernburg
Dessau
Köthen

**Hochschule Anhalt**
Anhalt University of Applied Sciences

emw
Fachbereich
Elektrotechnik, Maschinenbau
und Wirtschaftsingenieurwesen

# Smart Lighting

# *Problem description*

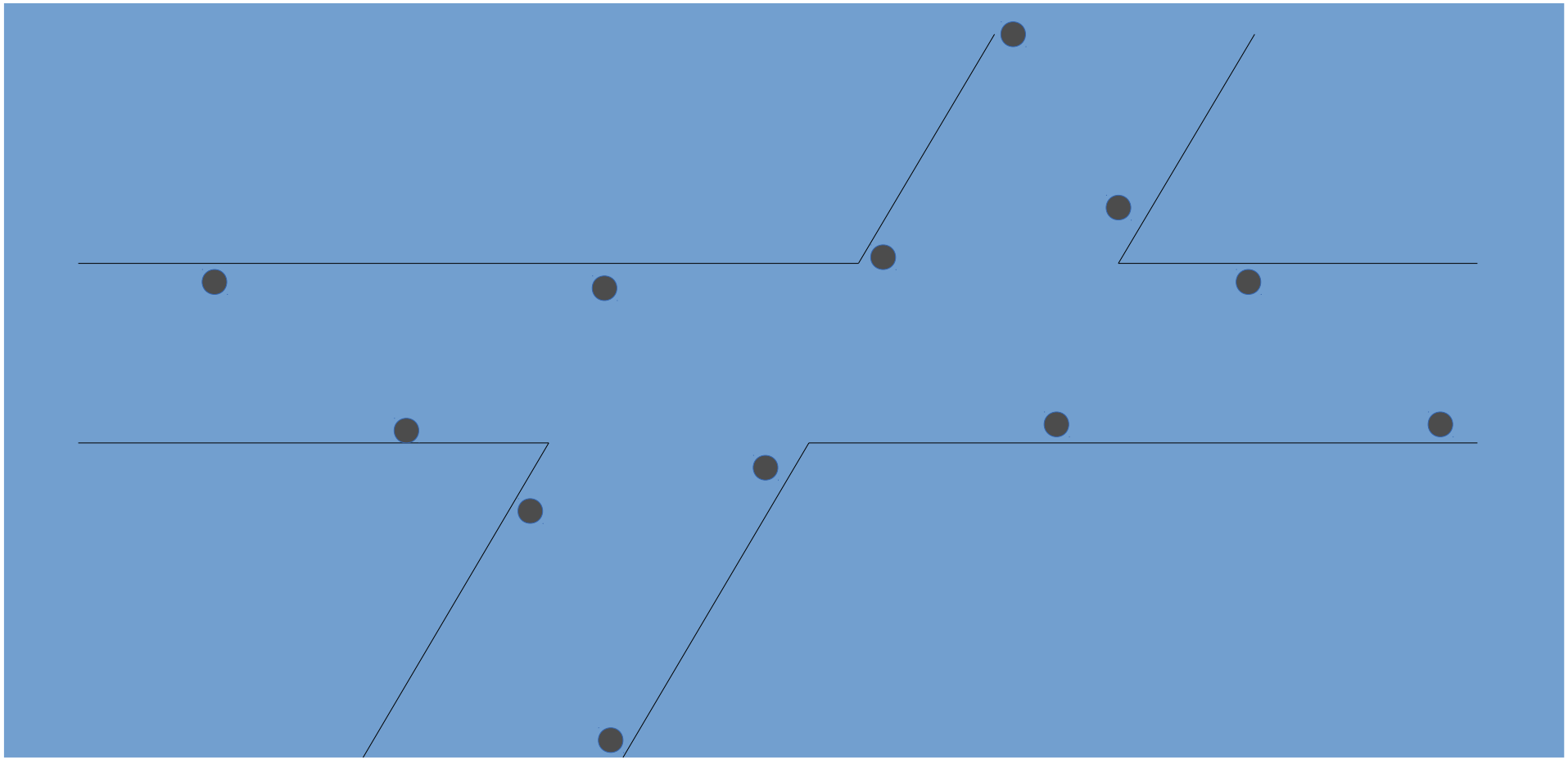
- Effective street lighting systems provide inhabitants with safety and comfort during dark time

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

## *Possible solutions*

- Turning off lights
  - Not solution at all
  - Safety and comfort impact
- Using motion detector sensor
  - Narow coverage of motion sensor
  - Allow to see only near field

# How it will looks like



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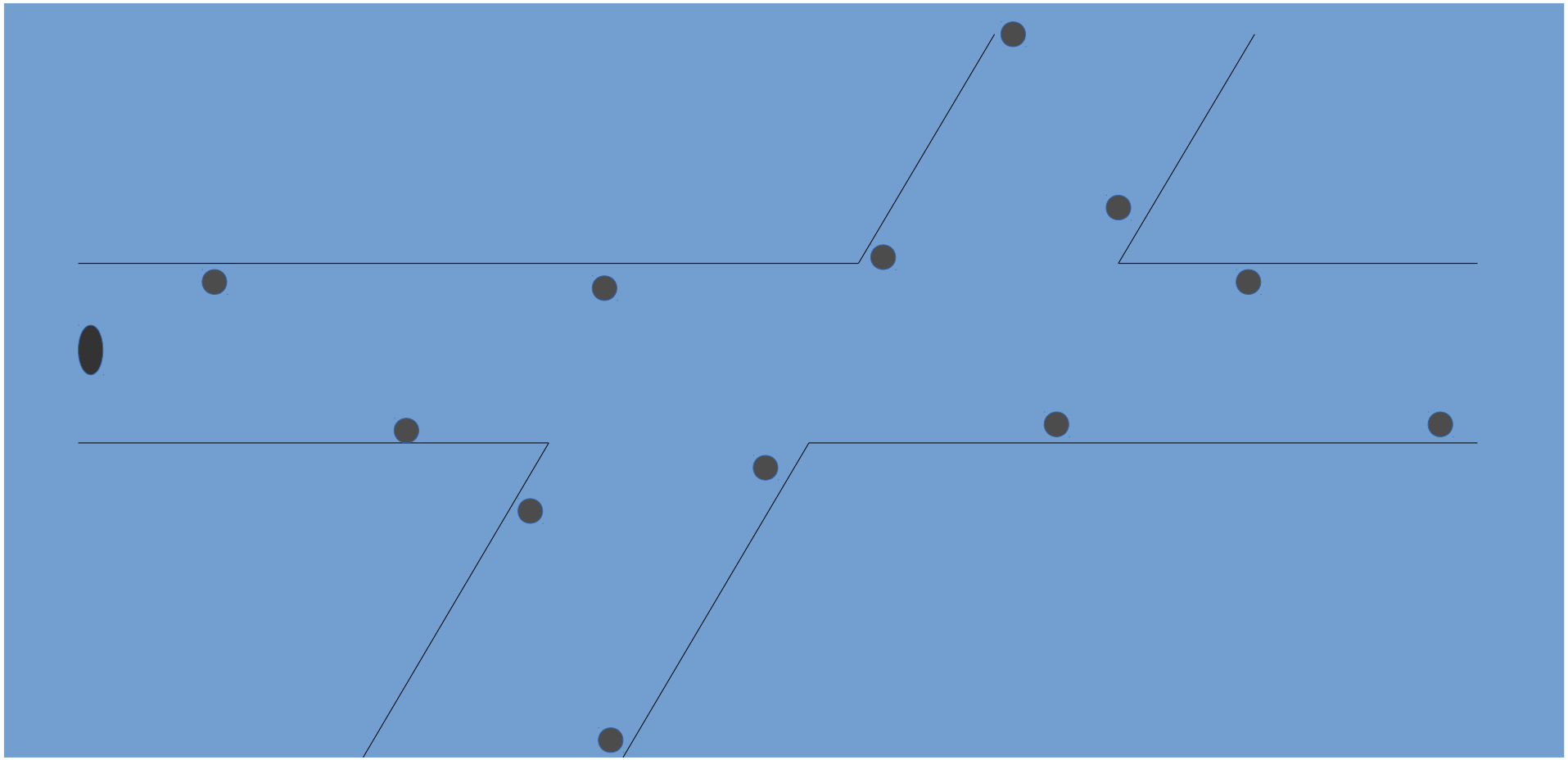

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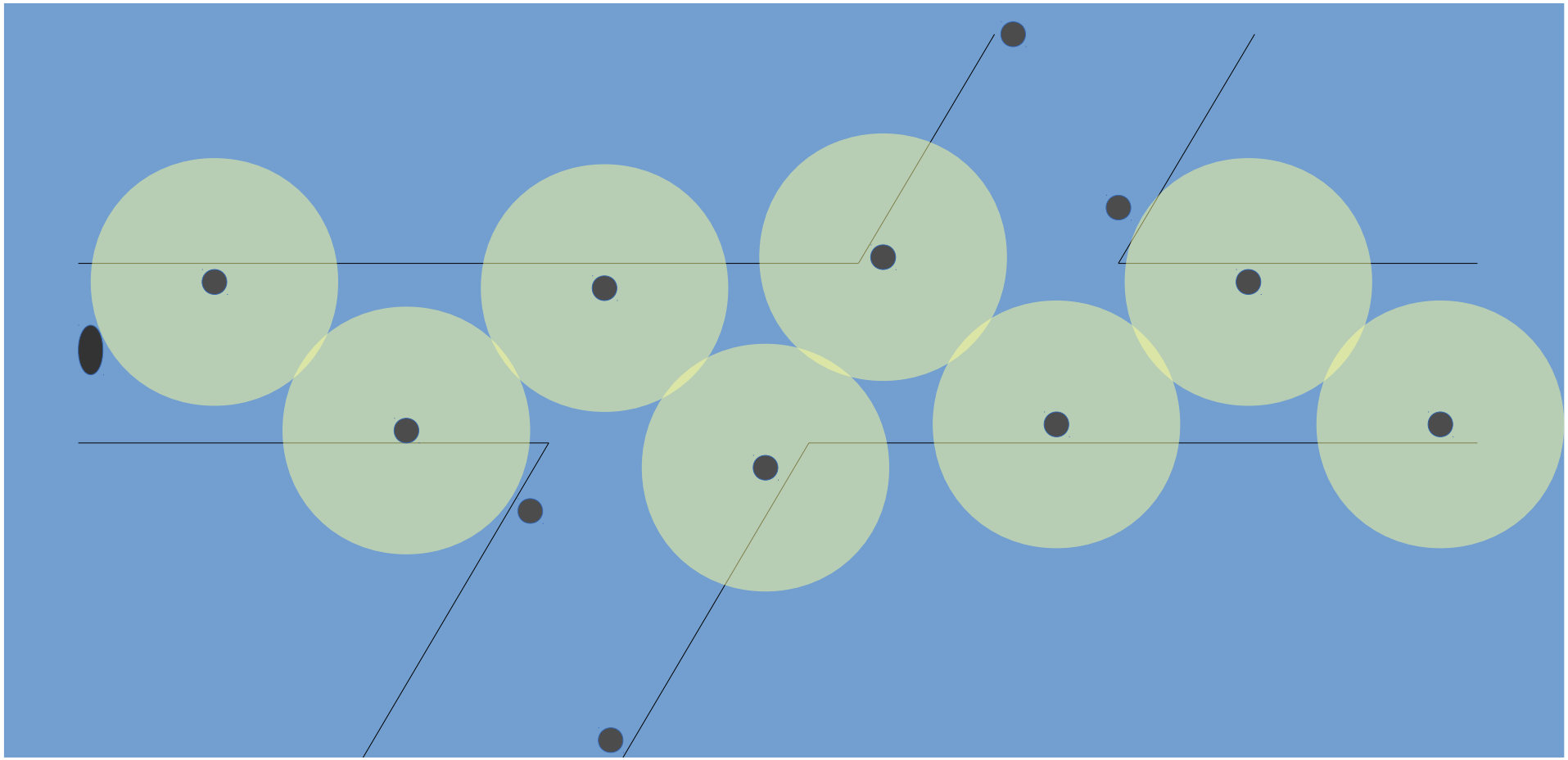

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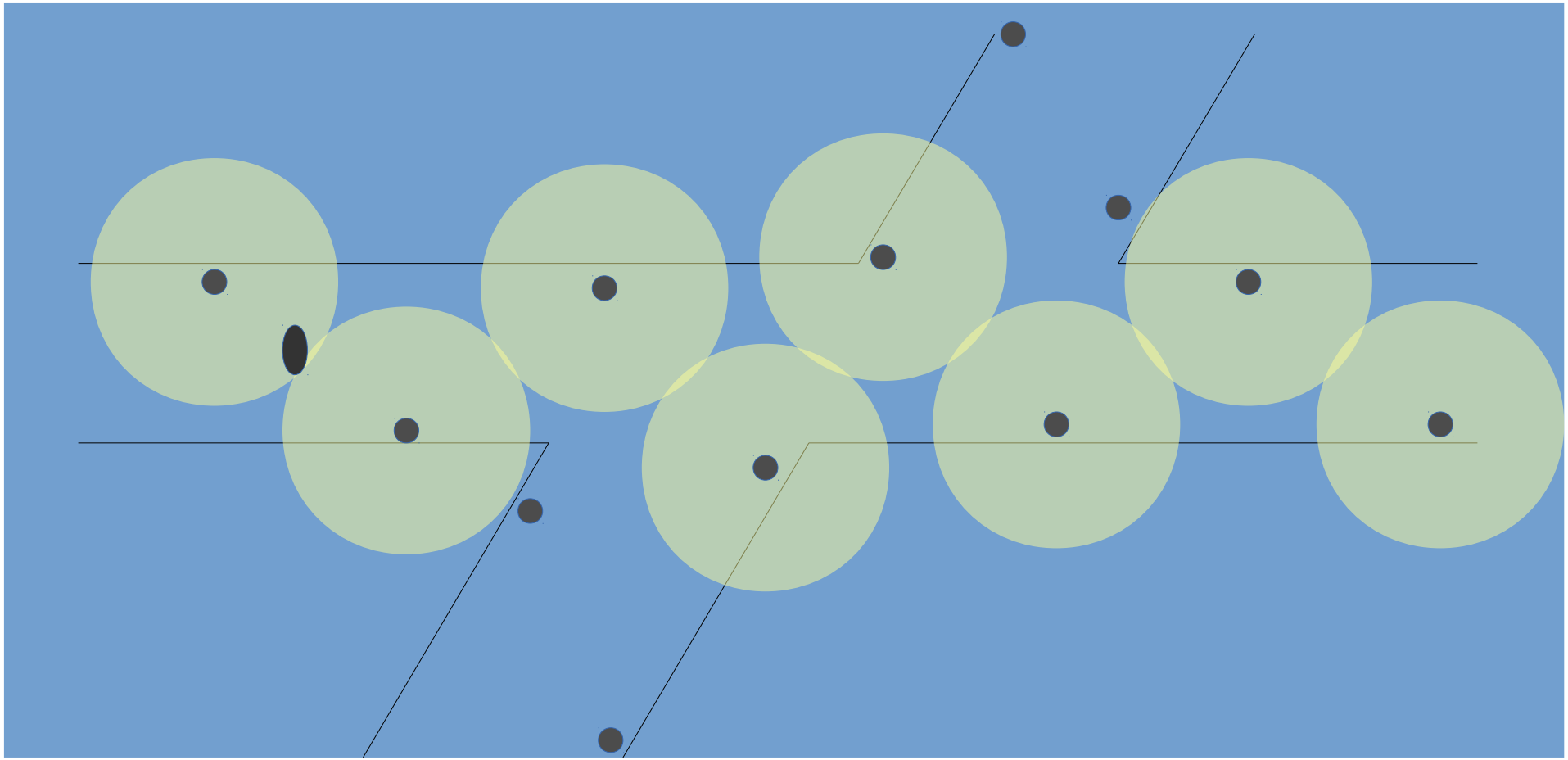

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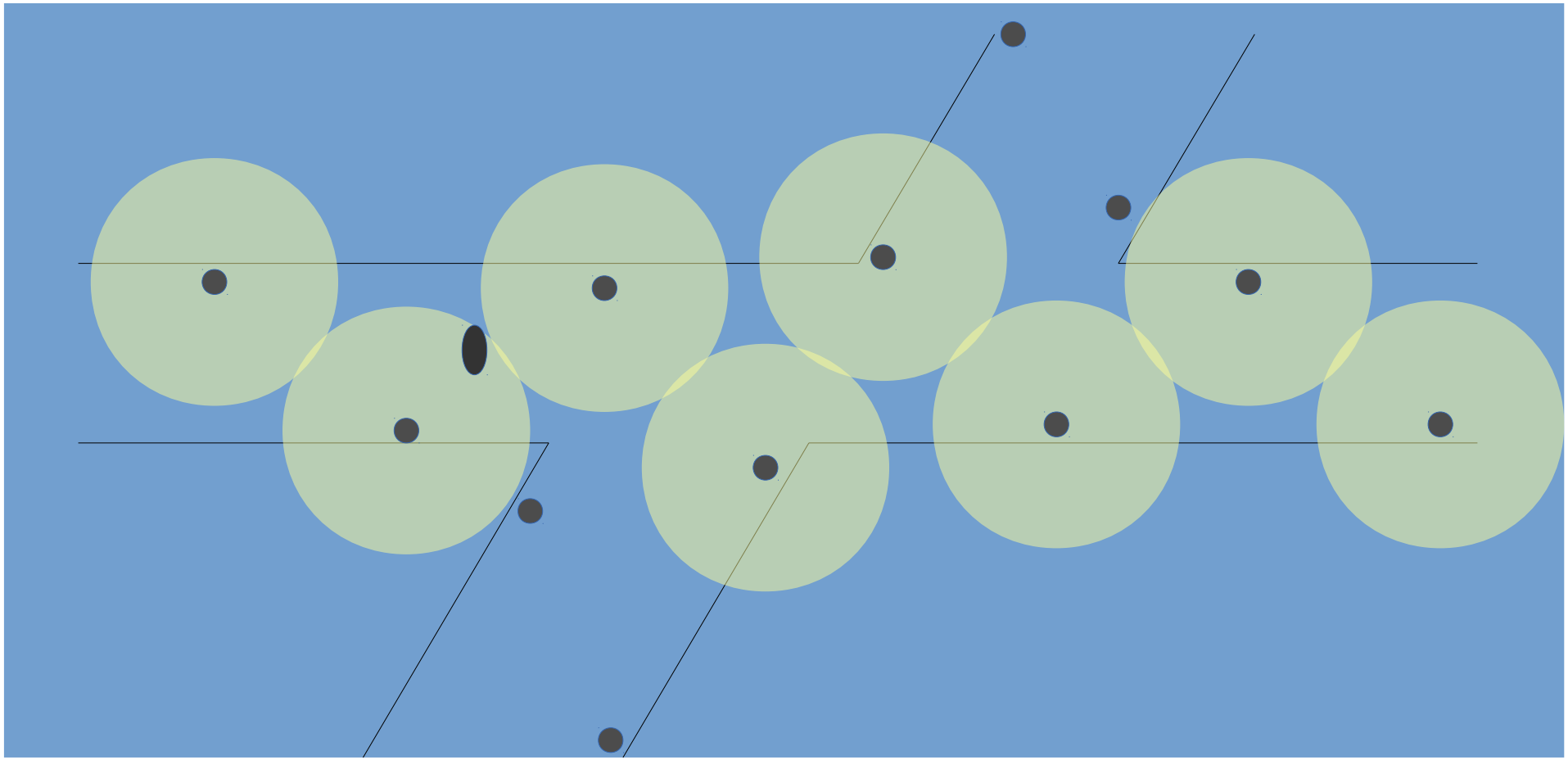

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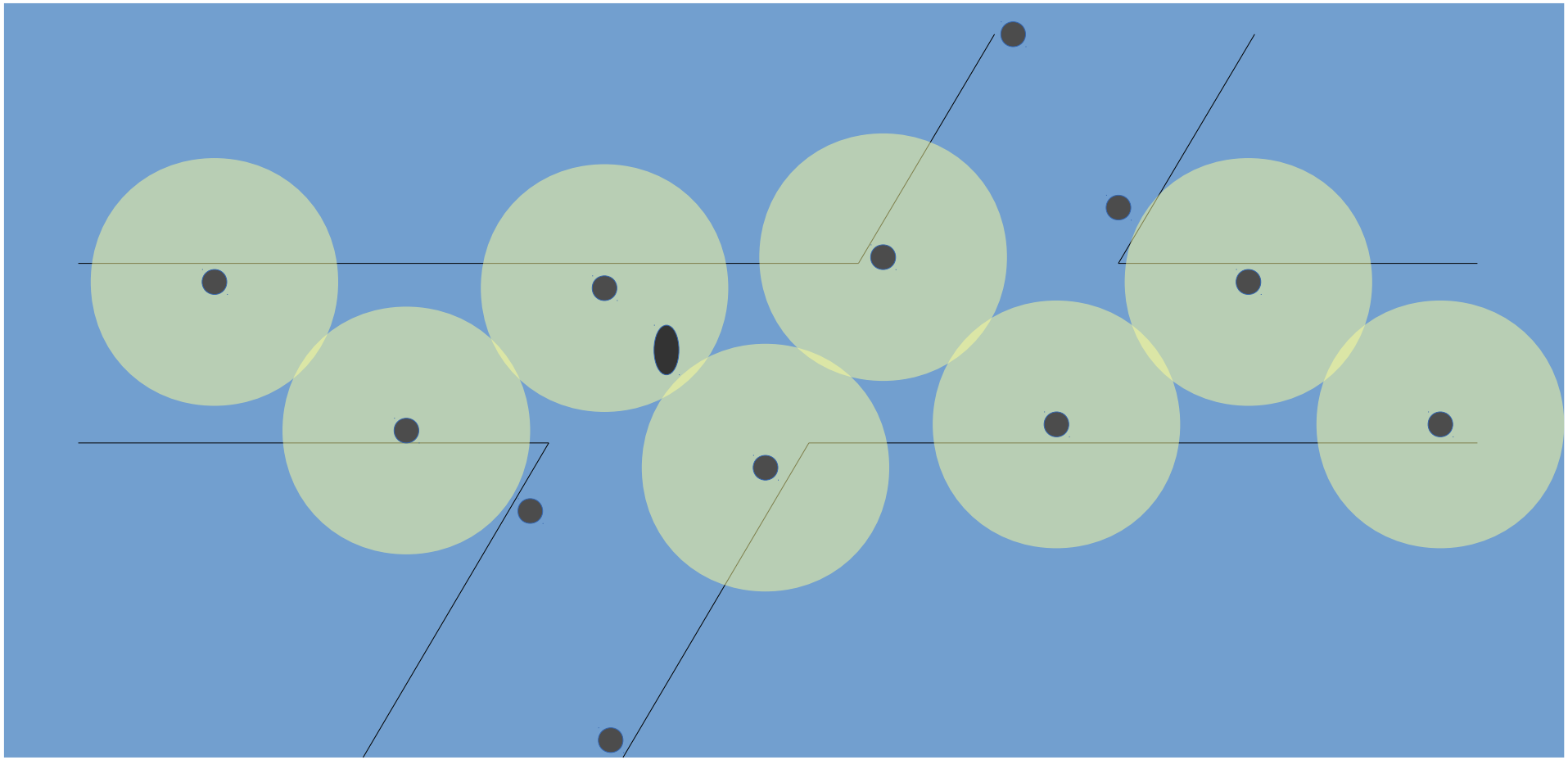

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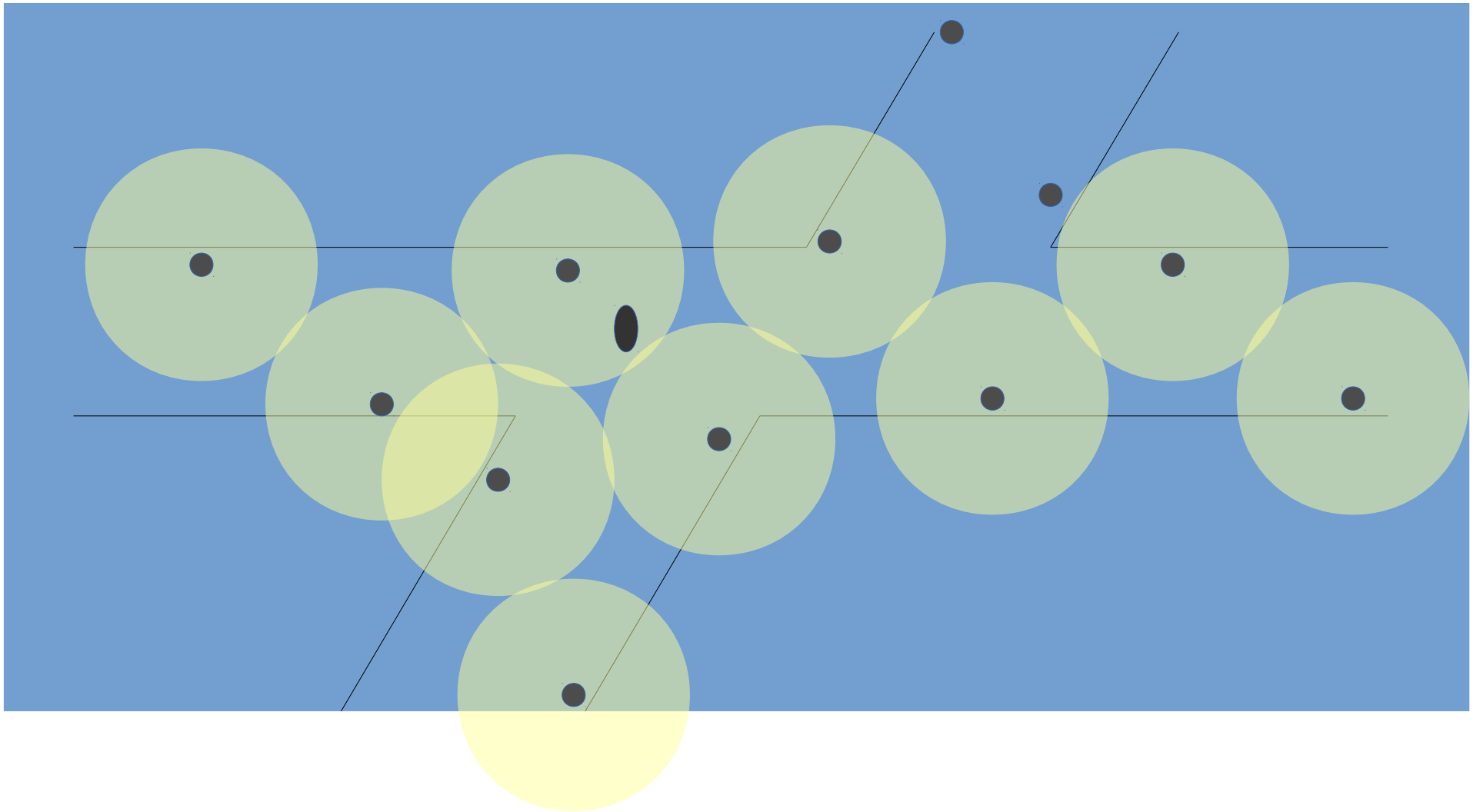

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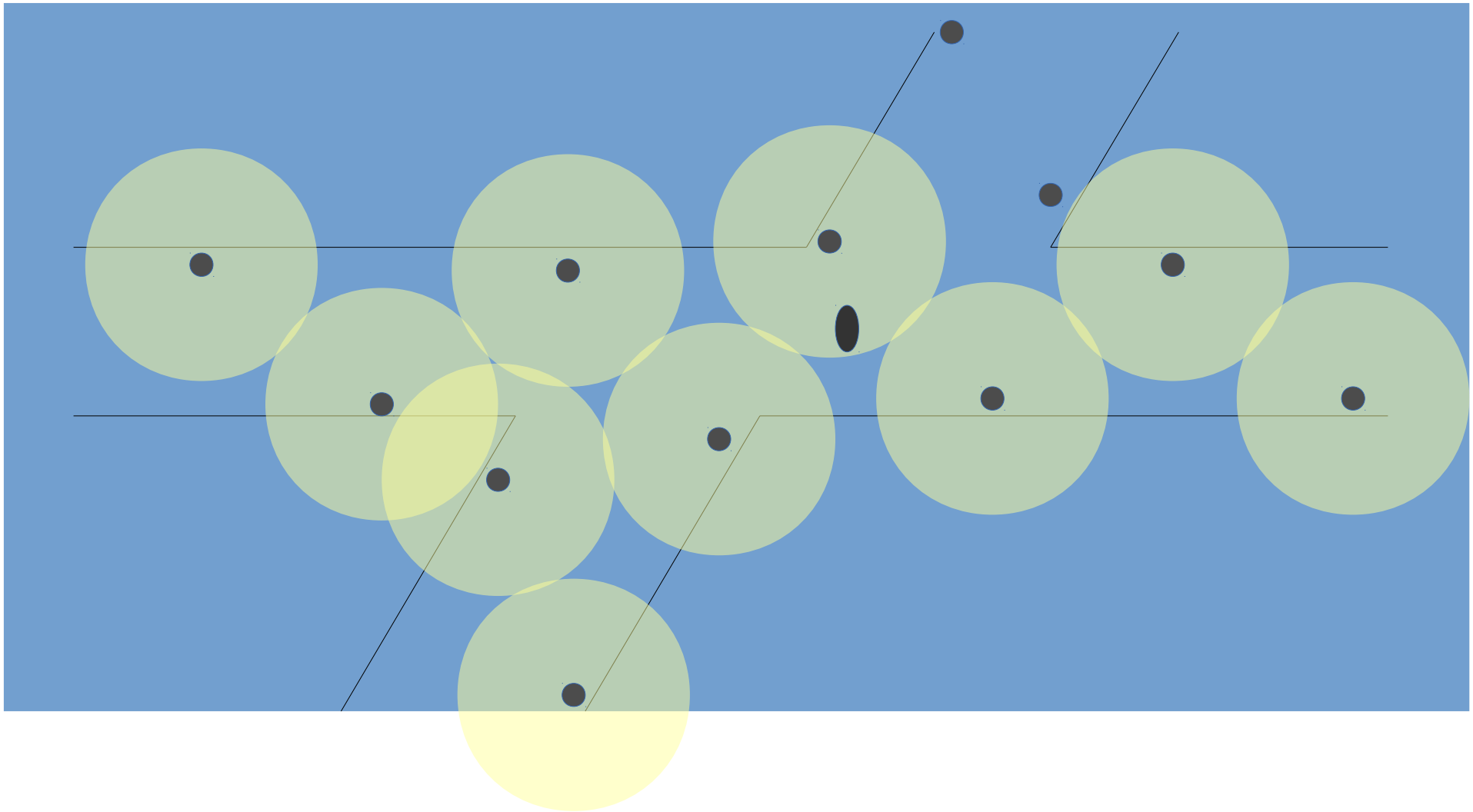

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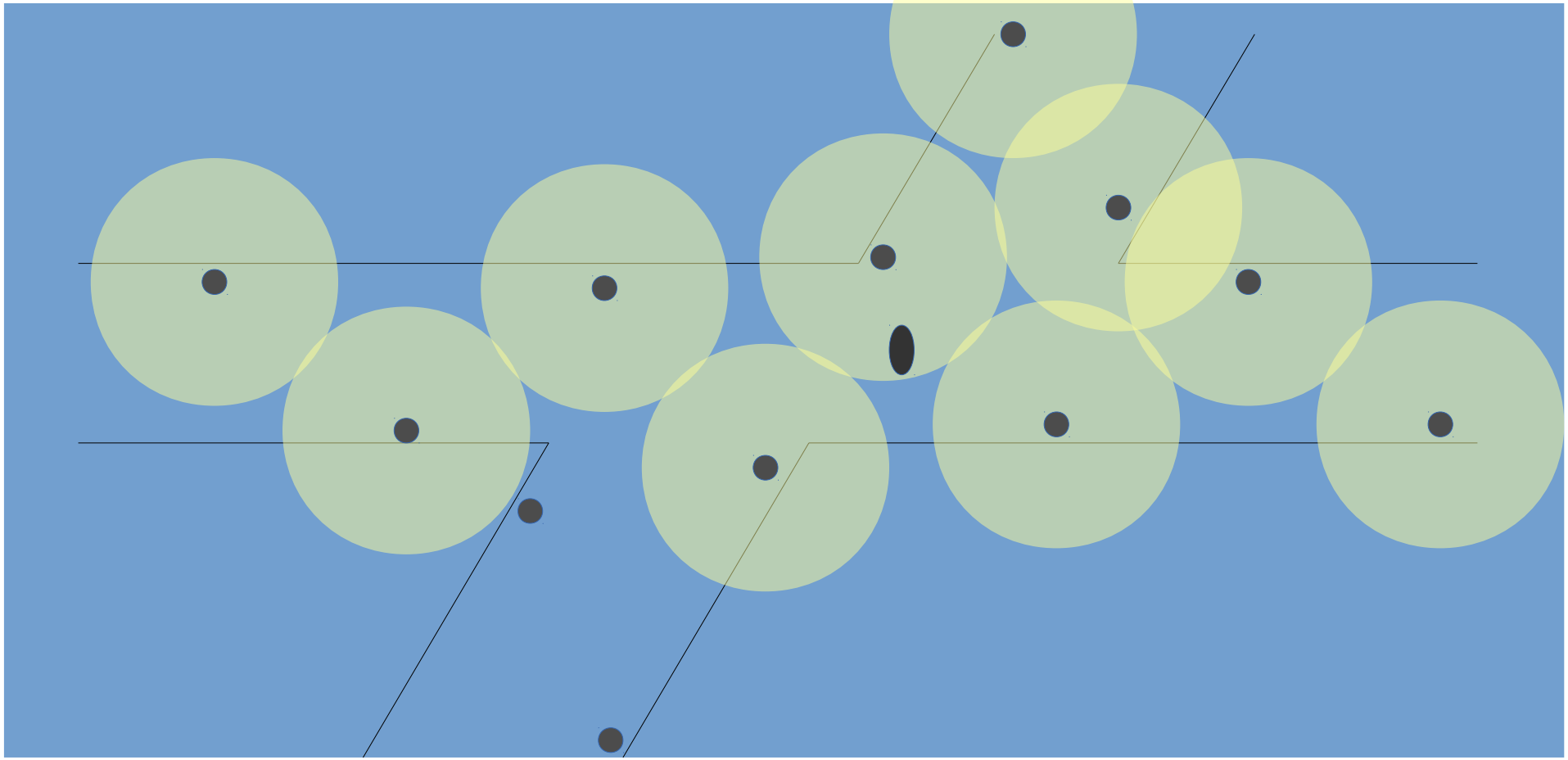

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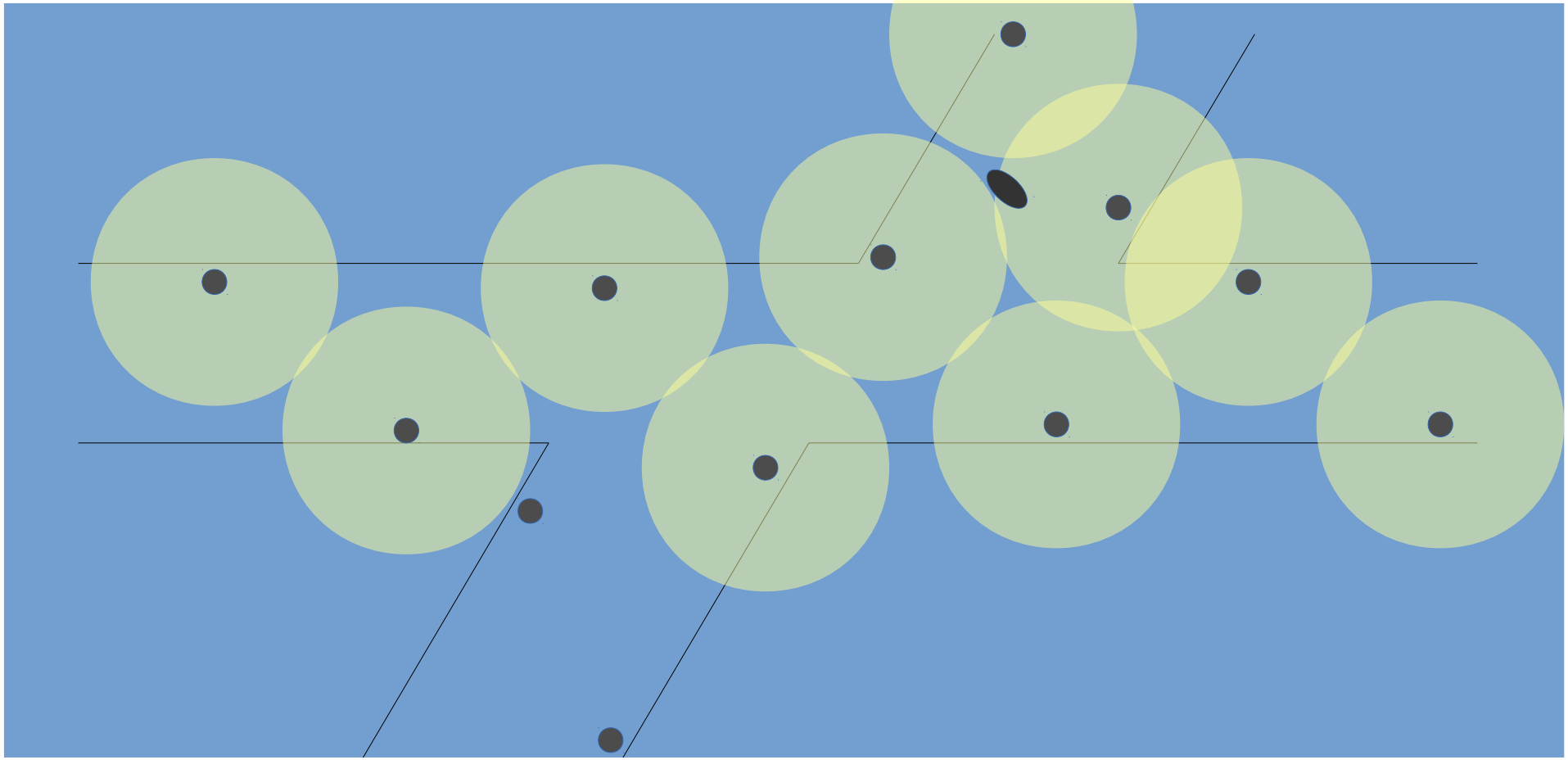

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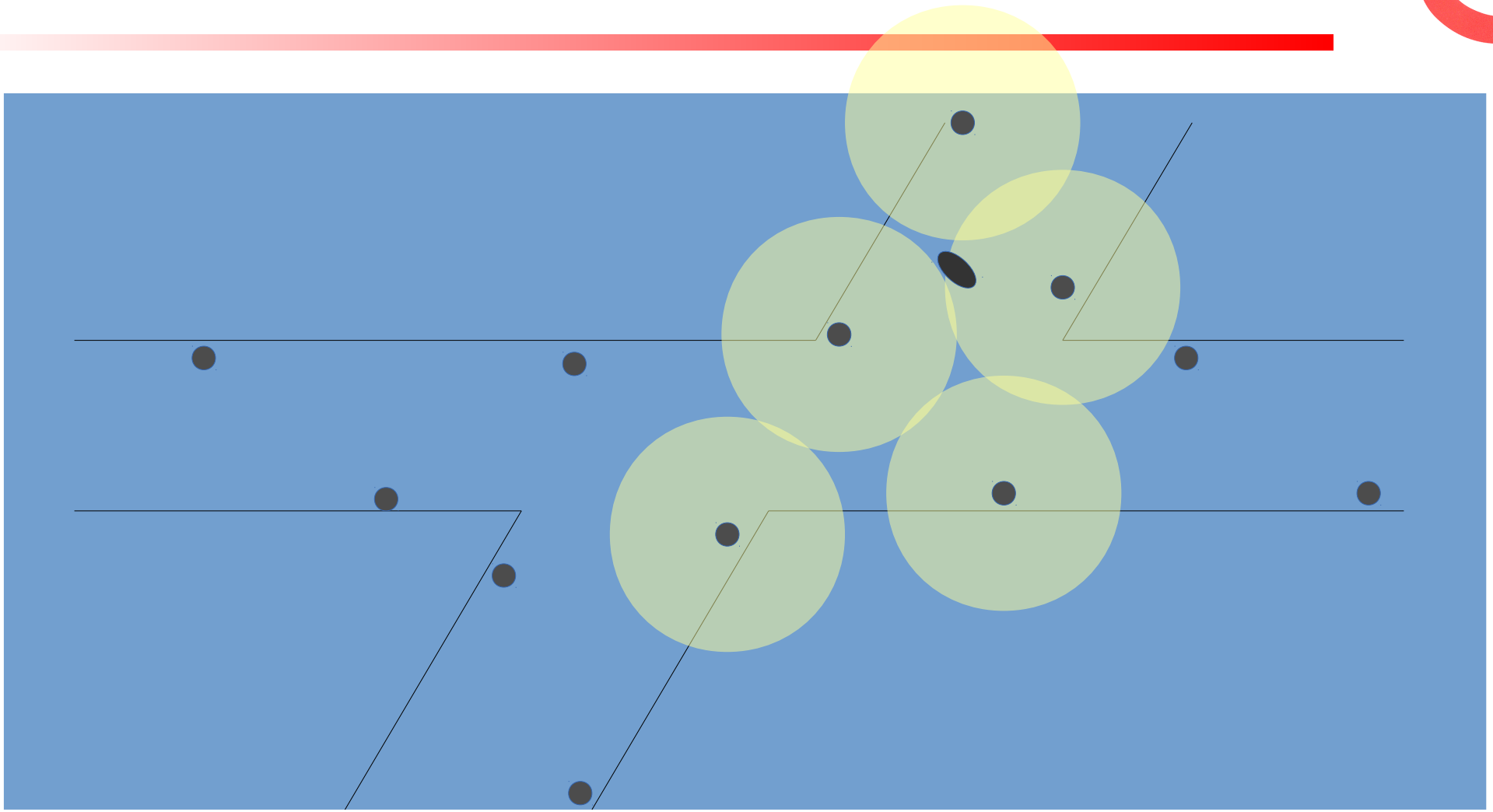


## *How to do this*

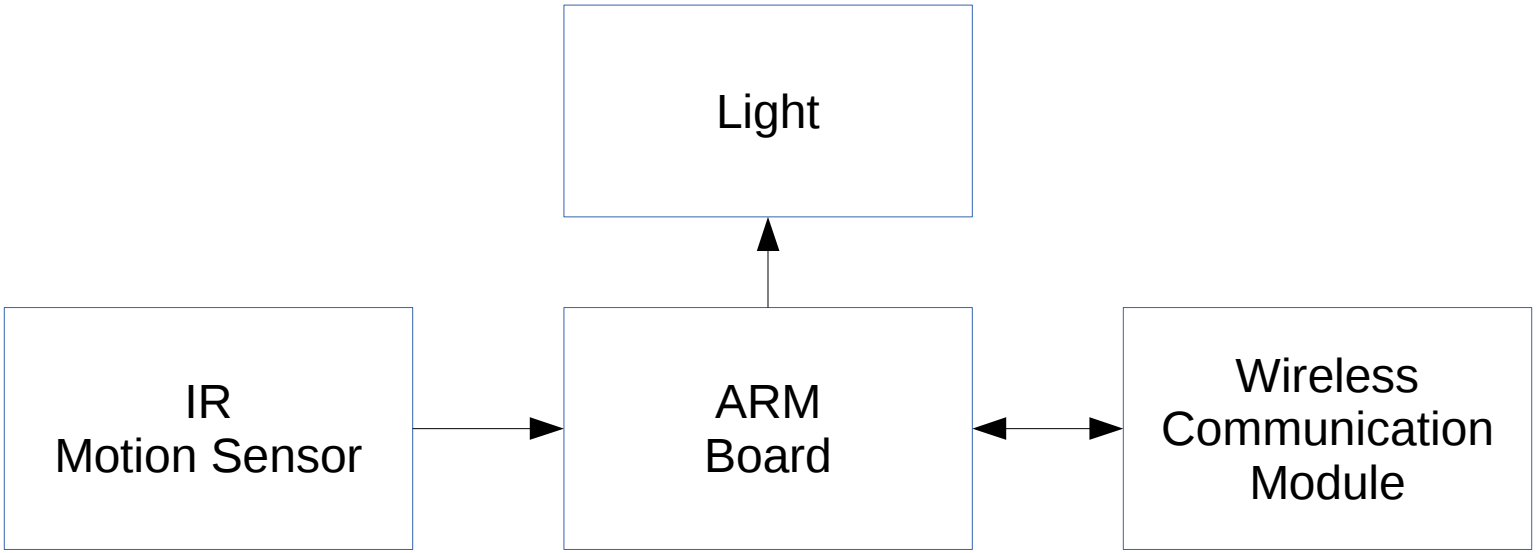
- Streetlights are driven by controllers
- Controllers interconnected in common network
- Light state depend not only state of local sensors, but also on states of all nearby sensors
- Based on information system decides which set of lights should be turned on

## *Strugles*

- Very large network
  - ~1000 light poles in town like Köthen
- Autoconfiguration
  - Manual configuration of each node will leed to enourmous deployment costs and could be imposible
- Connectivity
- Control alghortithm

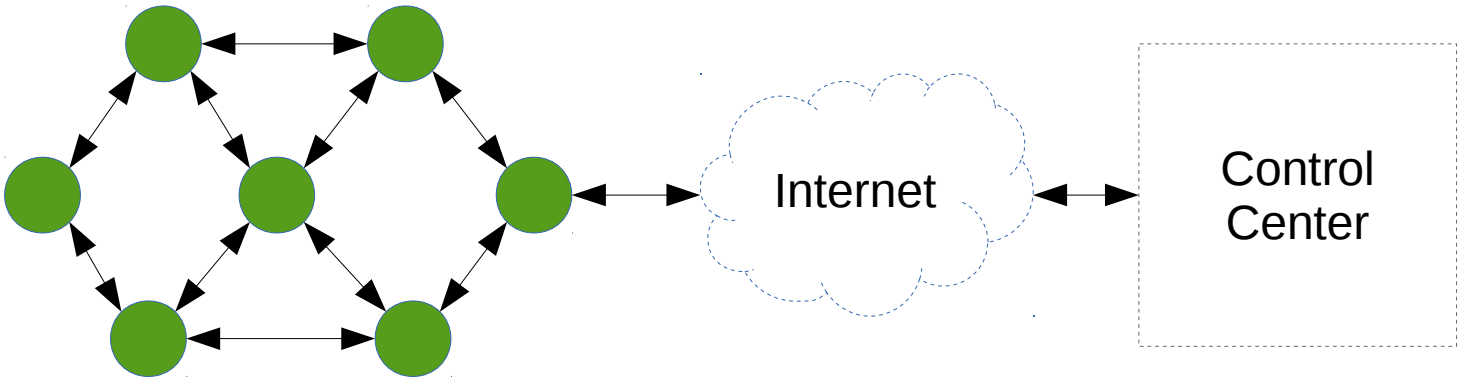
# *Light controller*

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



# *Sensor network*

- Wireless mesh networks
  - Easy to deploy
  - Mature technology
- Using IPv6 stack
  - Compatibility with existing networks




Sensors Mesh Network

# *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 behaviuor patterns
  - Gathering data from sensors into on storage
  - Analyze and create model of pedestrians movement
  - Apply model

## *Benefits*

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

- Side effects