Coverage Problem Ensure Fault-Tolerant-Connectivity and Target Detection in Wireless Sensor Networks

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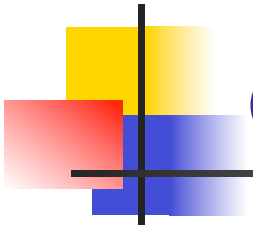


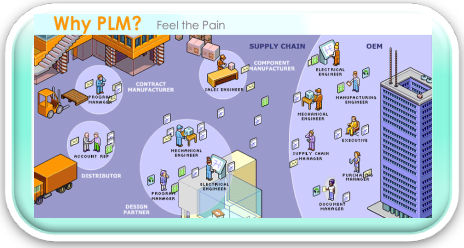
Outline

- **Introduction**
- Research Challenges
- Coverage Problem
- Proposed Approach
- Summary and conclusions

Application in WSNs

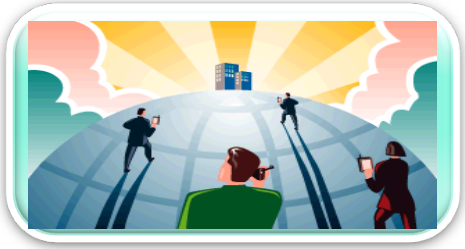
Natural Disaster Relief

Changing retail market.



Management product

WSN



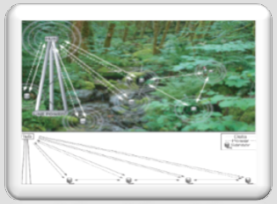
Communication

Health care

Intelligent transport systems

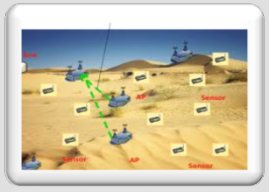
Necessity of Building WSNs

Cost



Topographic

Application



Environment

Criterion of Building WSNs

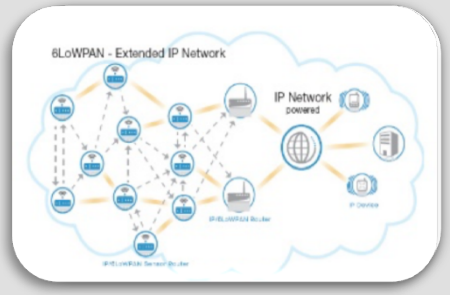
Optimizing Plan

Optimizing Energy Management

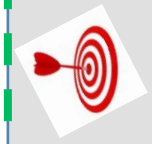
Optimizing Coverage

Optimizing Network Traffic

Coverage Problem in WSNs

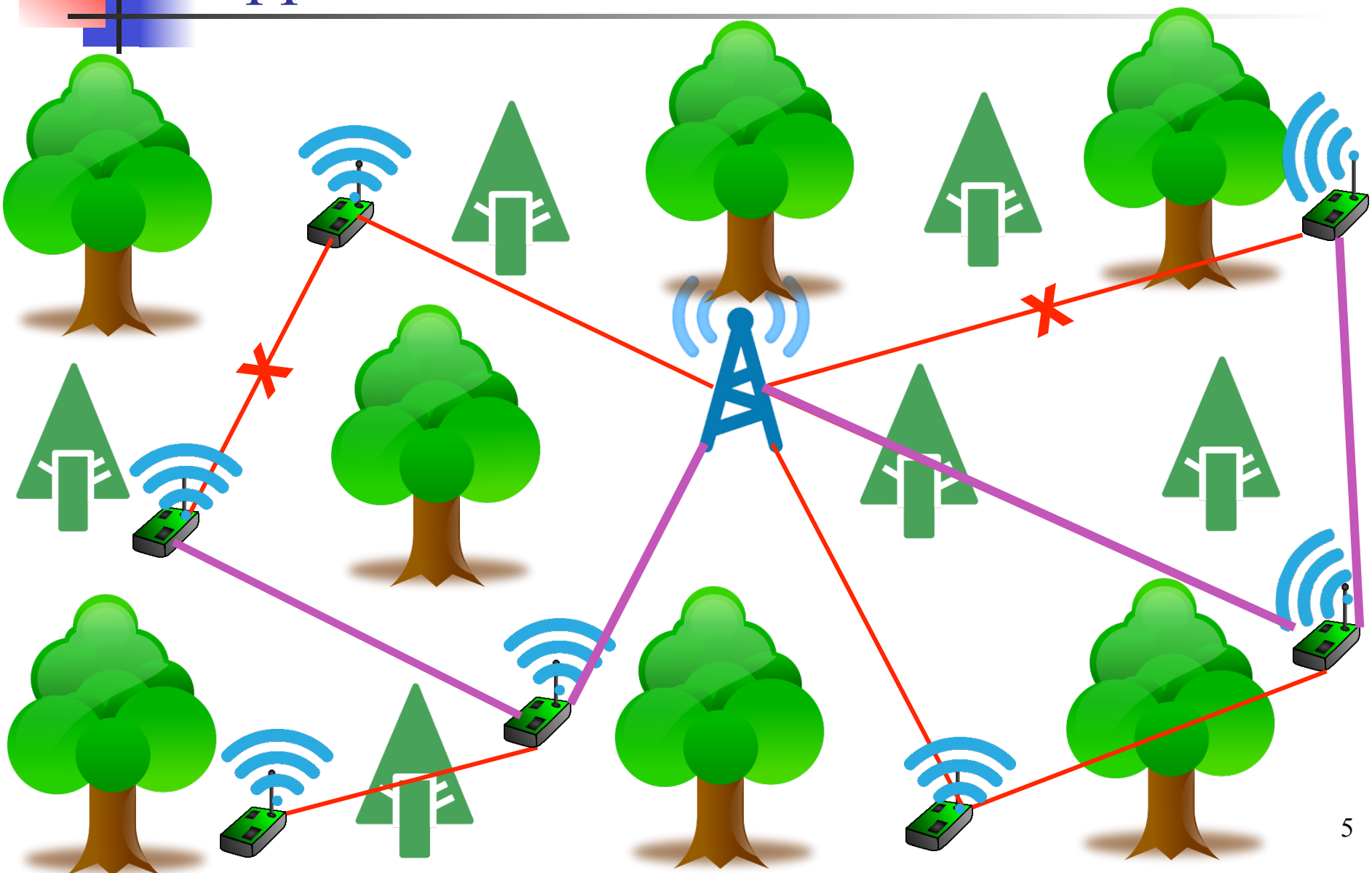


Coverage in WSNs

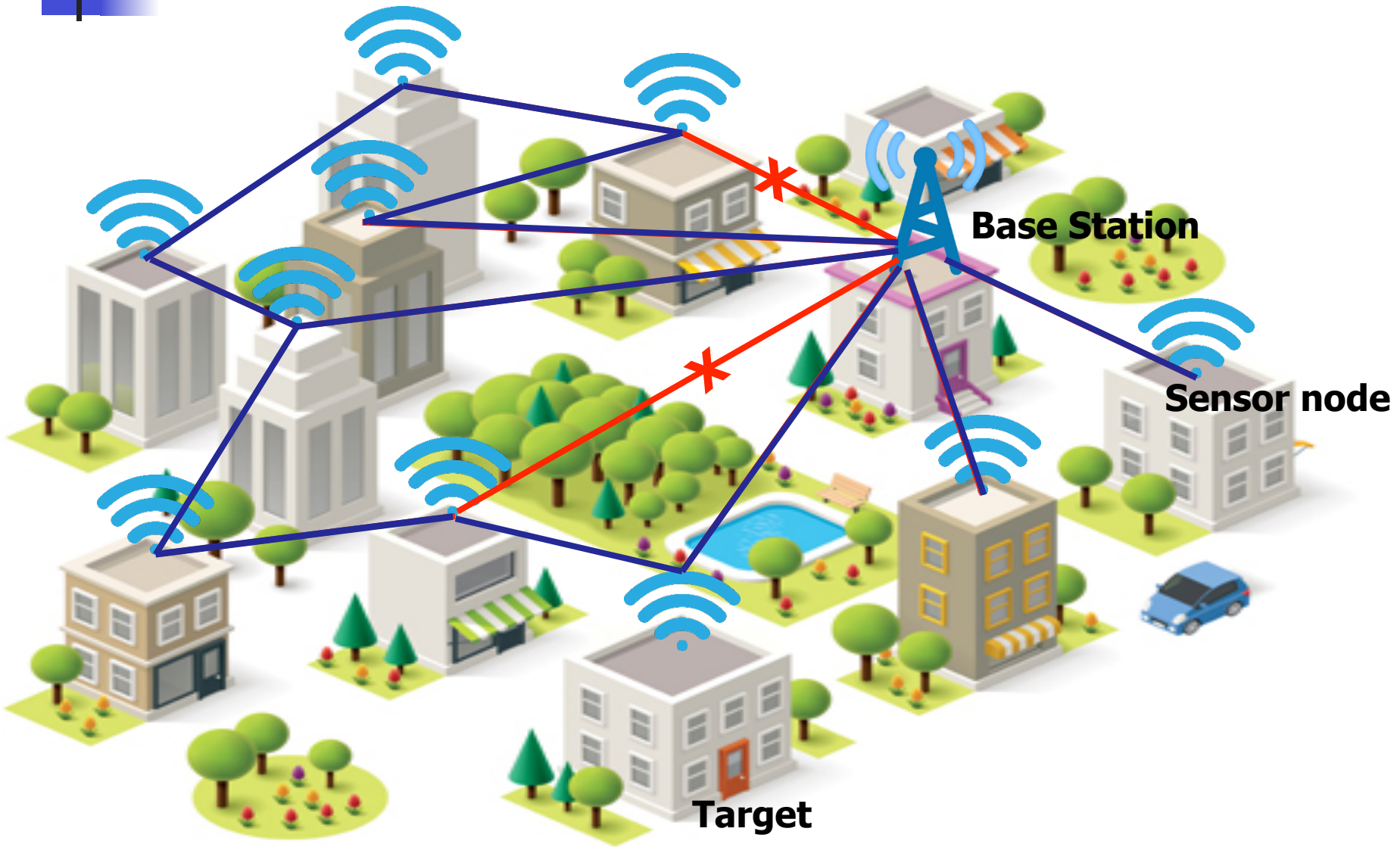


Optimizing Coverage in WSNs

Application for Forest fire detection



Application for Smart City



Modeling: Monitor the air pollution in Hanoi

Wireless sensor networks

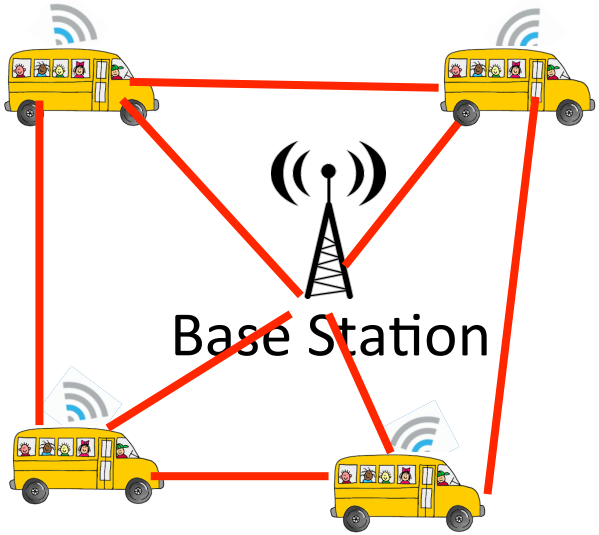
Fog

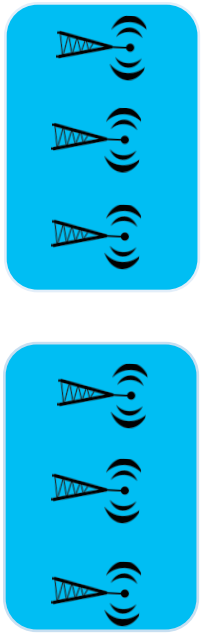
NFV

Cloud

Application

Sensor node



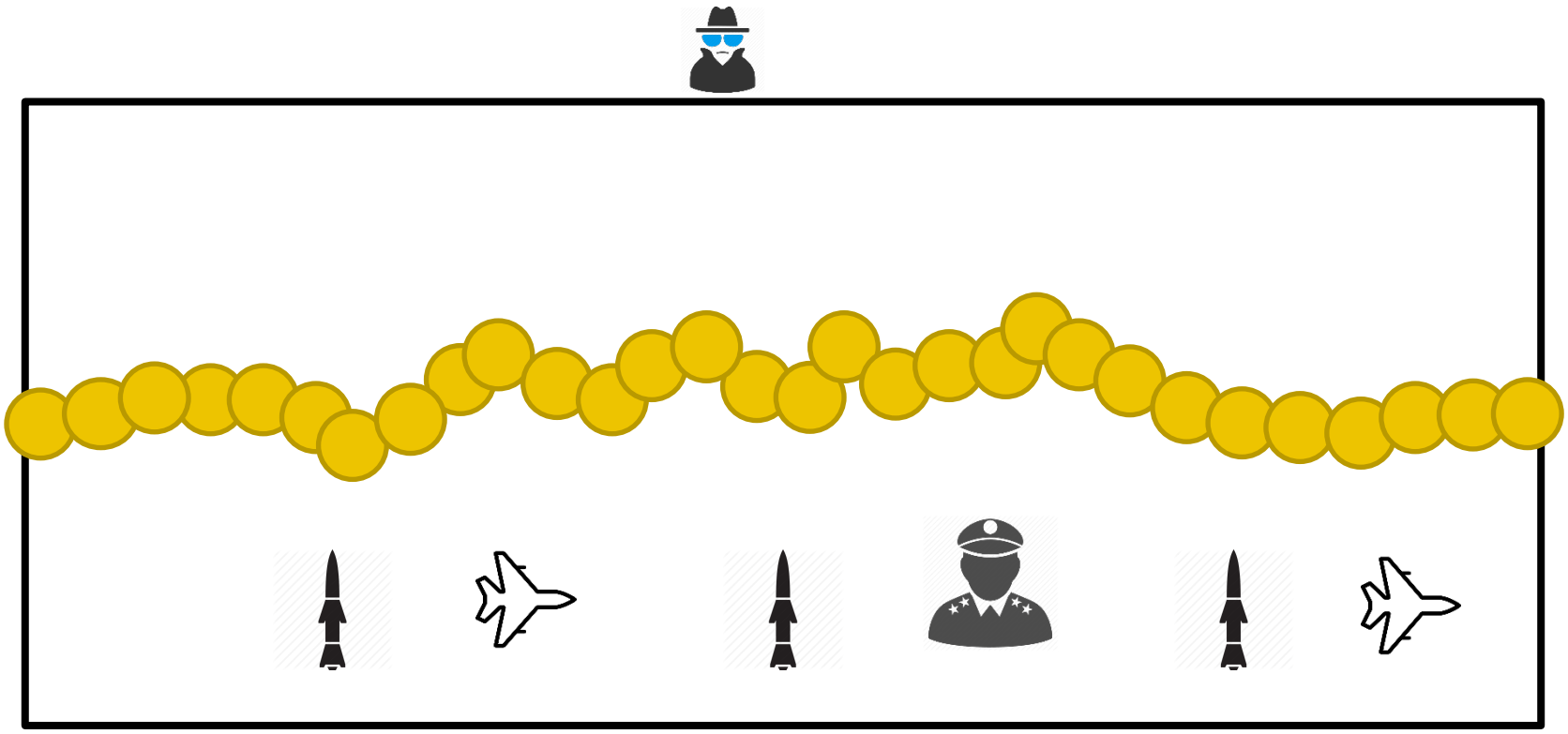


Fog Computing

IP Network

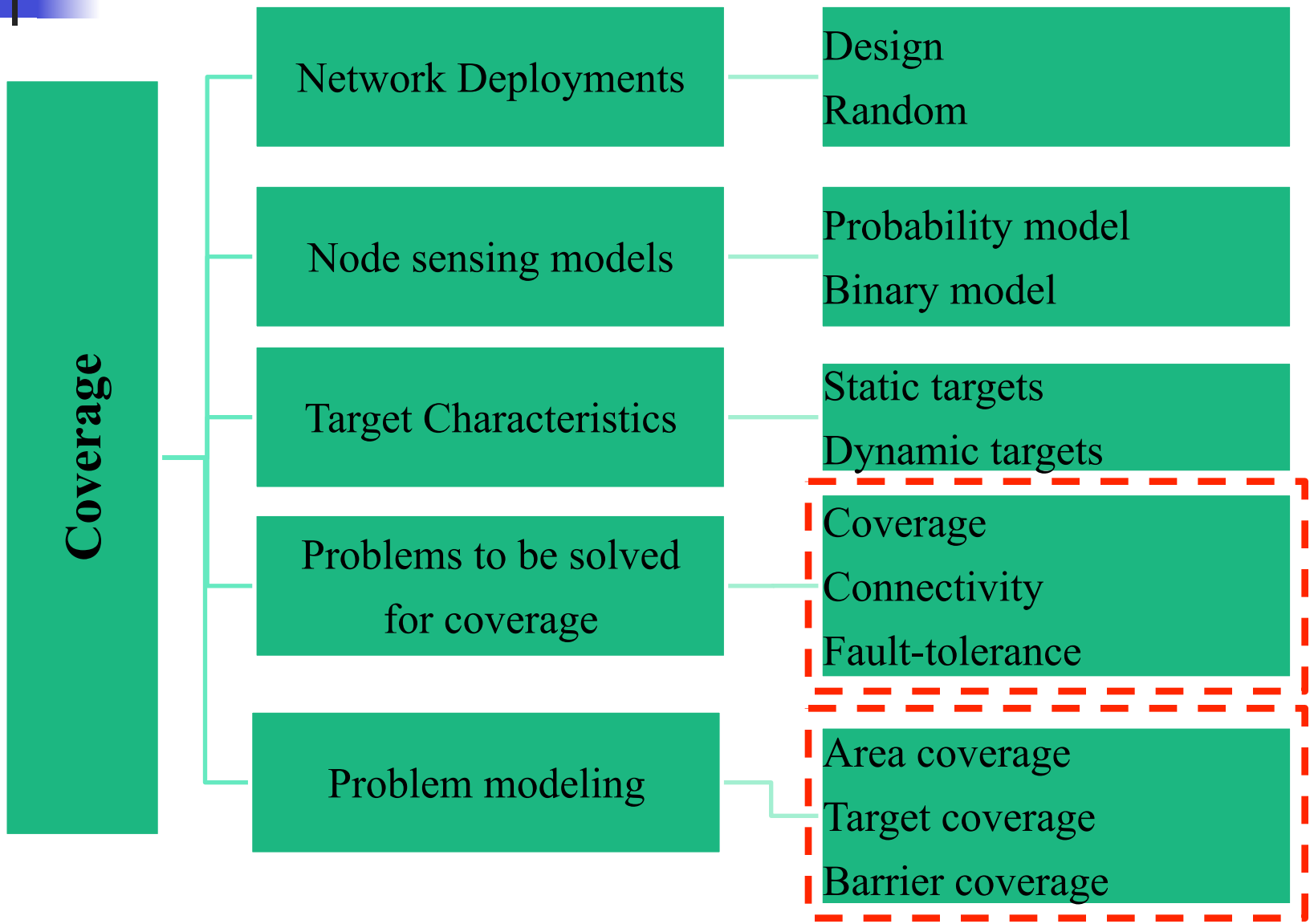
Cloud Computing

Application for Intruder detection

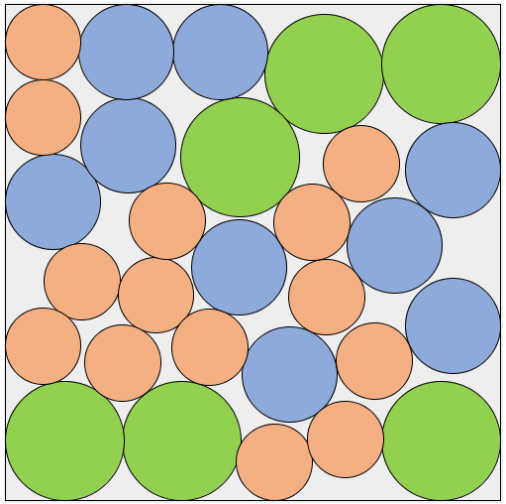


Application for Disaster Warning

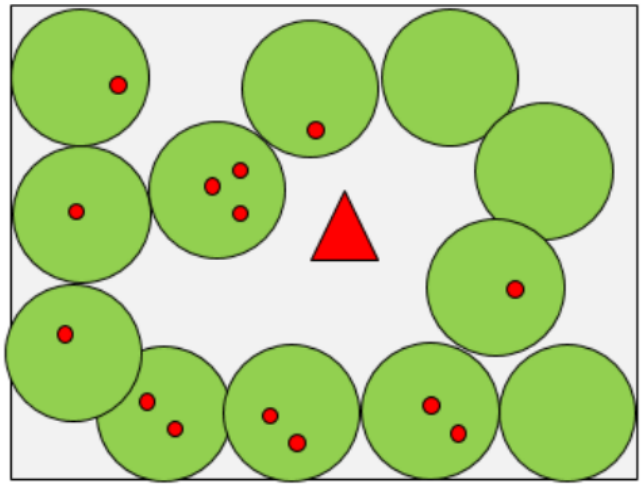
Research Challenges



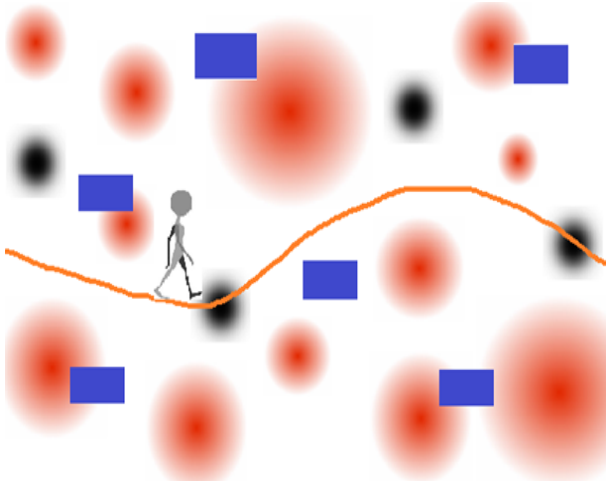
Coverage Problem



Area coverage

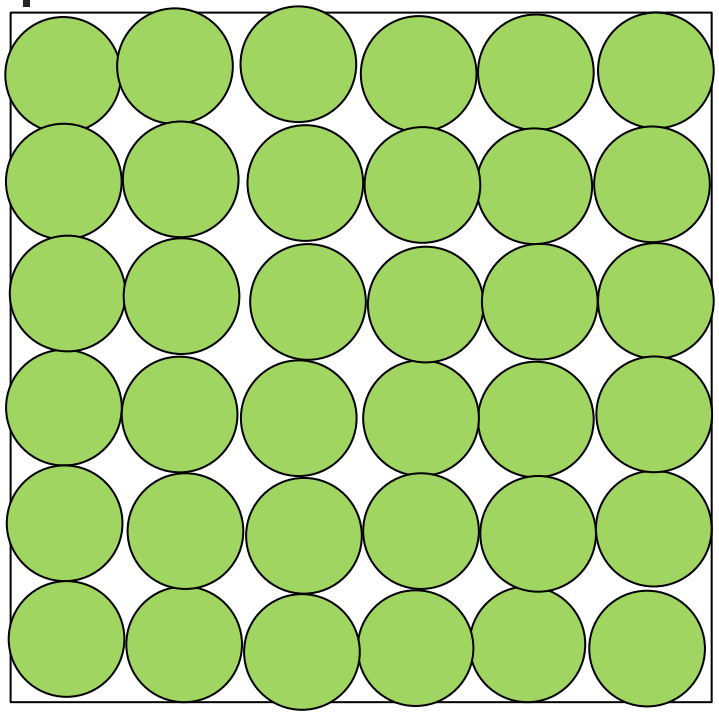


Target coverage



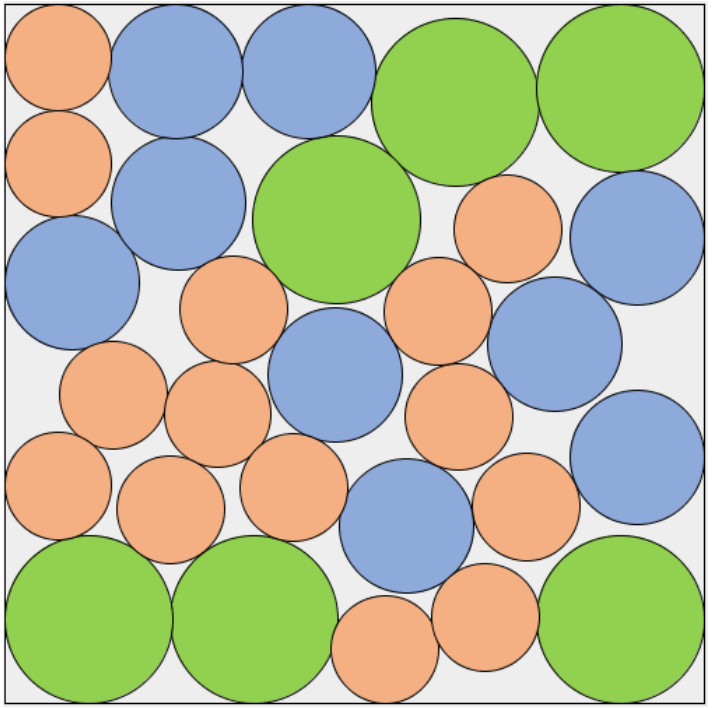
Barrier coverage

Area coverage in WSNs



The same of sensor

Area Coverage in WSN

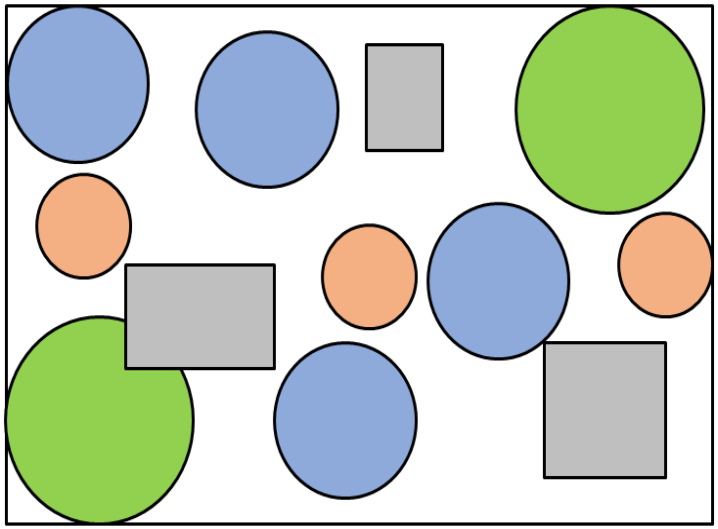


Different of sensors

NP-Hard

Maximize Area Coverage

Area coverage in WSNs with obstacles

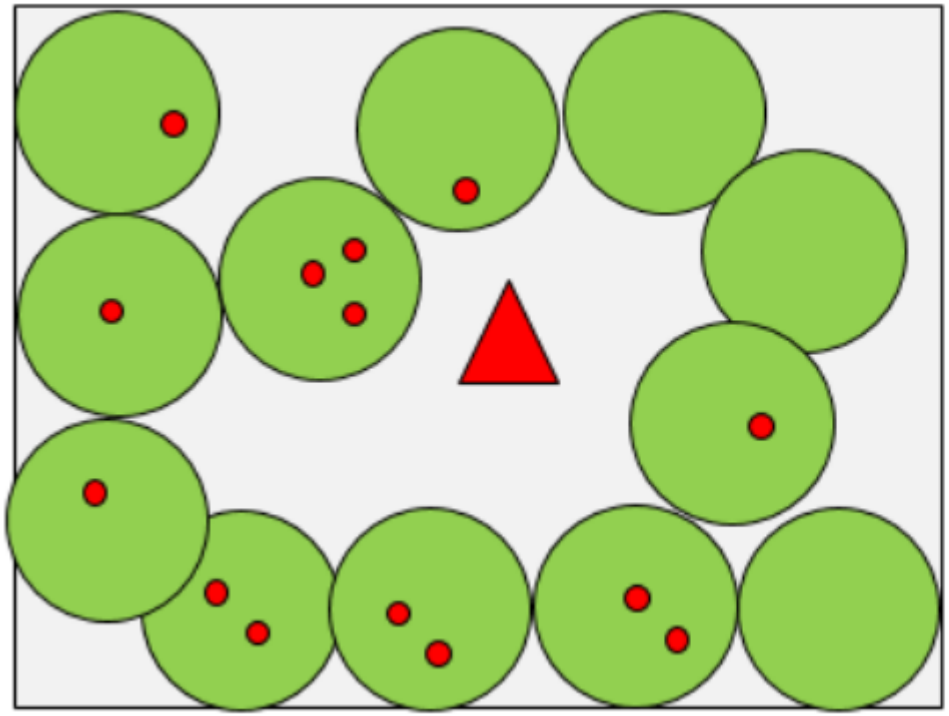


Type I
Type II
Type III
Obstacles

Area Coverage in WSN → **NP-Hard**

Maximize Area Coverage

Connectivity fault-tolerance for target coverage in WSNs.



Target

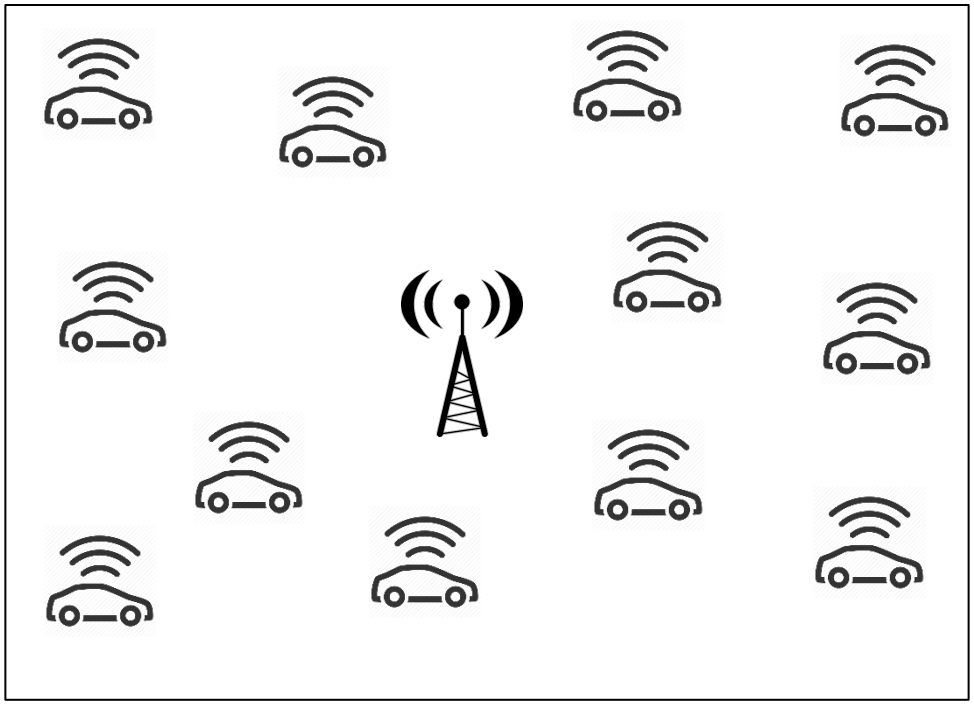
Sensor node

Base Station

Target Coverage in WSN ⇒ **NP-Complete**

Coverage, Connectivity and Fault-tolerance

Connectivity Optimization Problem in Vehicular Mobile Wireless Sensor Networks

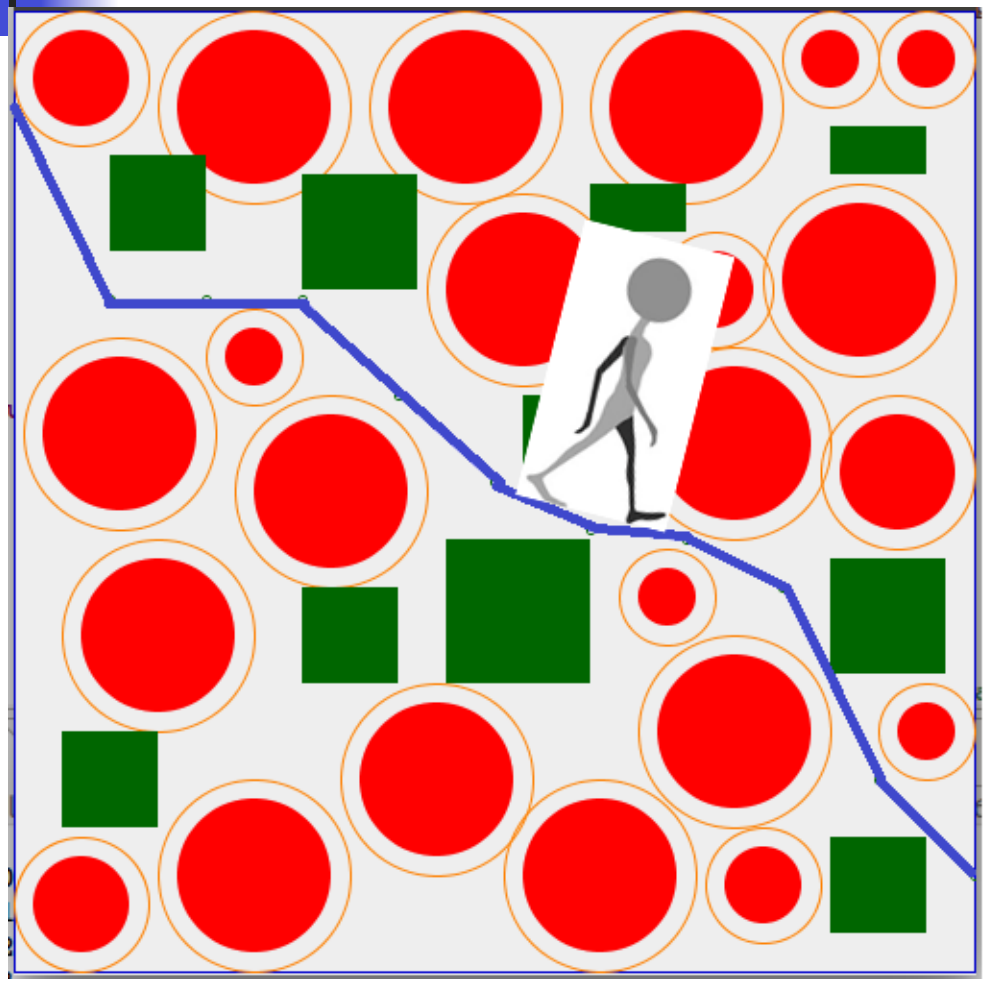


Base Station

Car

Connectivity in Vehicular with mobile sensors

Exposure Path



Obstacle

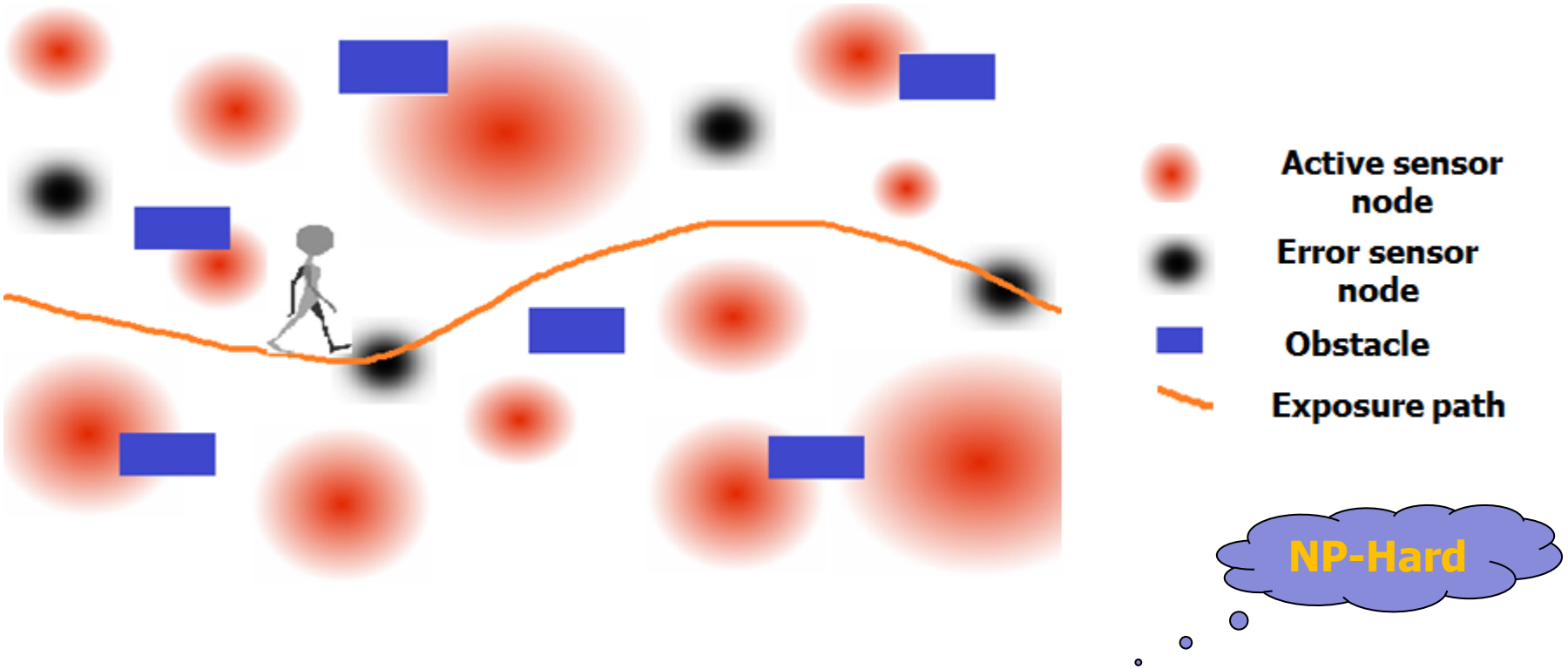
Sensor node

Exposure path

NP-Hard

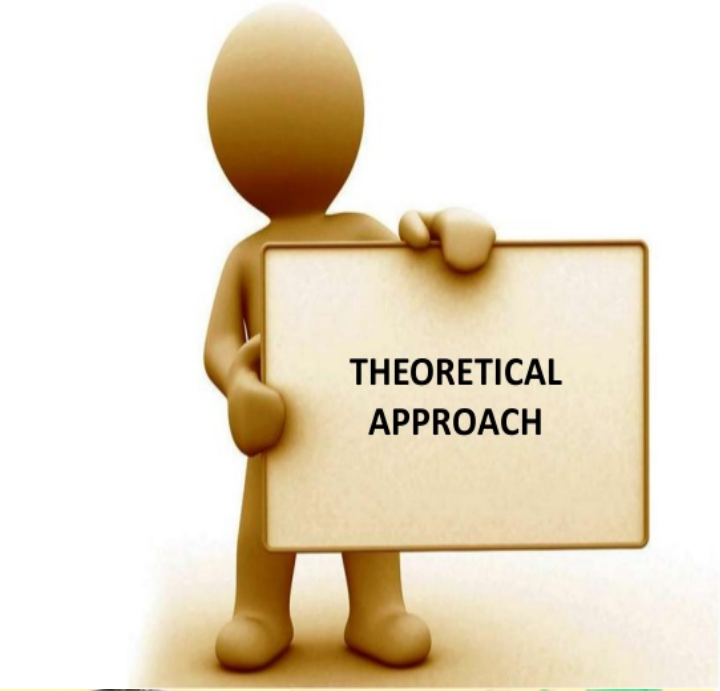
Minimal/Maximal Exposure Path with obstacles

Exposure Path



Minimal/Maximal Exposure Path with obstacles and noise

Proposed Approach



- Area coverage
  - Area coverage in WSNs
  - Area coverage in WSNs with obstacles
- Target coverage
  - Connectivity fault-tolerance for target coverage in WSNs
  - Connectivity optimization problems in WSNs apply for monitoring the area
- Barrier coverage
  - Build Intrusion Barrier
  - Find Penetration Path

Summary and Conclusions

- **The coverage problem classification:**
  - Area Coverage in WSNs with Mobile Sensor
  - Target Coverage in WSNs for Maximize Lifetime
  - Minimal/Maximal Exposure Path with obstacles and noise
- **Application:**
  - Internet of Things
  - Disaster Forecasts


Thank
you