SMART Buildings: A way forward for evacuation safety?

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Challenges and opportunities

- Challenges
  - Increasing complexity – difficult to evacuate
  - Larger buildings – more people
- Opportunities
  - Sensor technology – measuring fire and crowd parameters
  - Egress modelling – real-time simulation
  - Evacuation systems – dynamic notification and way-finding systems

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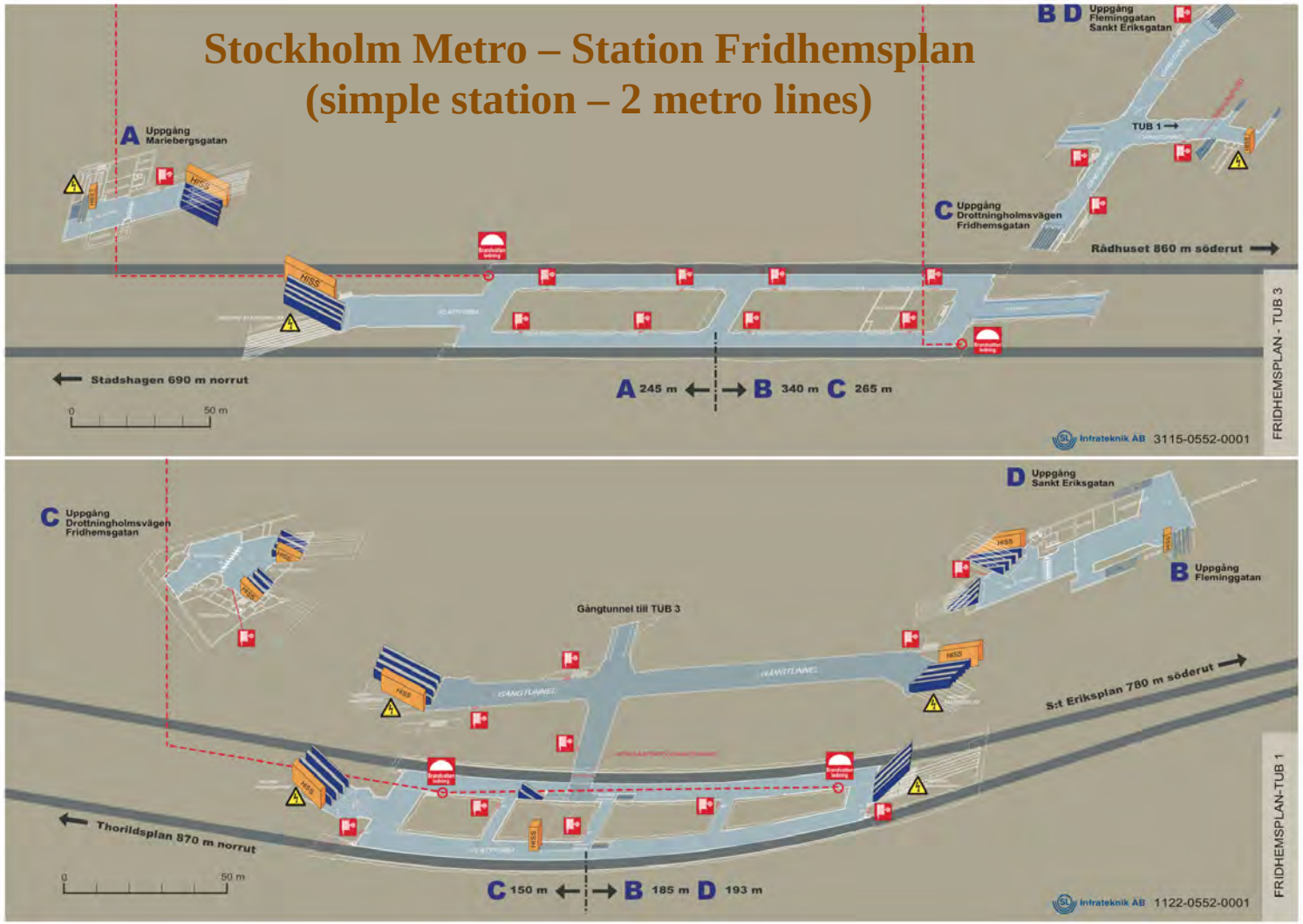
Complexity and size



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Complexity and size

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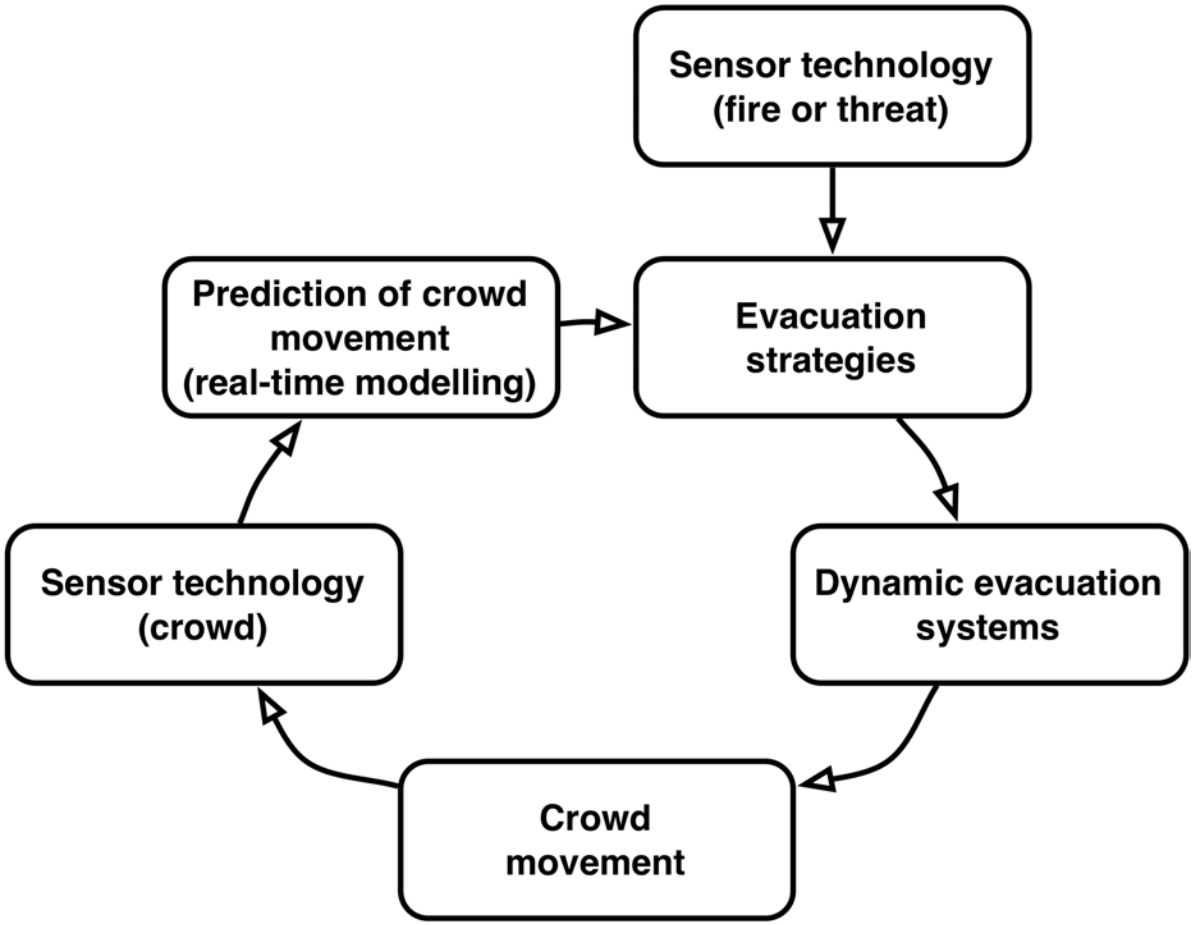
Dynamic crowd management: Adaption to changing conditions

SENSORS – PREDICTION – STRATEGIES – DYNAMIC EVACUATION SYSTEMS

Dynamic crowd management



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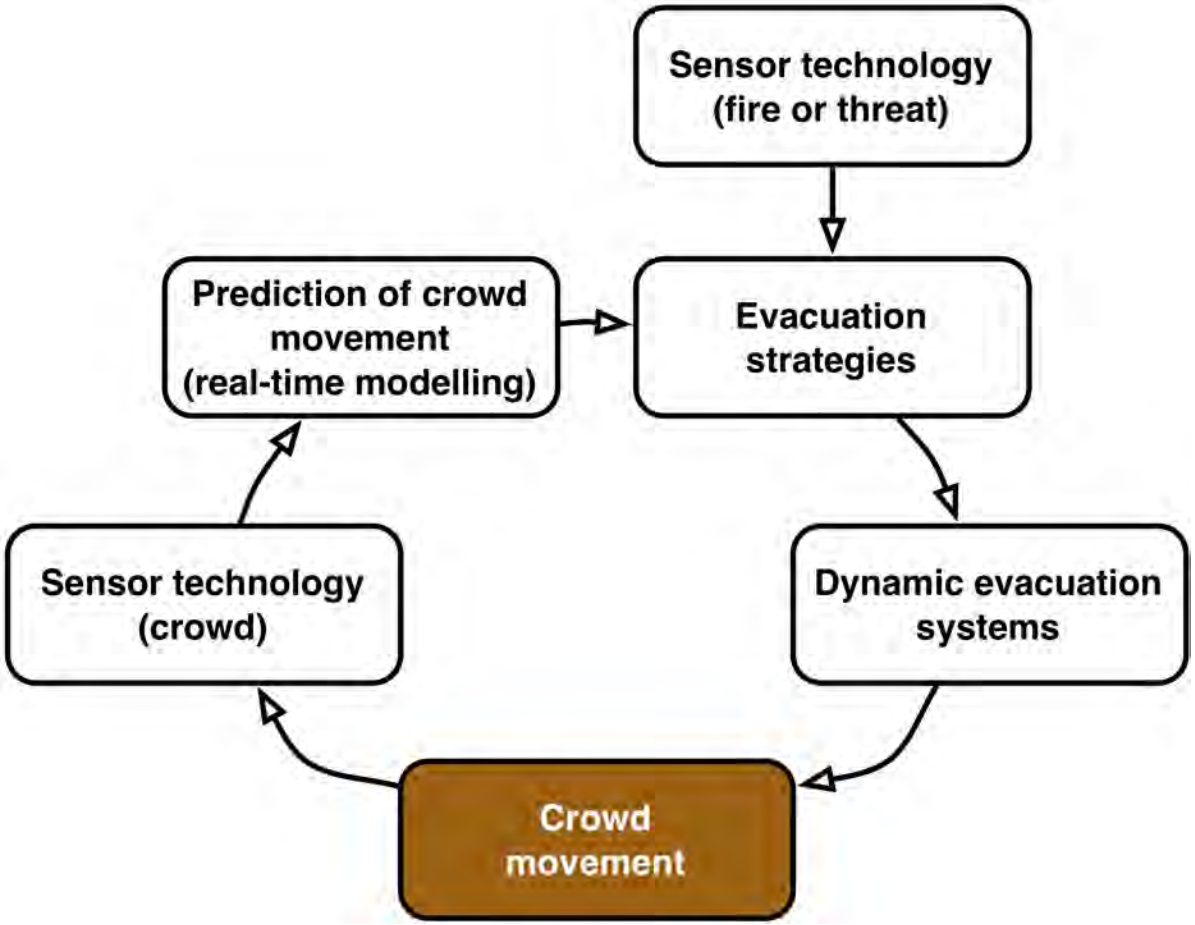

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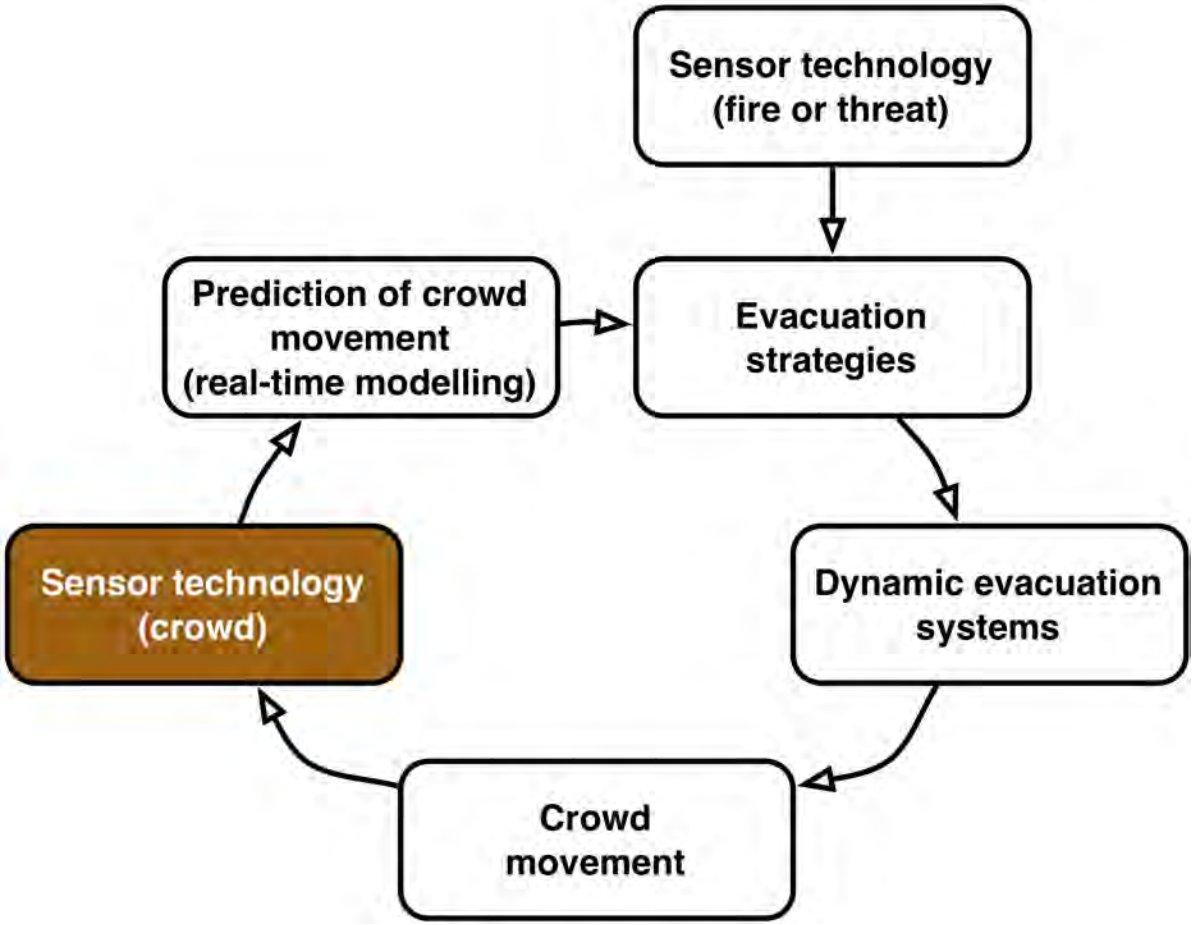

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Sensor technology (crowd)

- Monitoring location and movement of people
  - Existing sensors
    - » CCTV
    - » Ventilation, etc.
  - Novel sensor technologies
    - » Laser scanners
    - » Mobile phones
    - » Identity cards (RFID)

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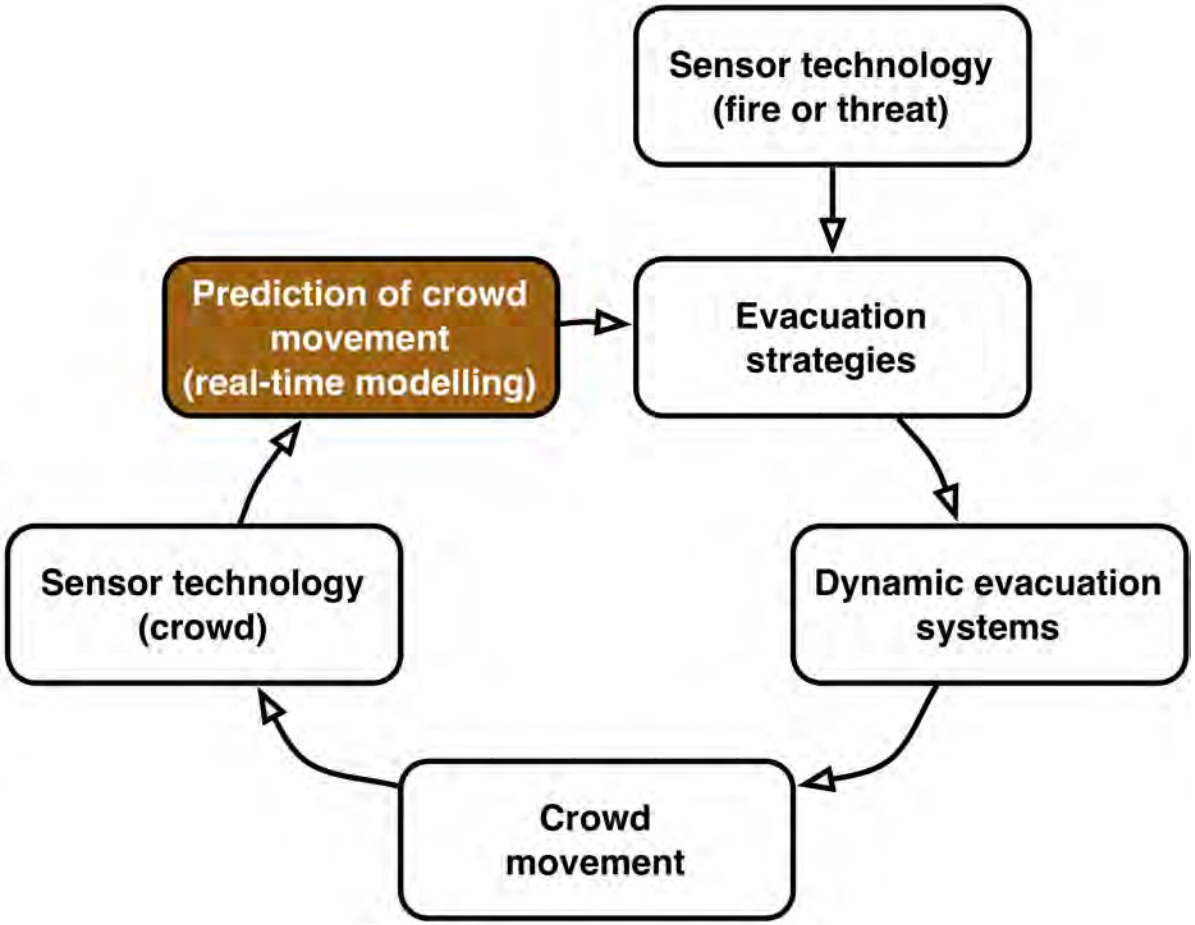
Dynamic crowd management



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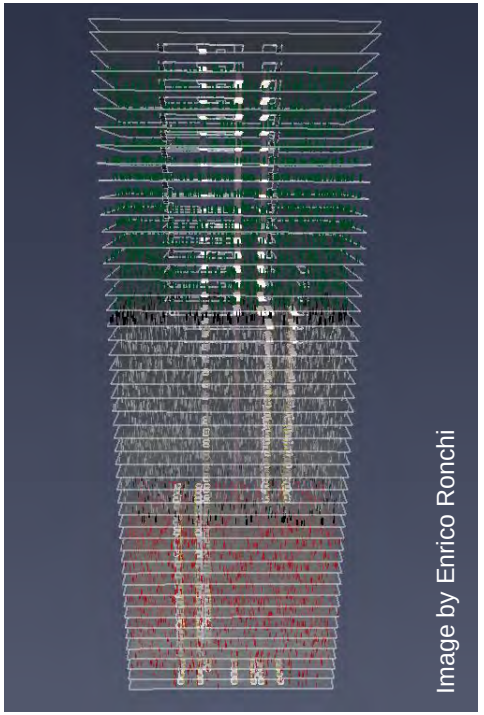
Prediction of crowd movement

- Prediction of crowd parameters
  - Location, crowding, bottlenecks, etc.
- Real-time modelling (or faster)
  - Existing models
    - » Simple models (Cellular automata)
  - Possible way forward
    - » Remote computational resources
    - » New (more advanced) approaches



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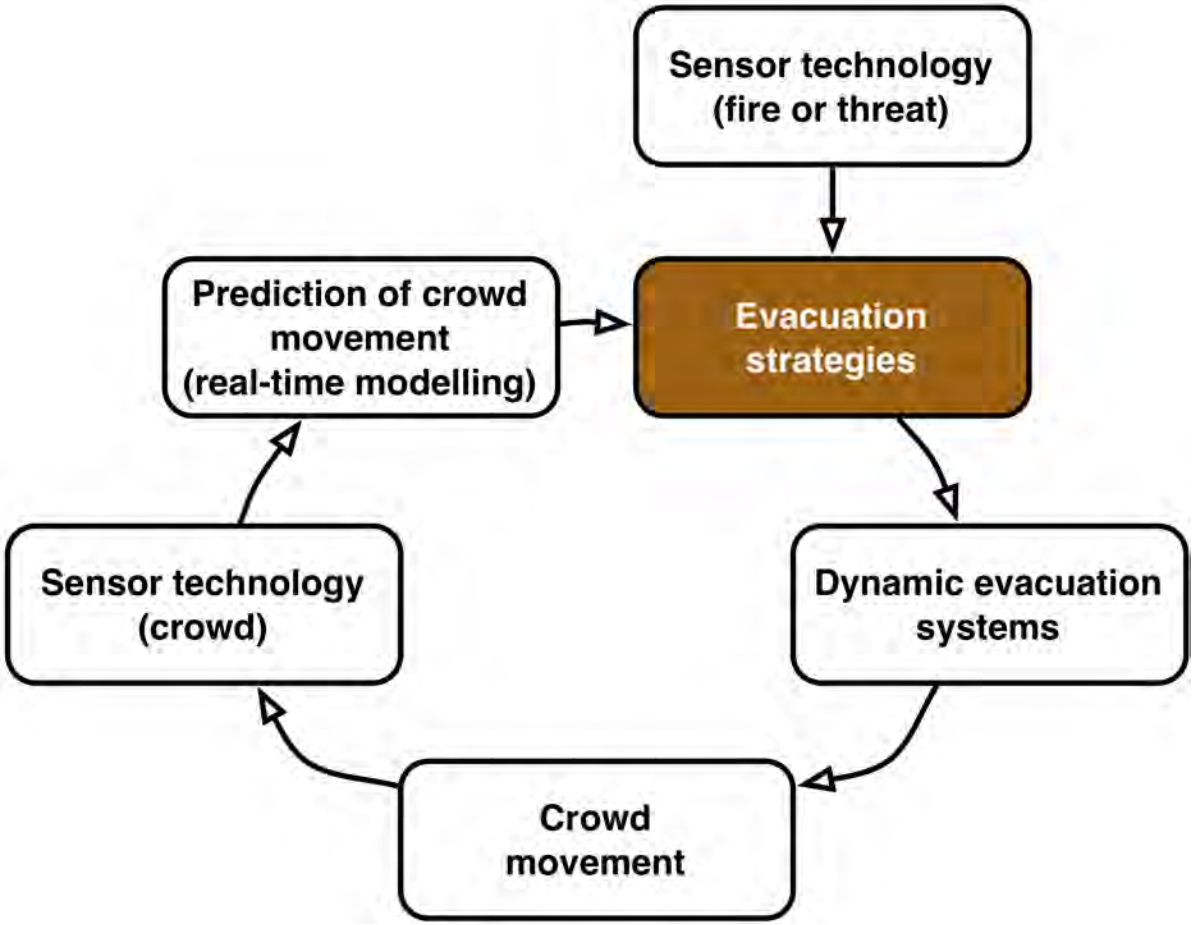
Dynamic crowd management



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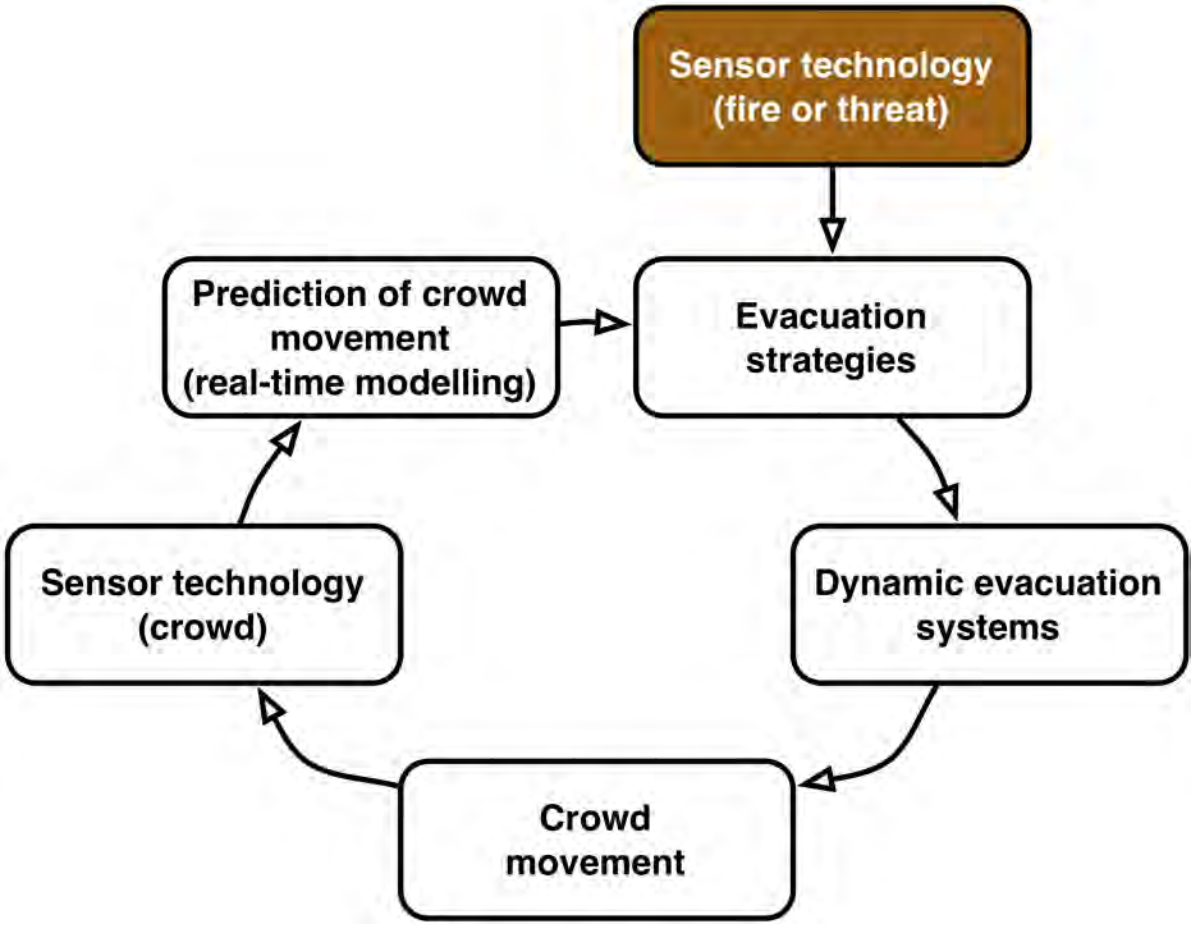

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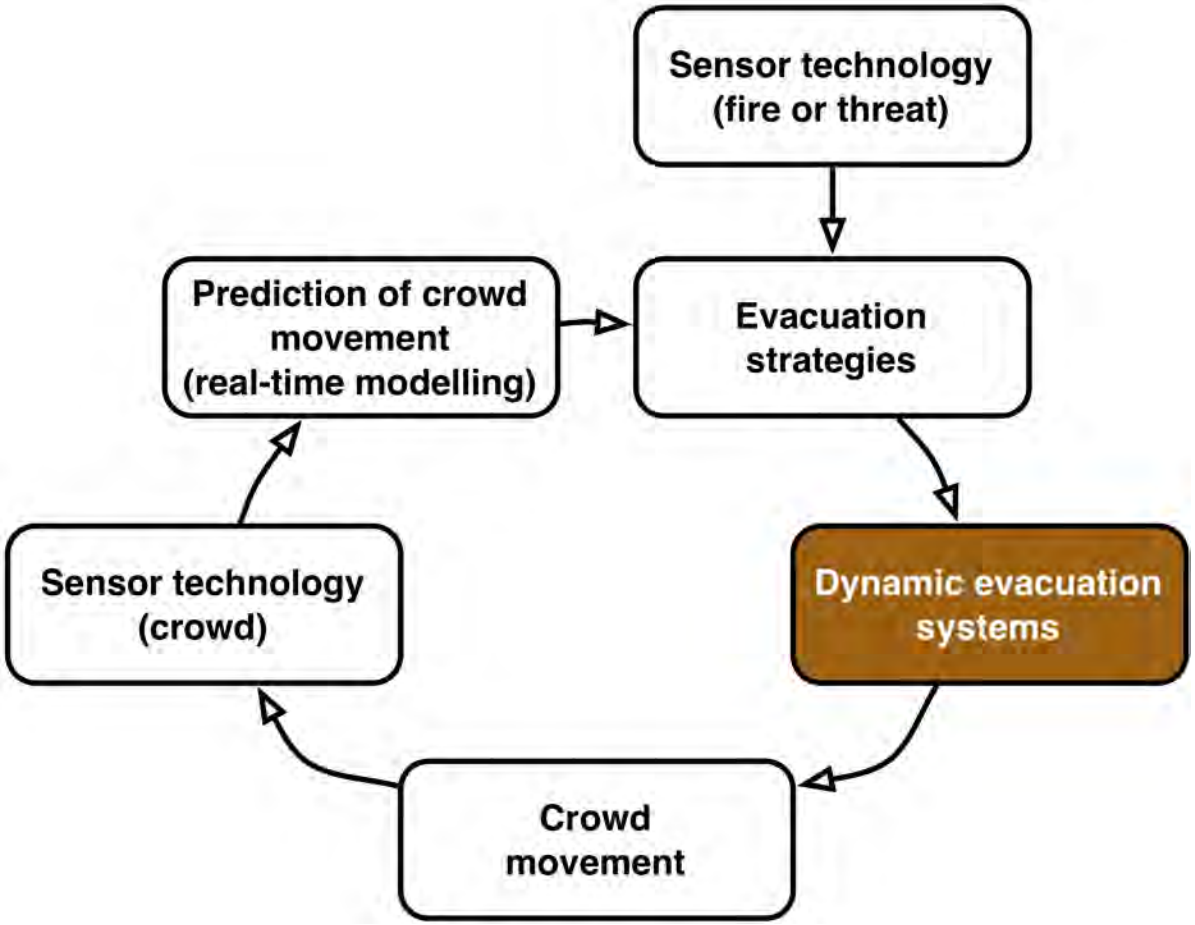

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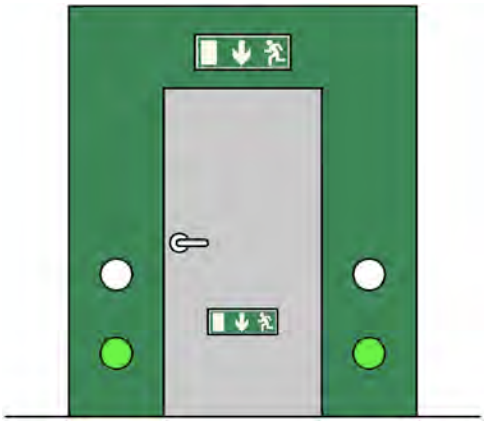
Dynamic evacuation systems

- Evacuation systems that change depending on the chosen strategy
  - Notification systems
  - Way-finding systems
- Design is **not** a simple and straight forward process



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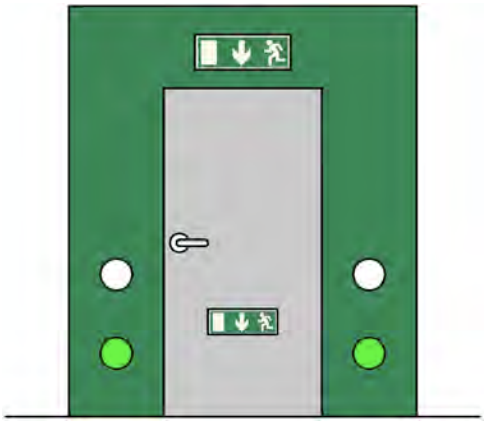

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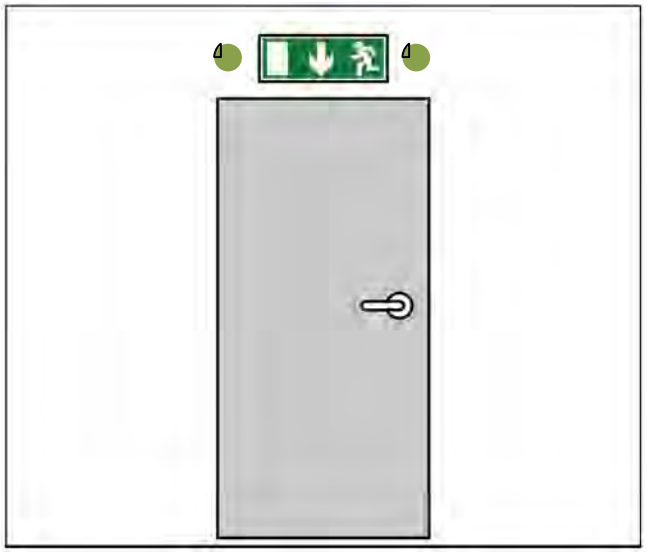
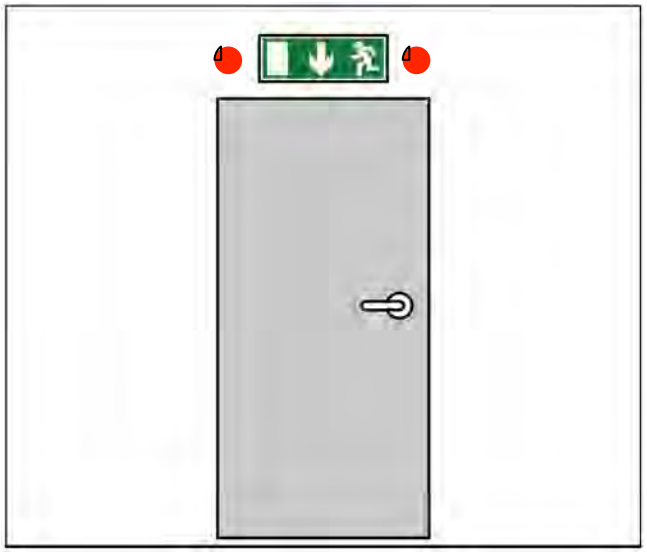
Dynamic evacuation systems

- Example – Way-finding system
  - How can people be influenced to use an exit?
  - How can people be influenced **not** to use an exit?
  - Can exit choice be influenced during movement?





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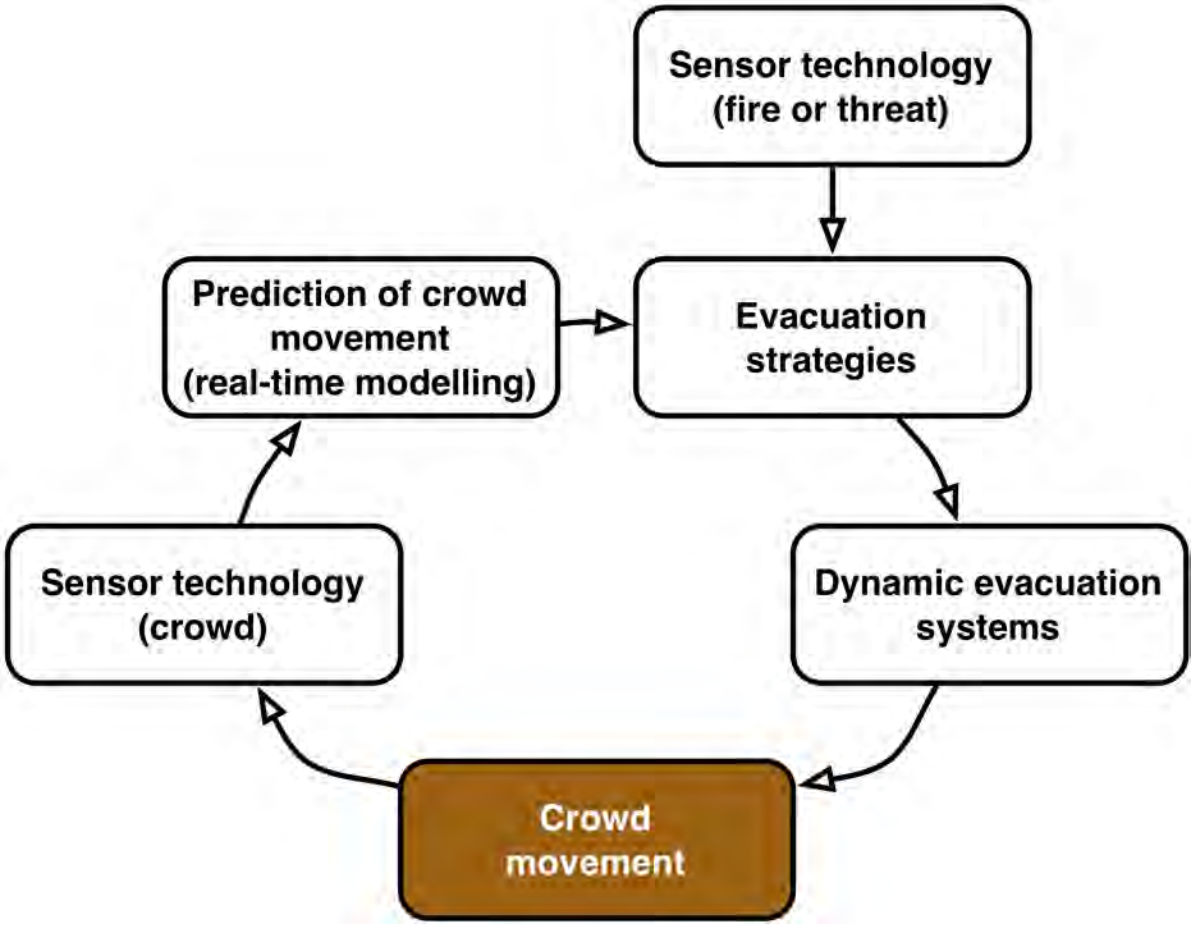

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