

# Rethinking Wireless Network Management Through Sensor-Driven Contextual Analysis

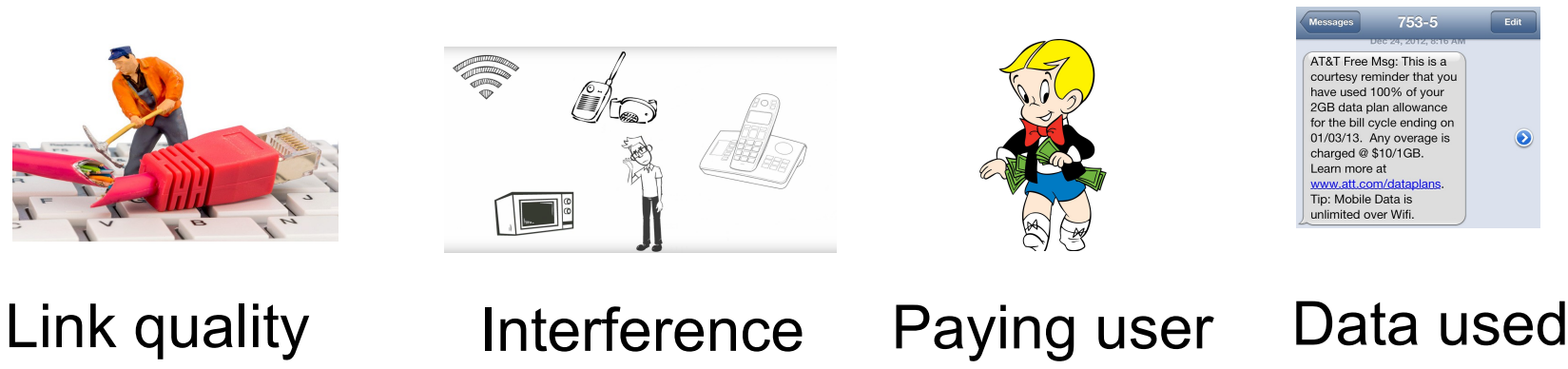


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## Problem and Goal

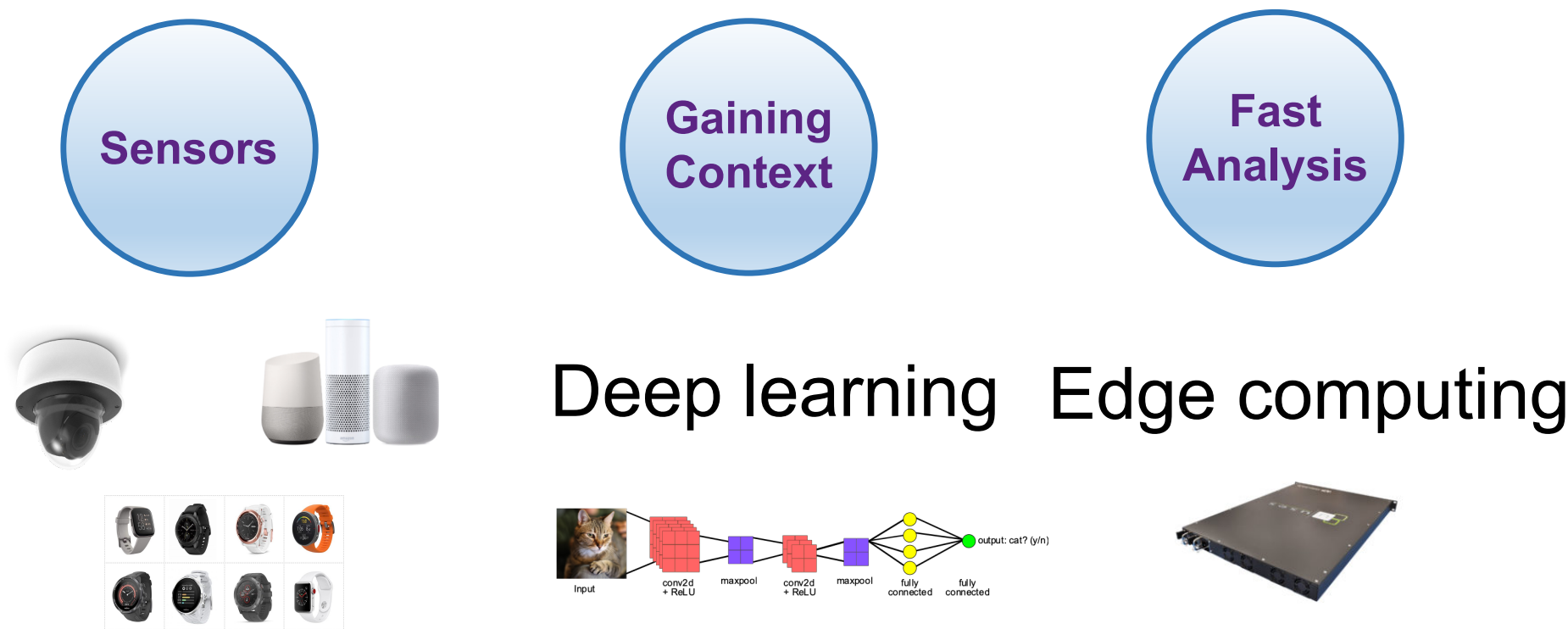
- Today, networks managed on in-band information and other easily-obtained management information



- We propose a **new way** to manage networks
- Goal: to use user's **context** for network management



- Why now? Fundamental advances in three thrusts:

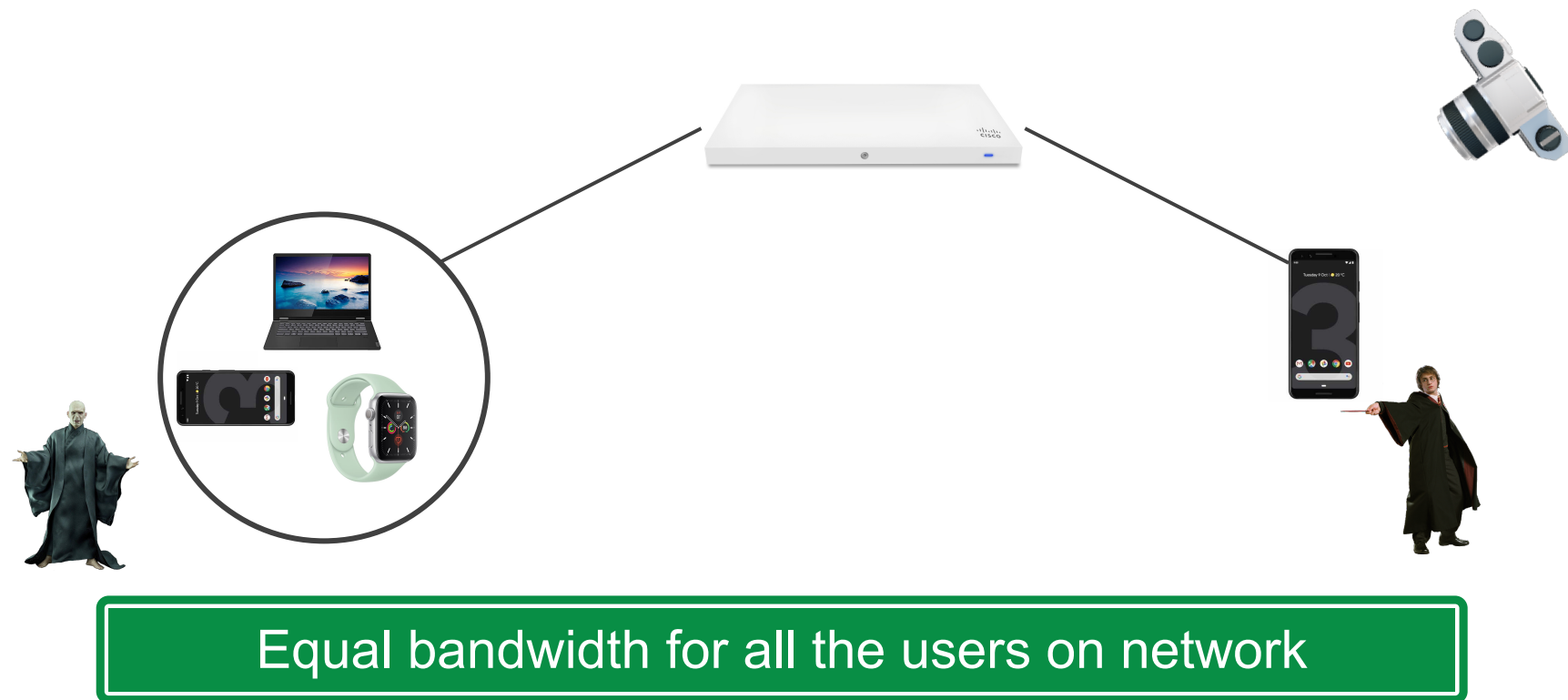


## Our Proposal: SenseNet

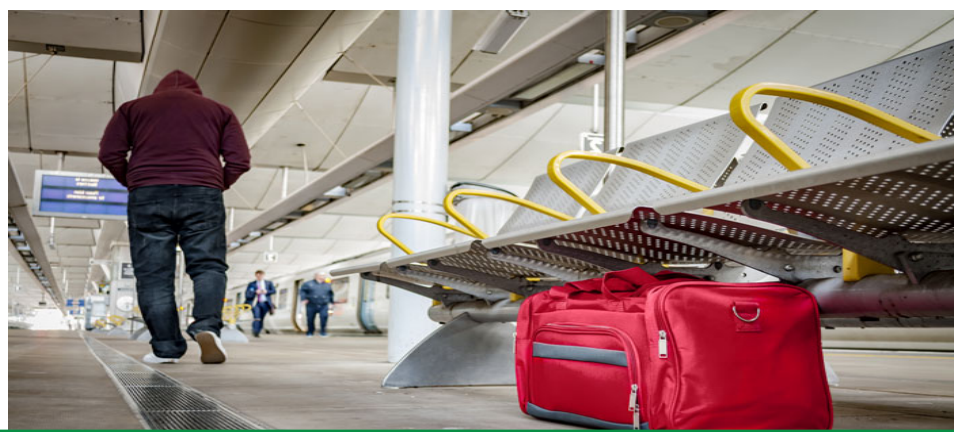
- User's context data from sensors to manage network



- Schedule traffic **efficiently** and **intelligently**

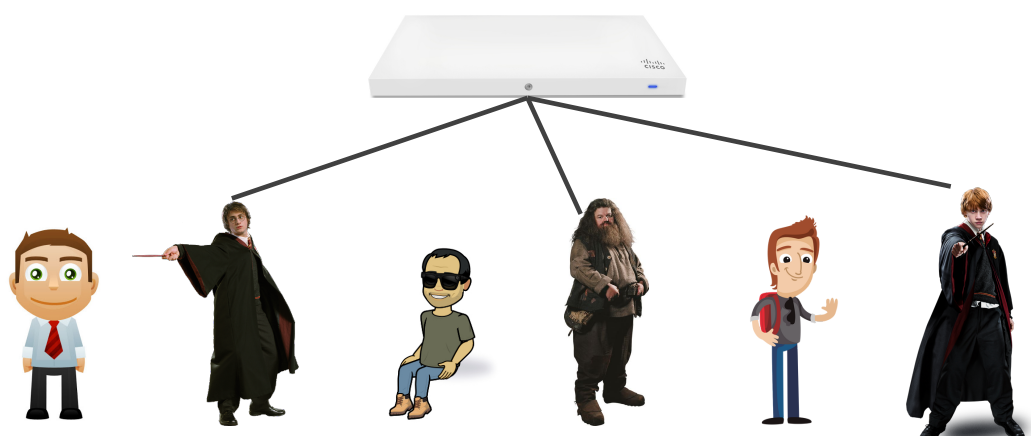


- New mechanisms to **increase public safety**



Monitor traffic of wireless devices in unattended bags

- Wireless providers can create new **revenue streams**



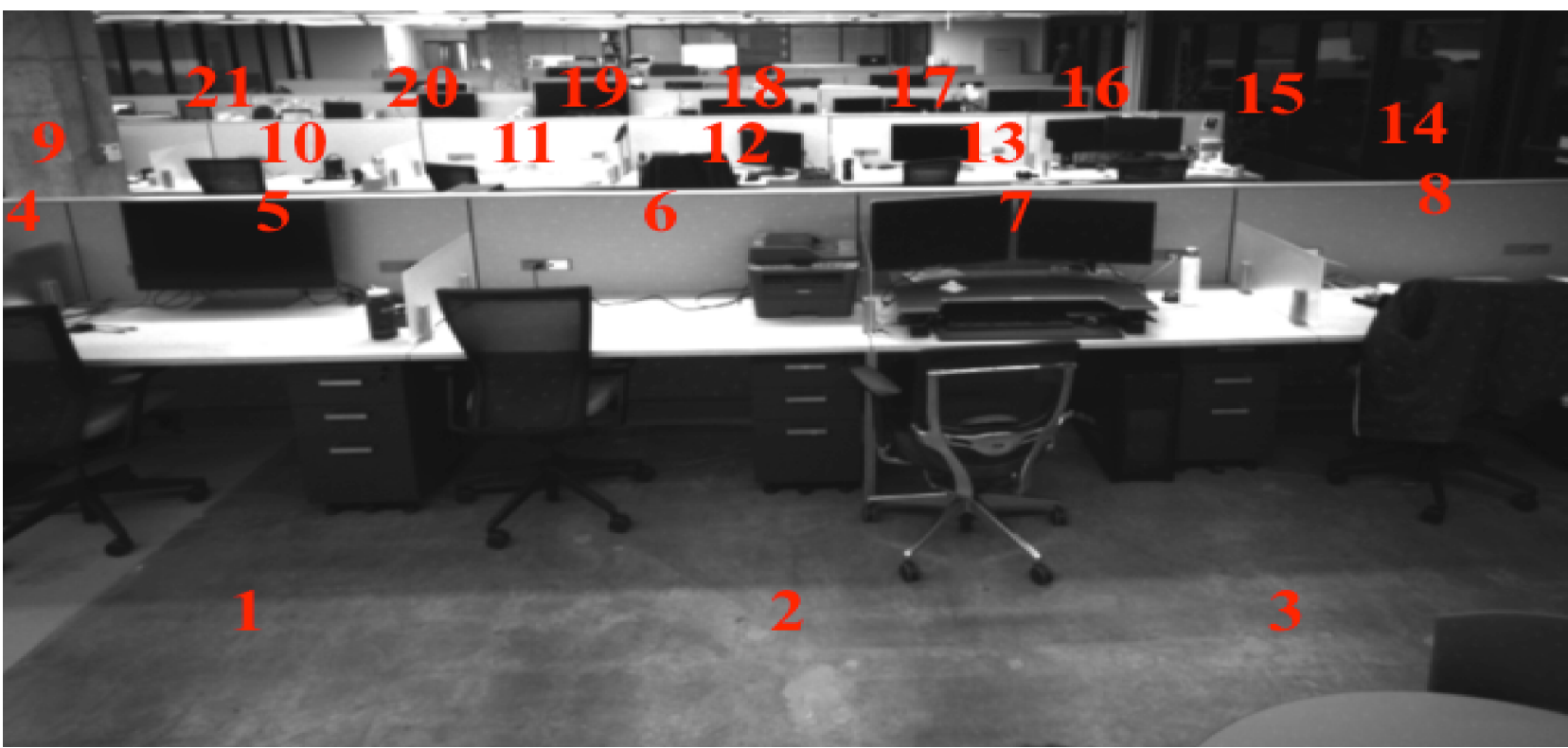
Better bandwidth to Harry Potter fans

## Evaluation

- Equipment setup:



- Collection points:



- User pairing: pair users in sensor & wireless domain
  - Fundamental primitive required for SenseNet
  - We use Hungarian method for assignment

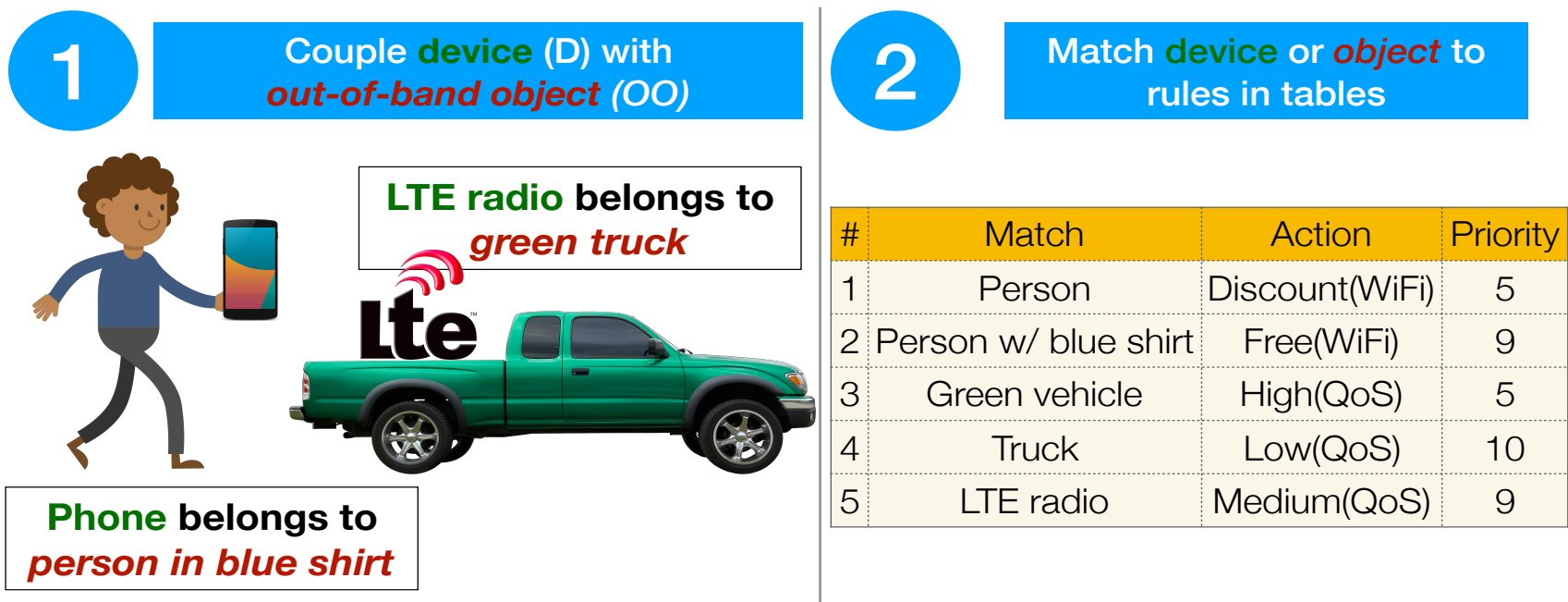
| Total Pairings | Matched Pairings | Accuracy |
|----------------|------------------|----------|
| 21             | 19               | 90.47%   |

- Improved localization and geofencing results in paper

## Challenges and Future Work

- Programmable Framework**

- Use **OpenFlow**-like rules and tables to instantiate rules on context



| # | Match                | Action         | Priority |
|---|----------------------|----------------|----------|
| 1 | Person               | Discount(WiFi) | 5        |
| 2 | Person w/ blue shirt | Free(WiFi)     | 9        |
| 3 | Green vehicle        | High(QoS)      | 5        |
| 4 | Truck                | Low(QoS)       | 10       |
| 5 | LTE radio            | Medium(QoS)    | 9        |

- Security and Privacy**

- Most sensing systems deployed in public, which may **limit concerns**
- Prior work can be utilized: intelligent brokers; smart sensors

- Expanding Scope of Sensors**

- Integrating **other sensors** along with video sensors



- Heterogeneous Deployments**

- Heterogeneous deployments of sensors and edge
- Compiler can determine where and how to run functionality

## Summary

- We propose a new way to manage wireless networks using user or device context derived from sensors
- We demonstrate example use cases which show promise for SenseNet
- We also outline challenges needing to be overcome to make SenseNet practical