

# User Tracking System Based on RFID Signal Proposal

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NCTU NSS-Lab 2018

Cheng-Fa Huang

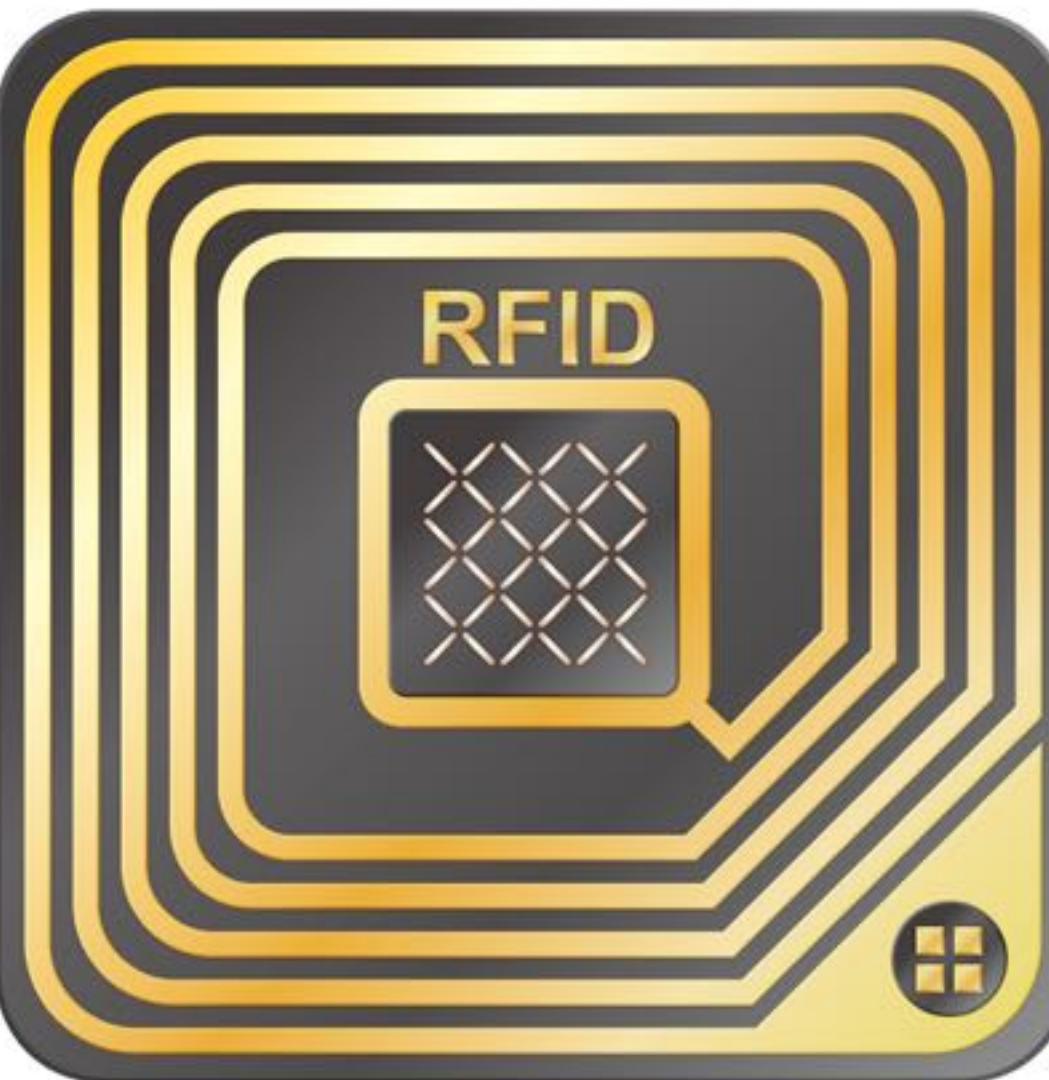
**Willy Cheng-Fa Huang**

2018.08.23 @NCTU EC-543



# Outline

- Motivation
- Environment
- Challenge



# Motivation







# Unmanned Store

- No checkout, no line

- Human recognition

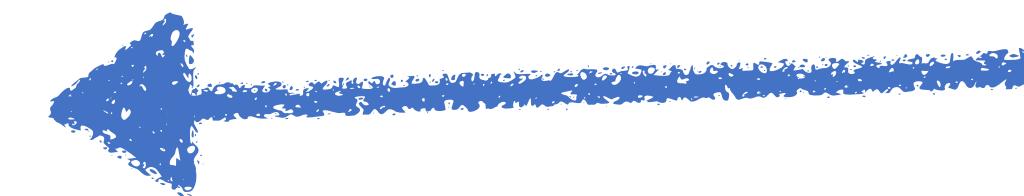
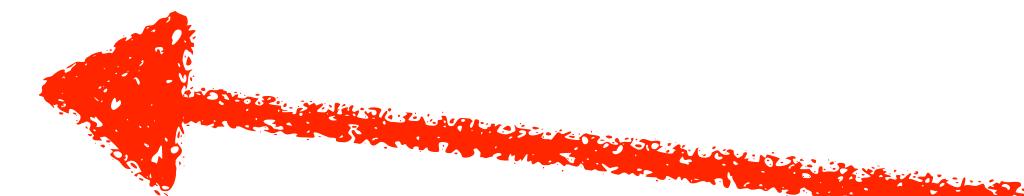


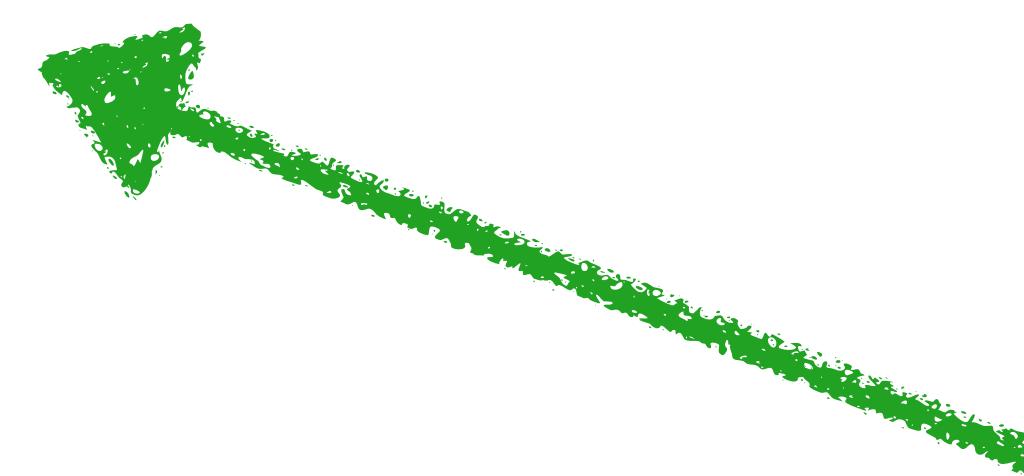
Image Recognition

- Stuff picking



Wright Sensing

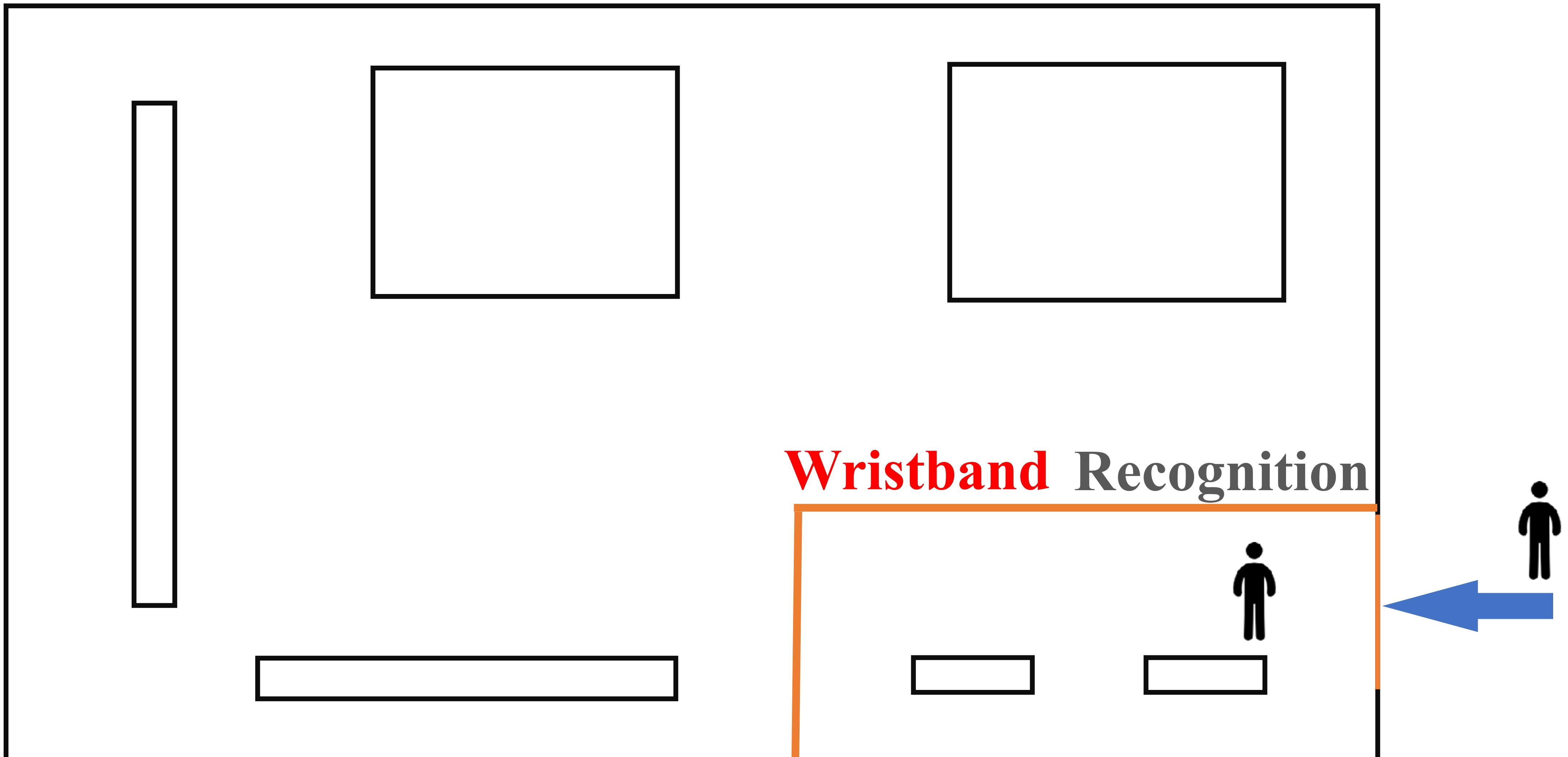
- Money paying

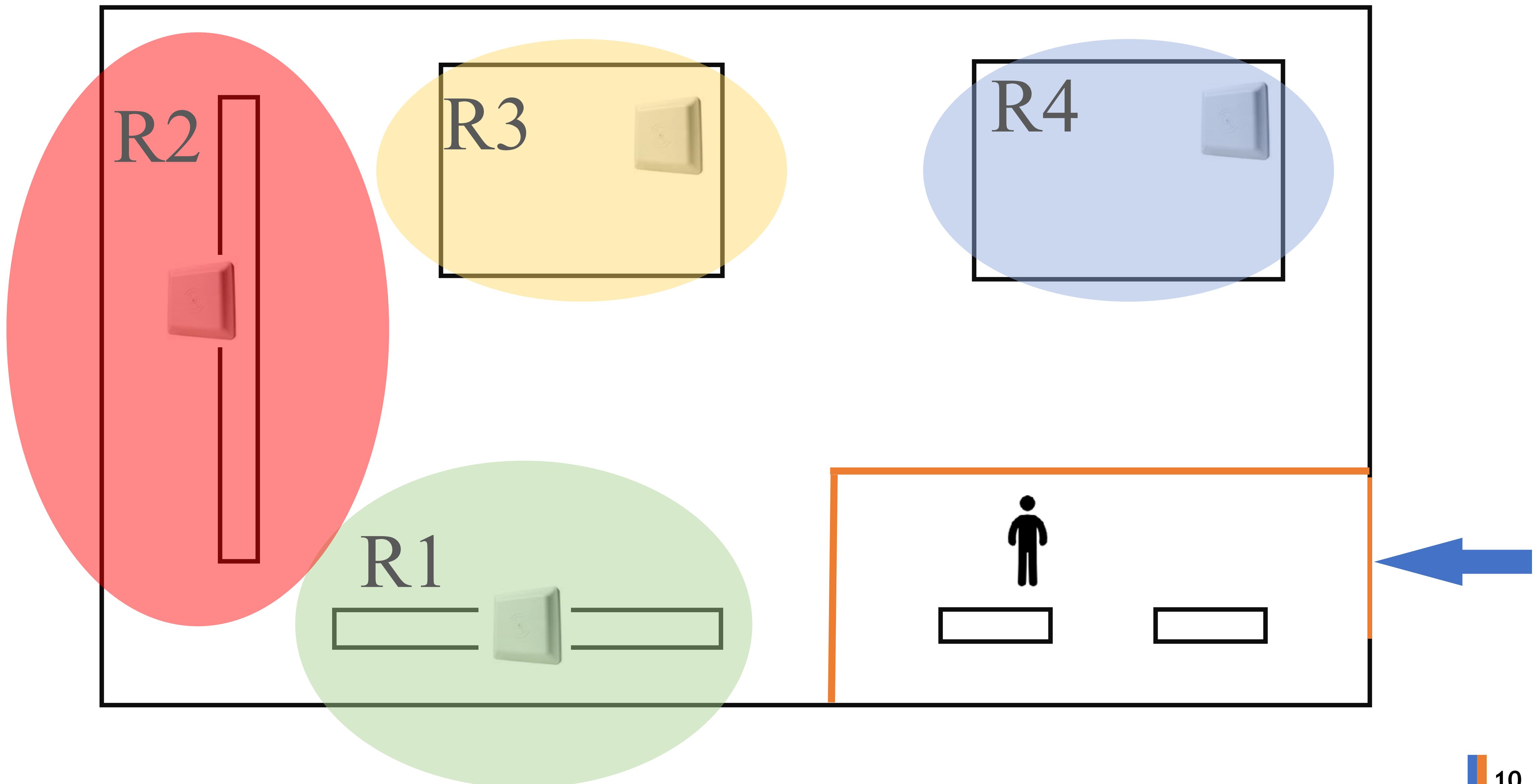


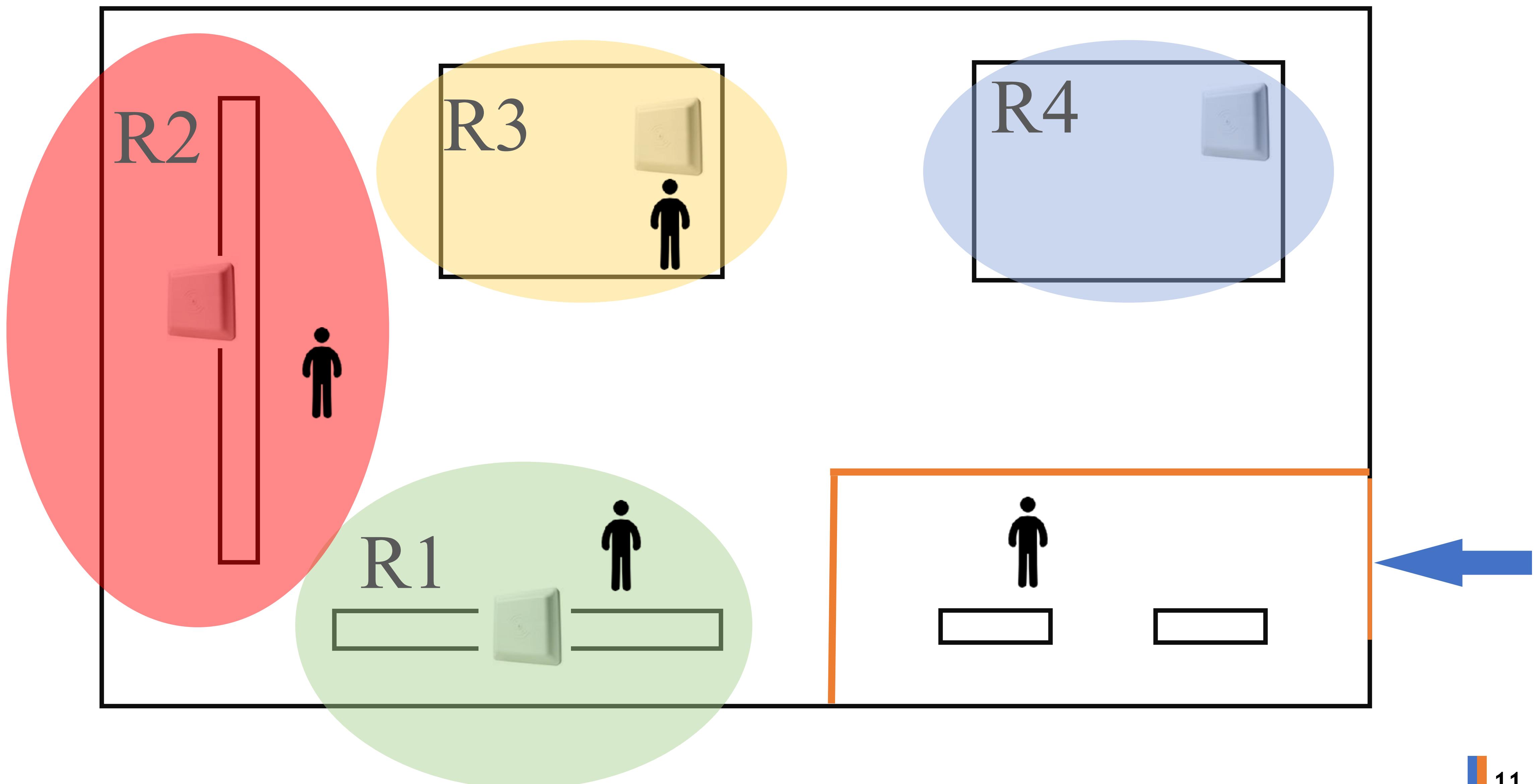
QR code

# System Inspiration

- Human recognition
- Region Localization
  - UHF RFID tag
- Stuff picking
- Stuff-Hand Grouping
  - UHF RFID tag
- UHF RFID
  - Light weight
  - Easy tracking
  - NLOS
  - Multiple reading







Bottle with tag

Wrist with tag

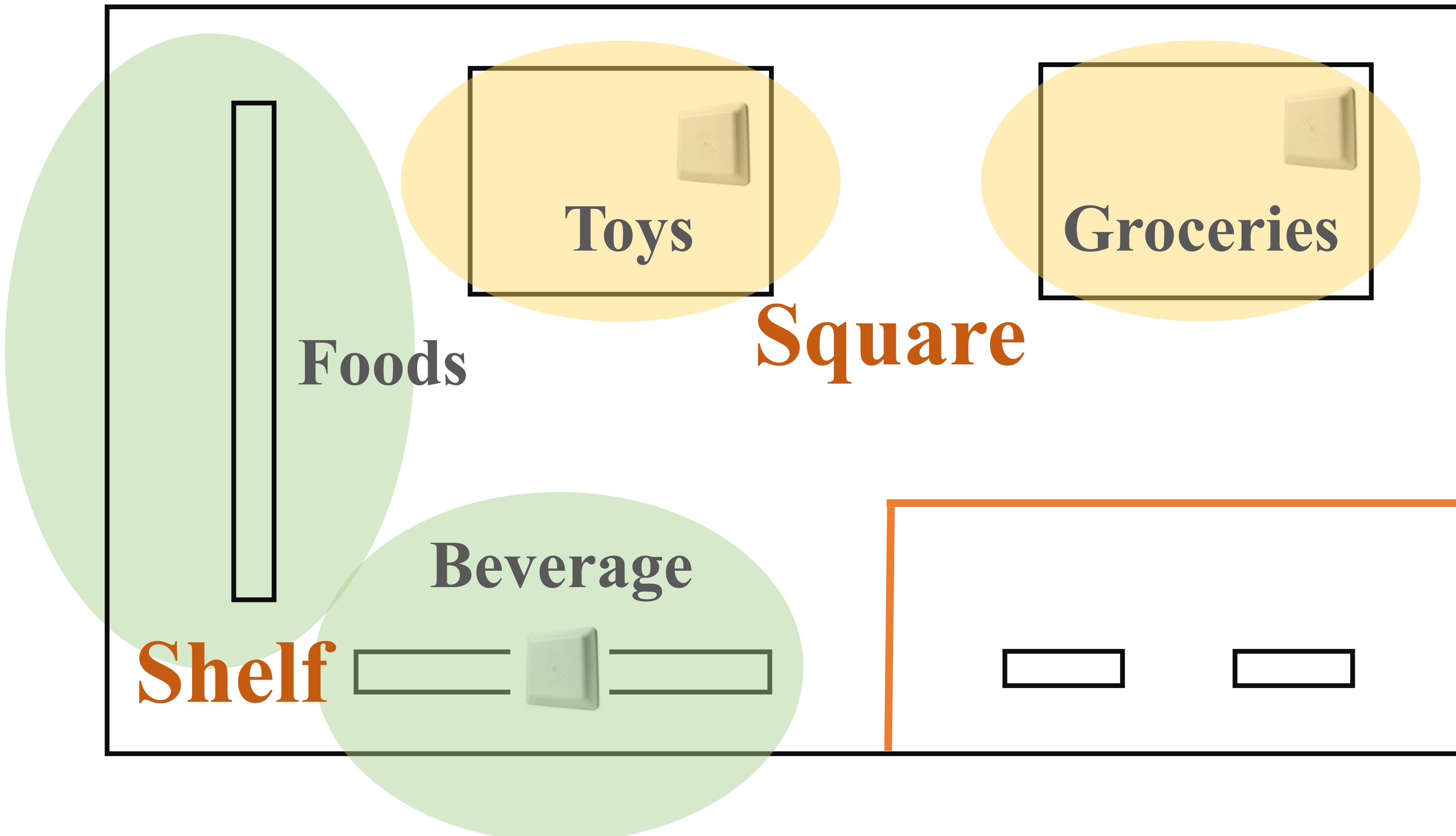


# Environment

# Region

- Definition
  - Shelf block
  - Square block
- Place
- Super market
- Shopping mall
- Convenient store





# RFID Setting

- Passive tag
  - Object tag
  - Wrist tag
- Reader
  - Over each region
- Data base
  - QR-code



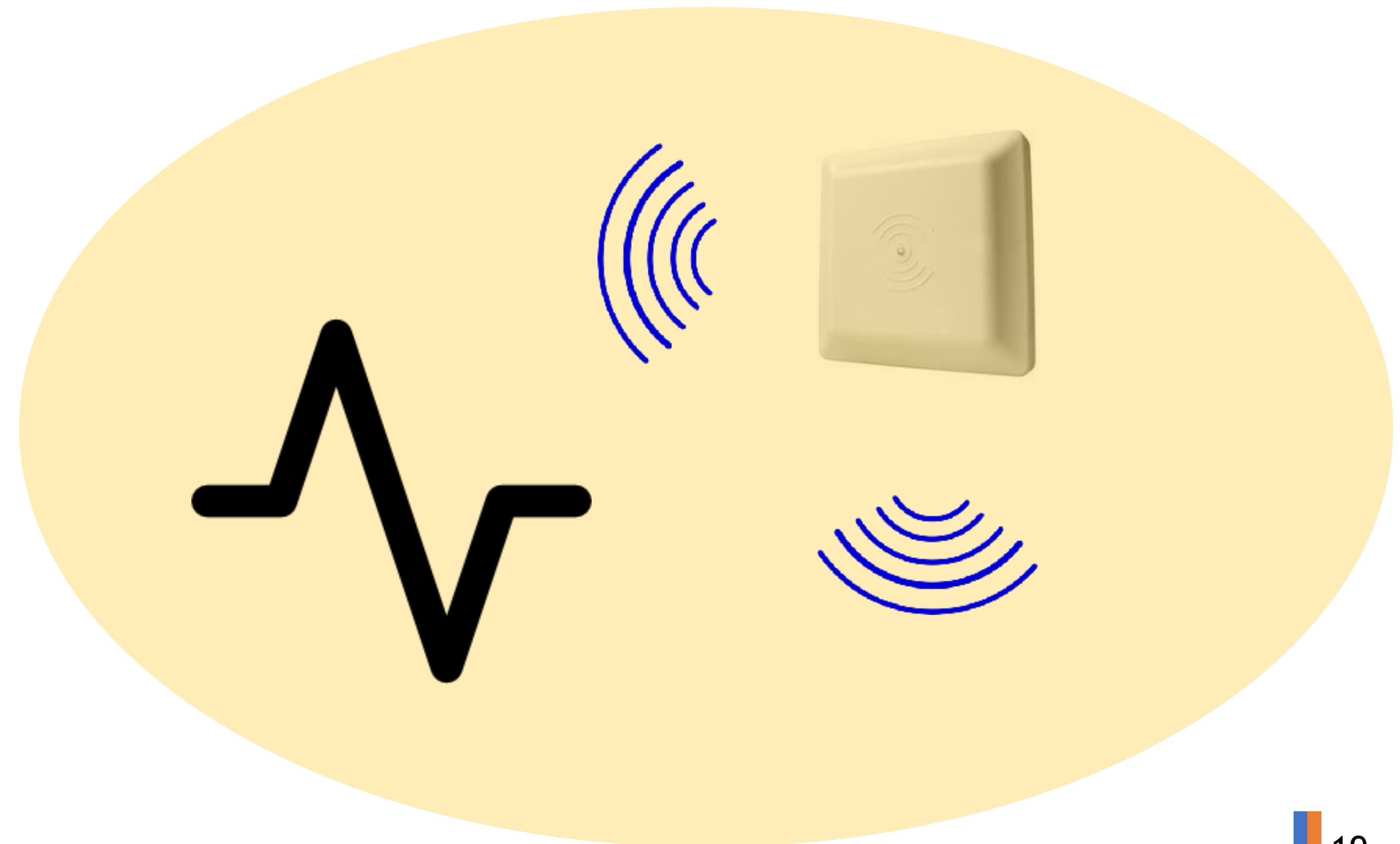
# Challenge

# Problem

- How to detect new region user
- How to detect unknown tag
- How to match tag-object

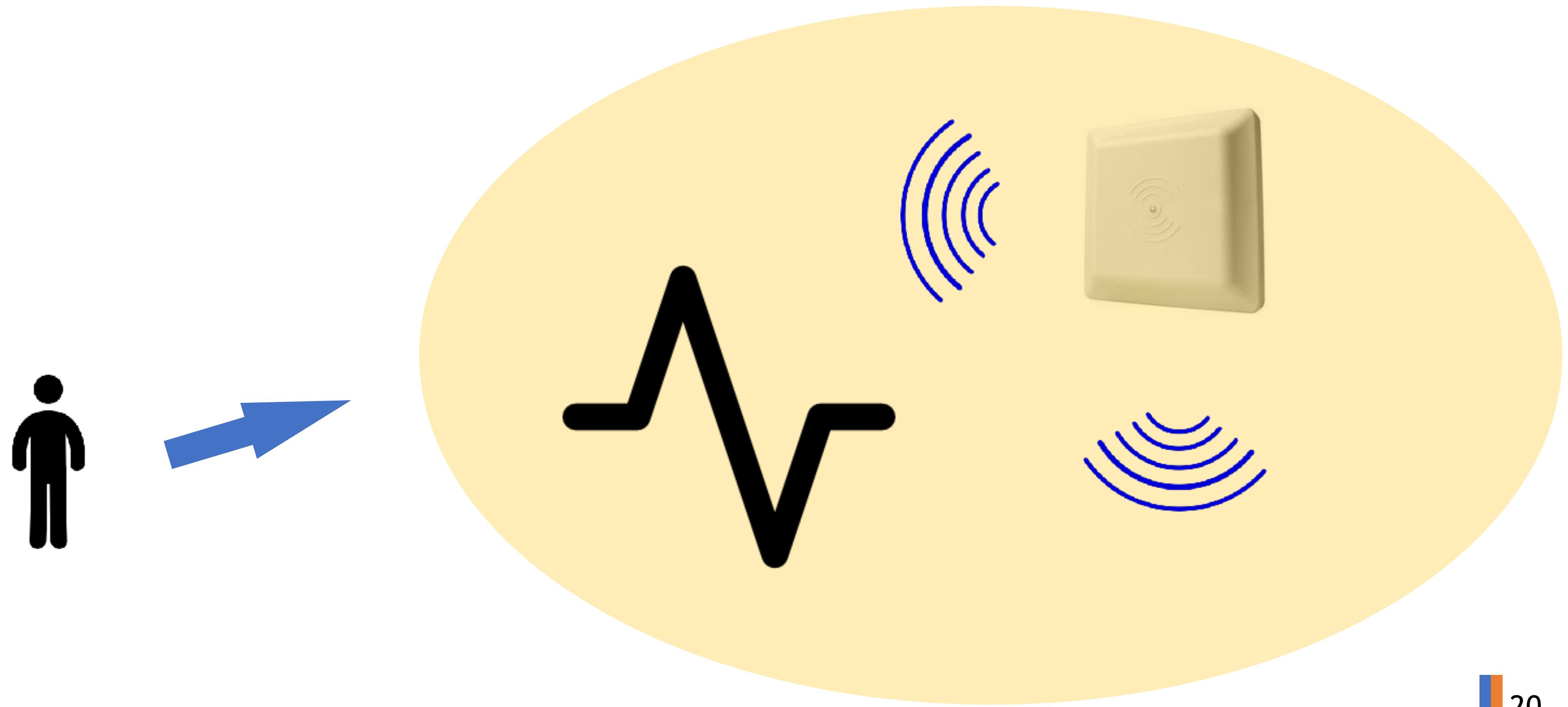
# How to Detect New Region User?

- The origin signal without new user



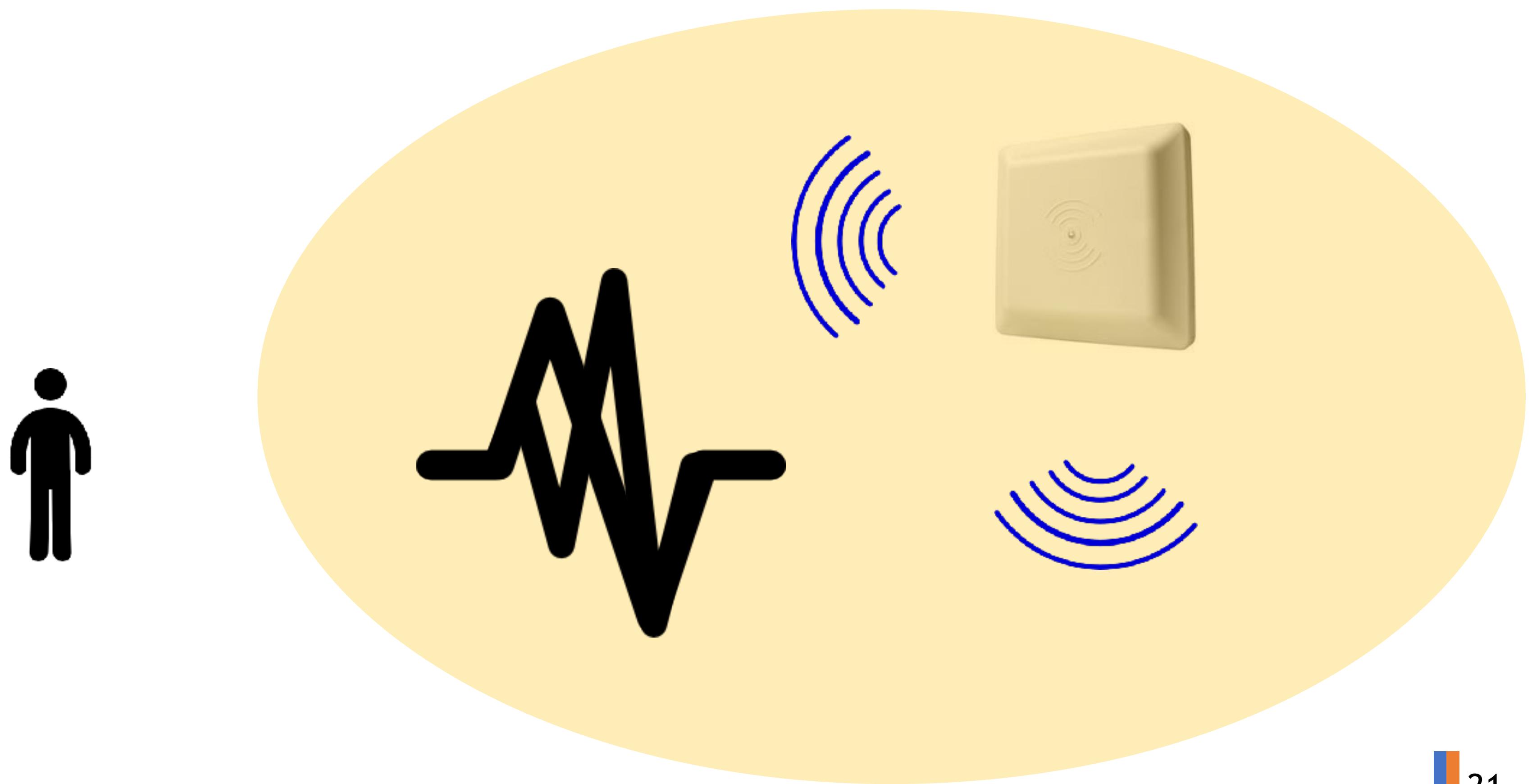
# How to Detect New Region User?

- An user forwards to a region

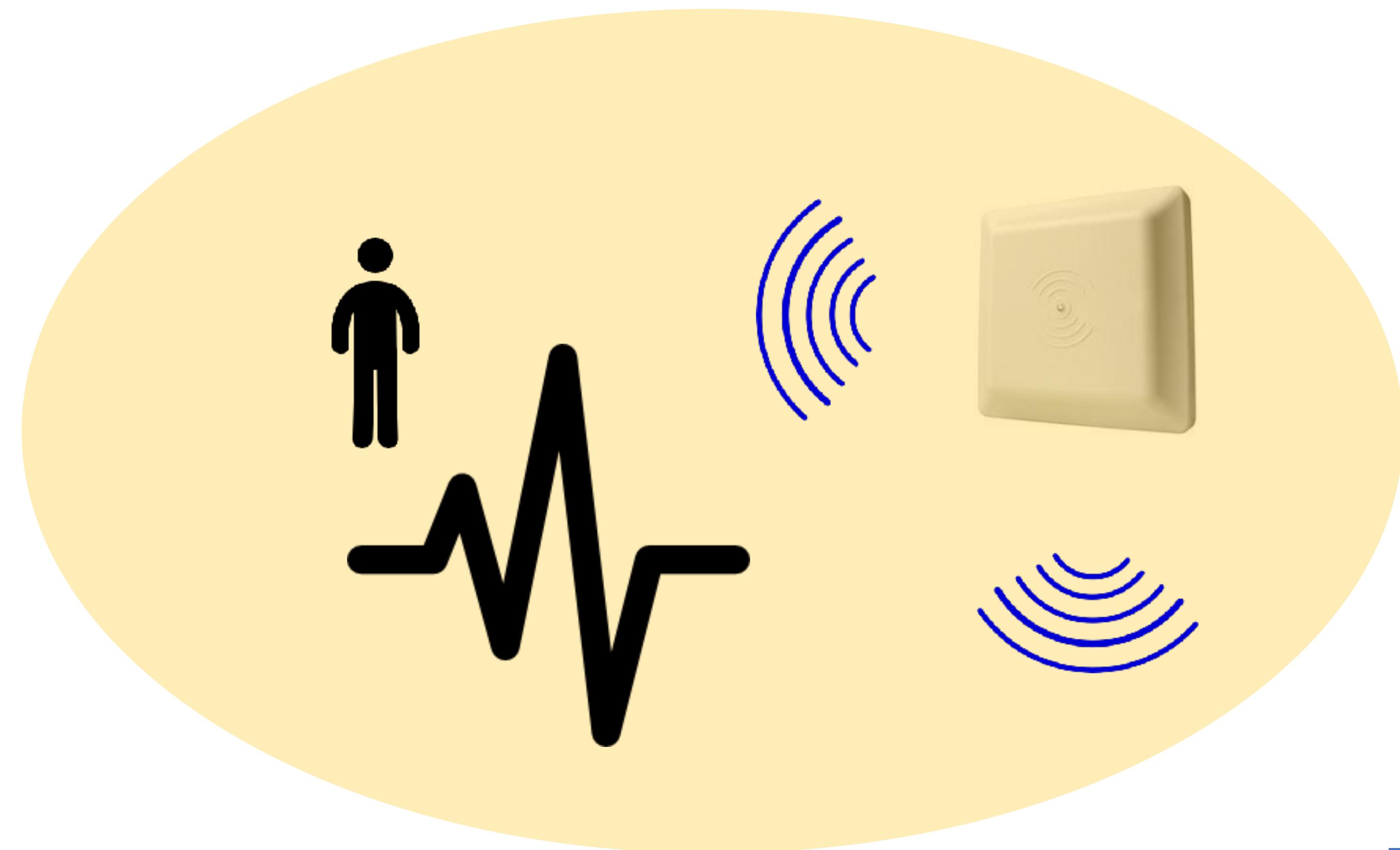


# How to Detect New Region User?

- Detect the **signal variation** within the region

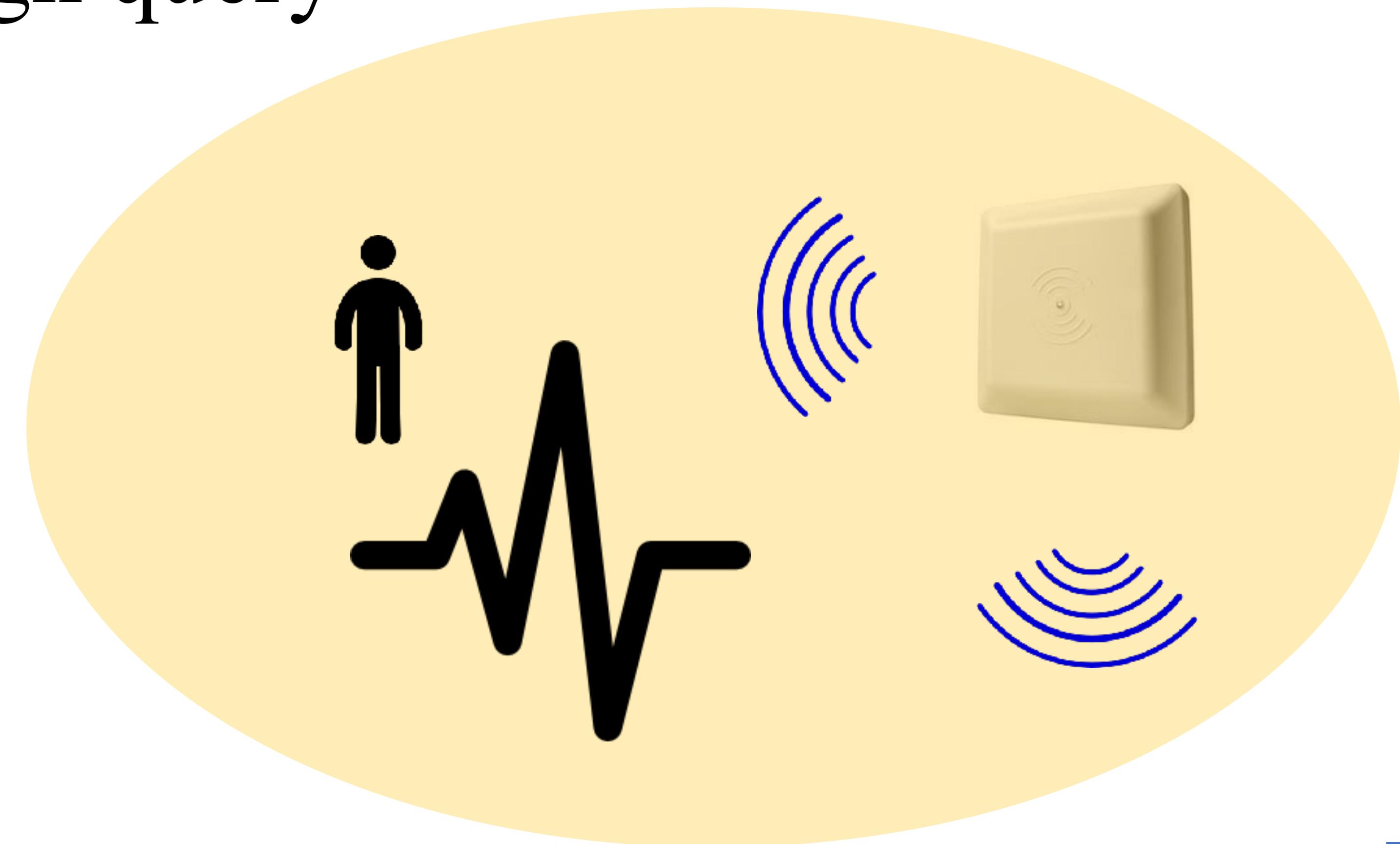


# How to Determine Unknown Tag?



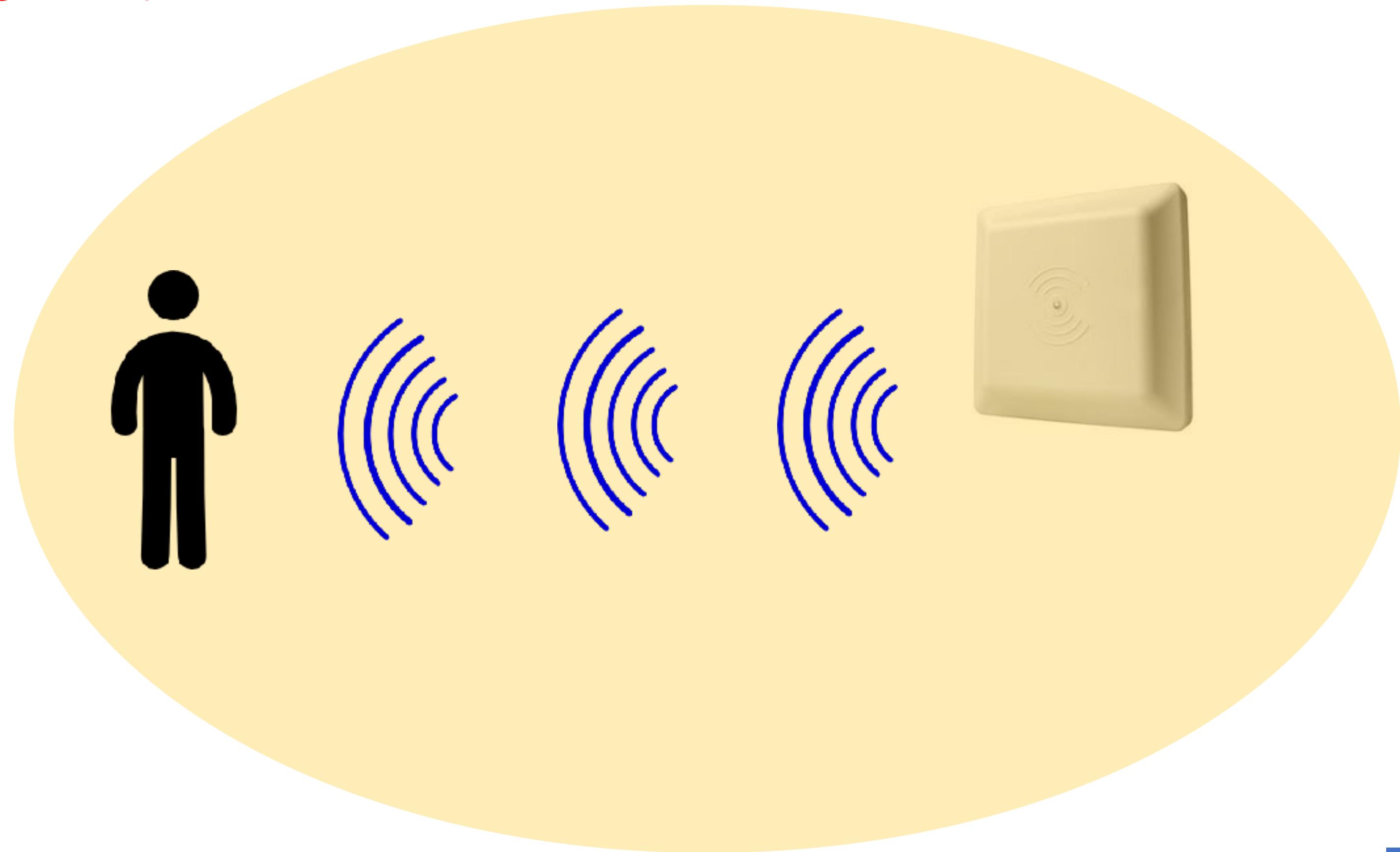
# How to Determine Unknown Tag?

- Ask the ID through query



# Track Known Tag

- Send query to **track it**



# How to Match Tag-object?

- Find the tag-object pair



# Reference

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- <https://www.theverge.com/2016/12/5/13842592/amazon-go-new-cashier-less-convenience-store>
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