VideoLoc:
Video-based Indoor Localization

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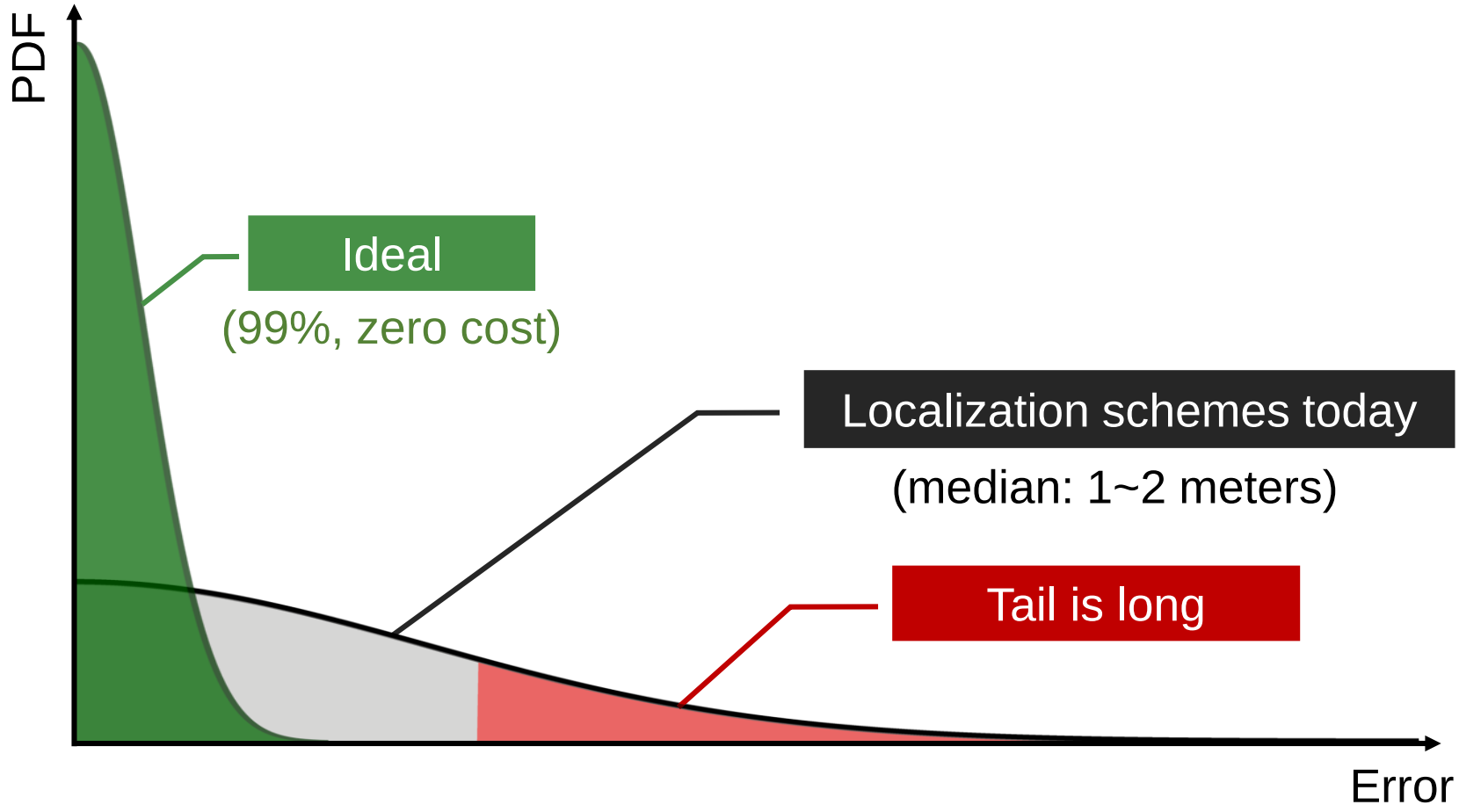
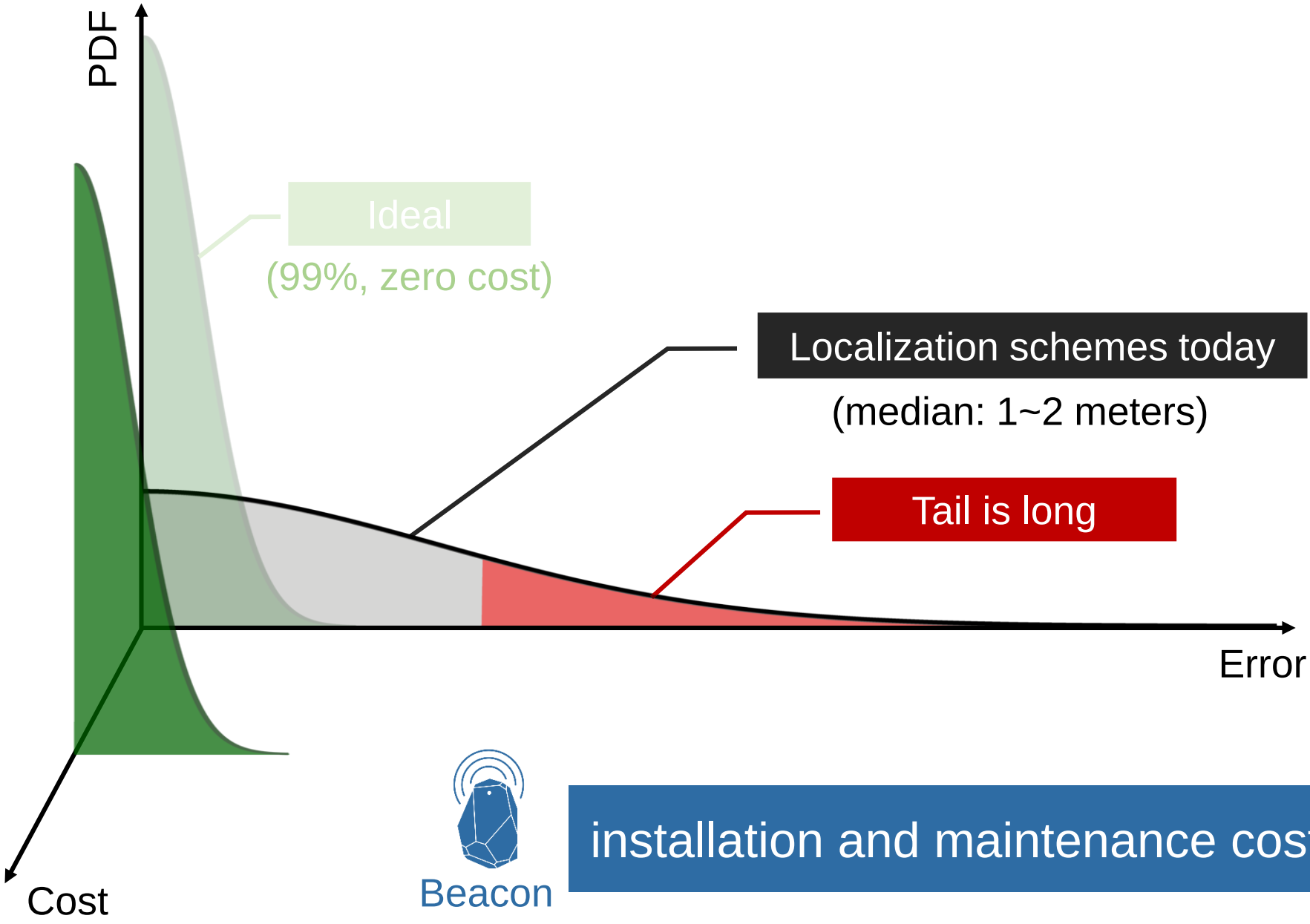

PDF
Ideal
(99%, zero cost)
Localization schemes today
(median: 1~2 meters)
Tail is long
Error


PDF
Ideal
(99%, zero cost)
Localization schemes today
(median: 1~2 meters)
Tail is long
Error
Cost
Beacon
installation and maintenance costs

location: (X,Y)

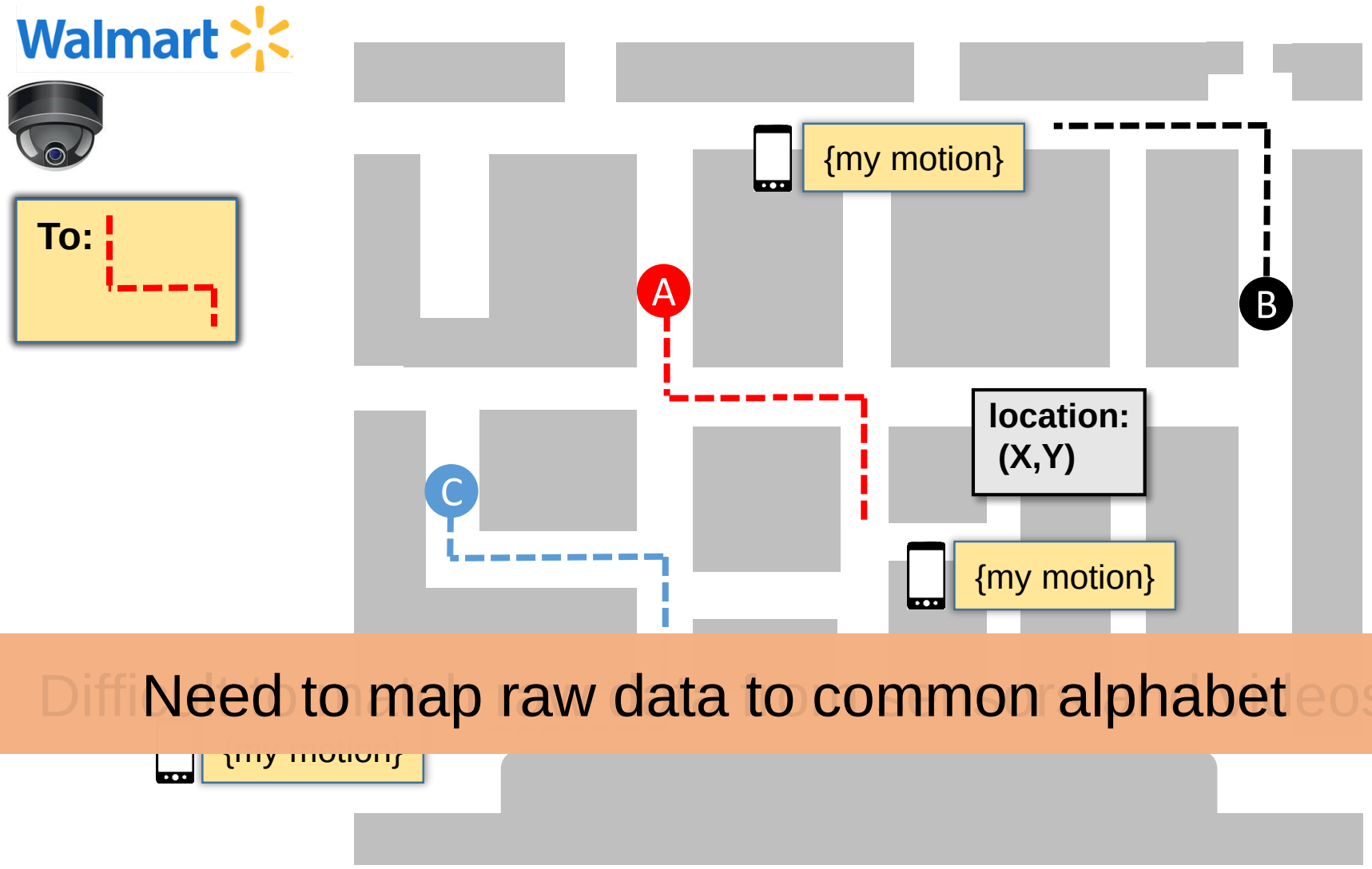
Estimate a user's location from video

Send the location to the user

MAC address is unknown

Motion as address

Motion as Address



Need to map raw data to common alphabet

String of Motion Alphabet

walk east walk east pause

motion string = {E, E, P, S, …}

walk south

Comparing Motion Strings

his motion string = {E, E, P, S, …}, location = [X,Y]

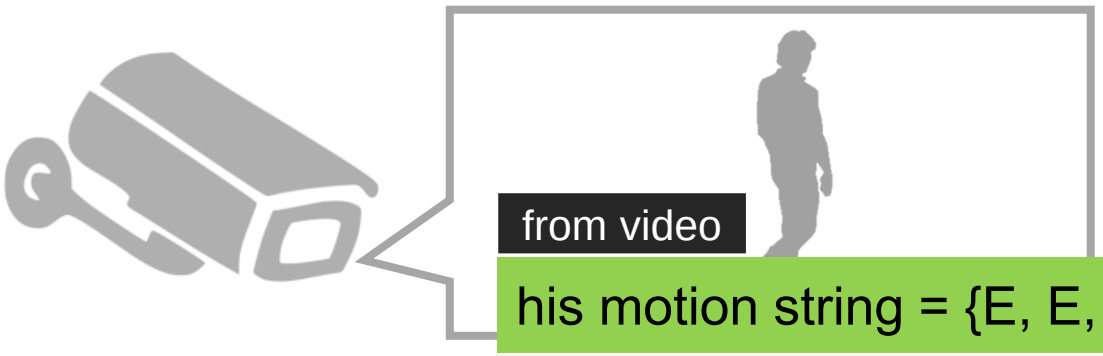
Bob

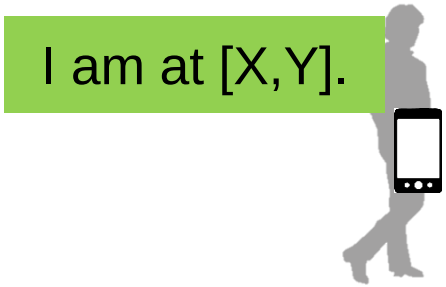
my motion string = {E, E, P, S, …}

Joe

my motion string = {E, E, P, N, …}

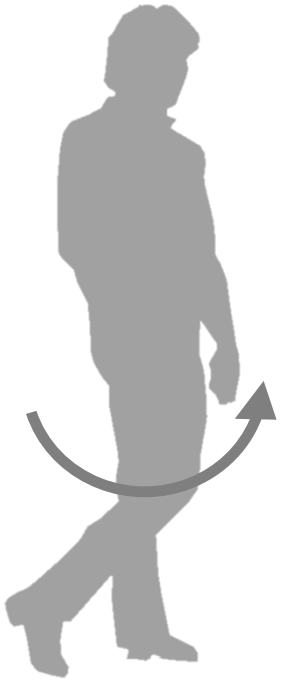
Comparing Motion Strings





Motion Alphabet

IsPausing



IsRotating

IsWalking

Step duration

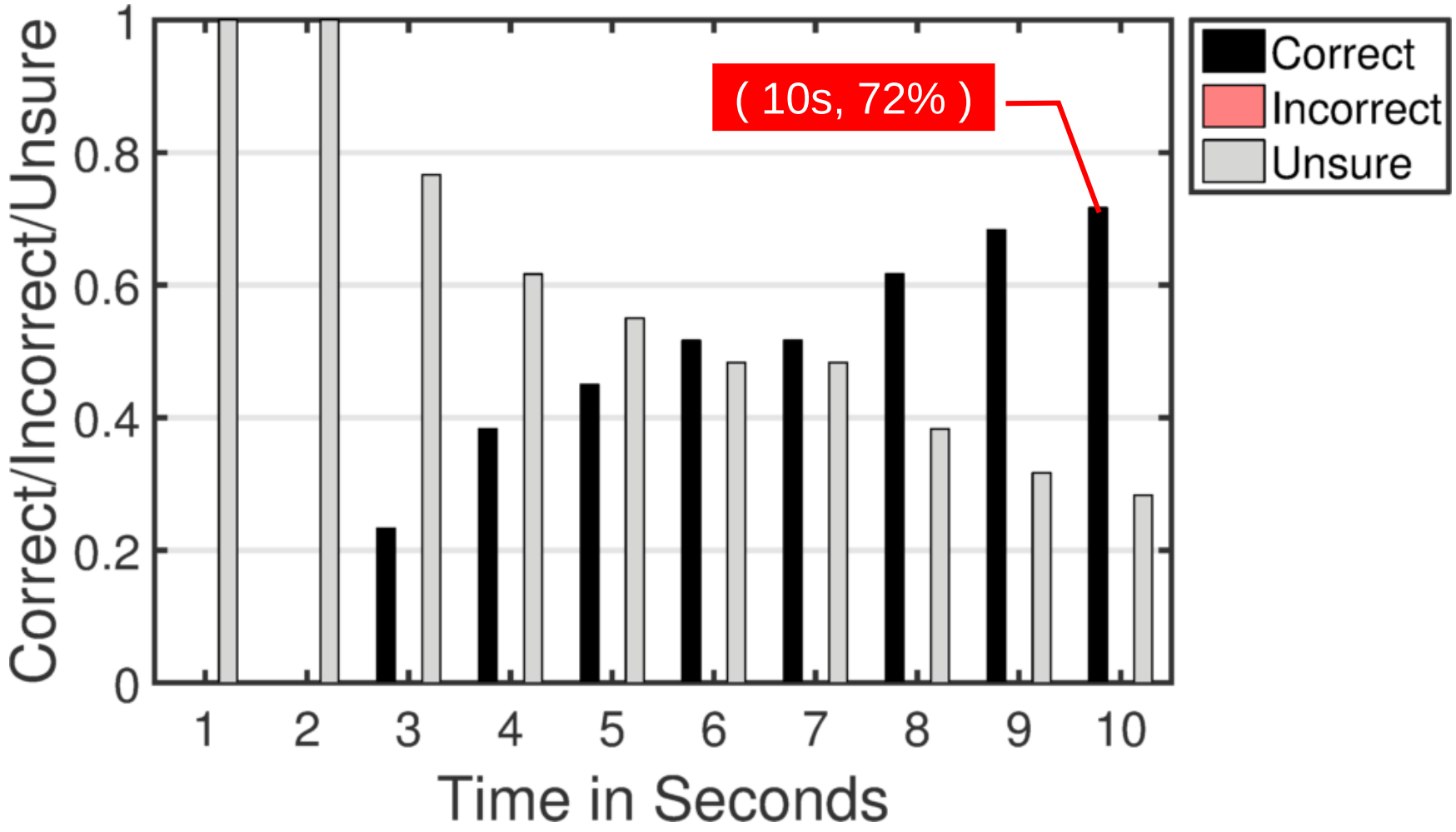
Step direction

Step phase

$$\text{Similarity}_{\text{string}} = \frac{\text{matched alphabets}}{\text{total alphabets}}$$

Visual Address Evaluation

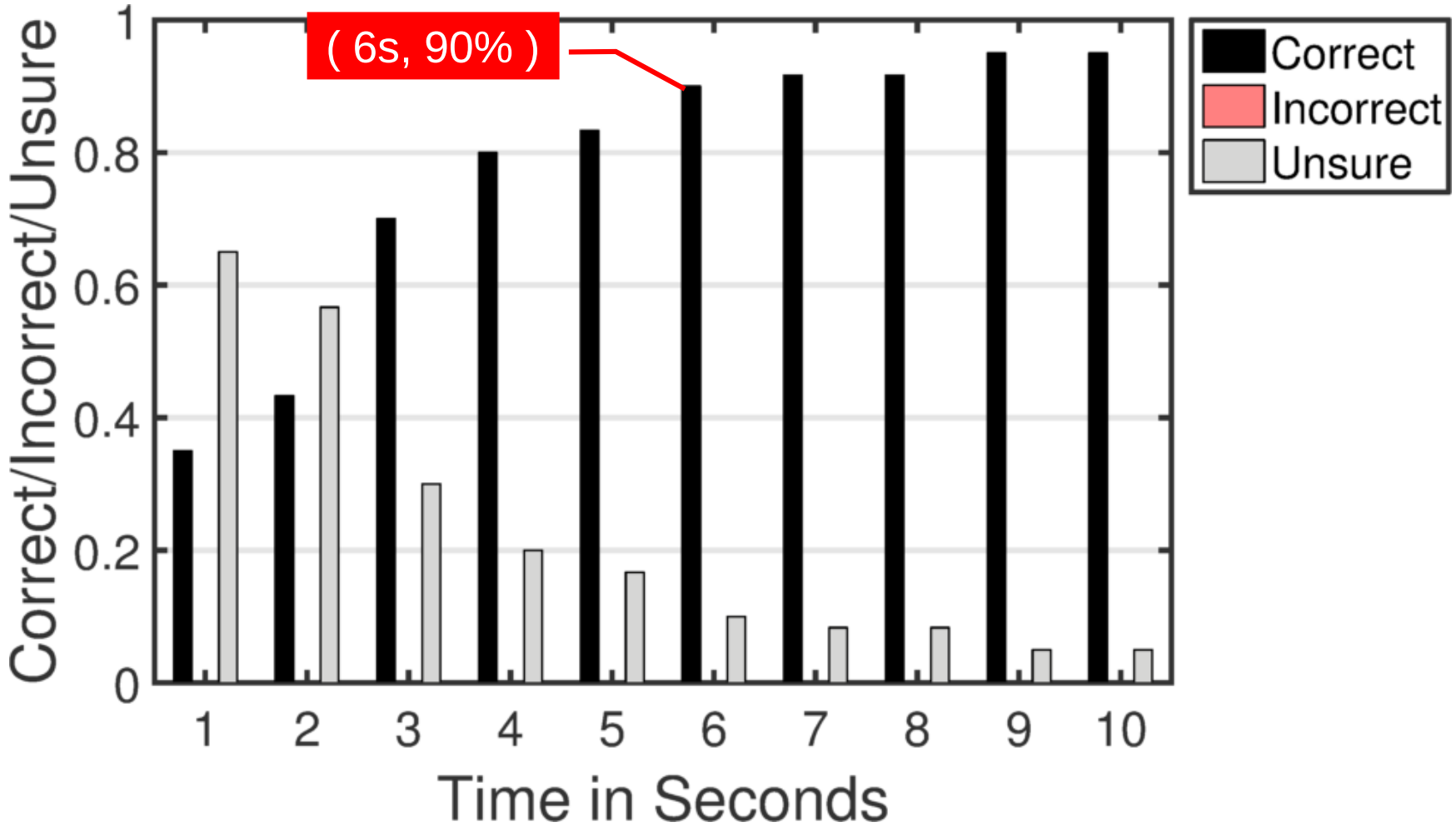
12 volunteers, Samsung Android phone



Visual Address Evaluation

12 volunteers, Samsung Android phone

Motion + Clothing



Summary

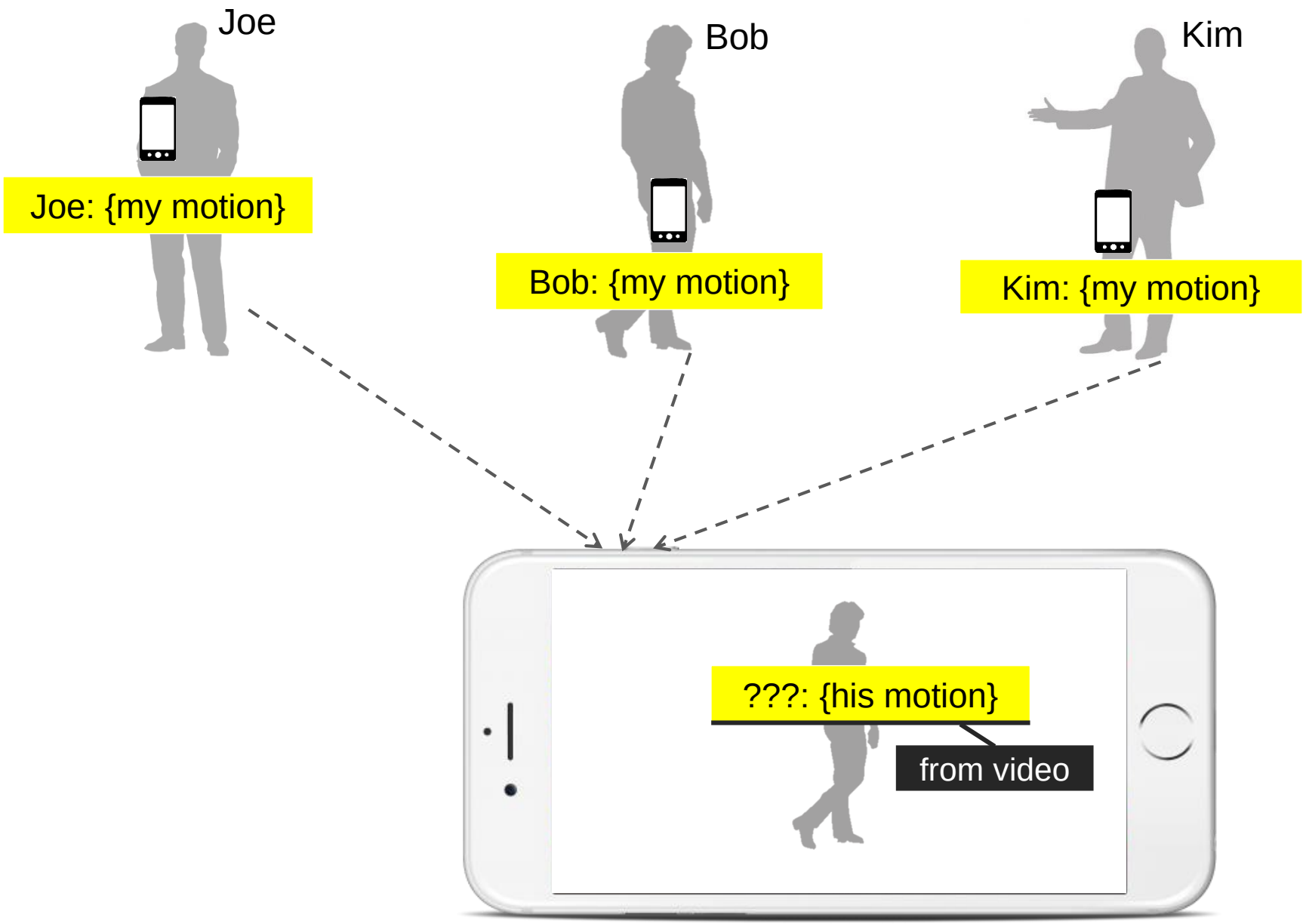
Surveillance cameras can be used for indoor localization

Use motion (and clothing) as visual address

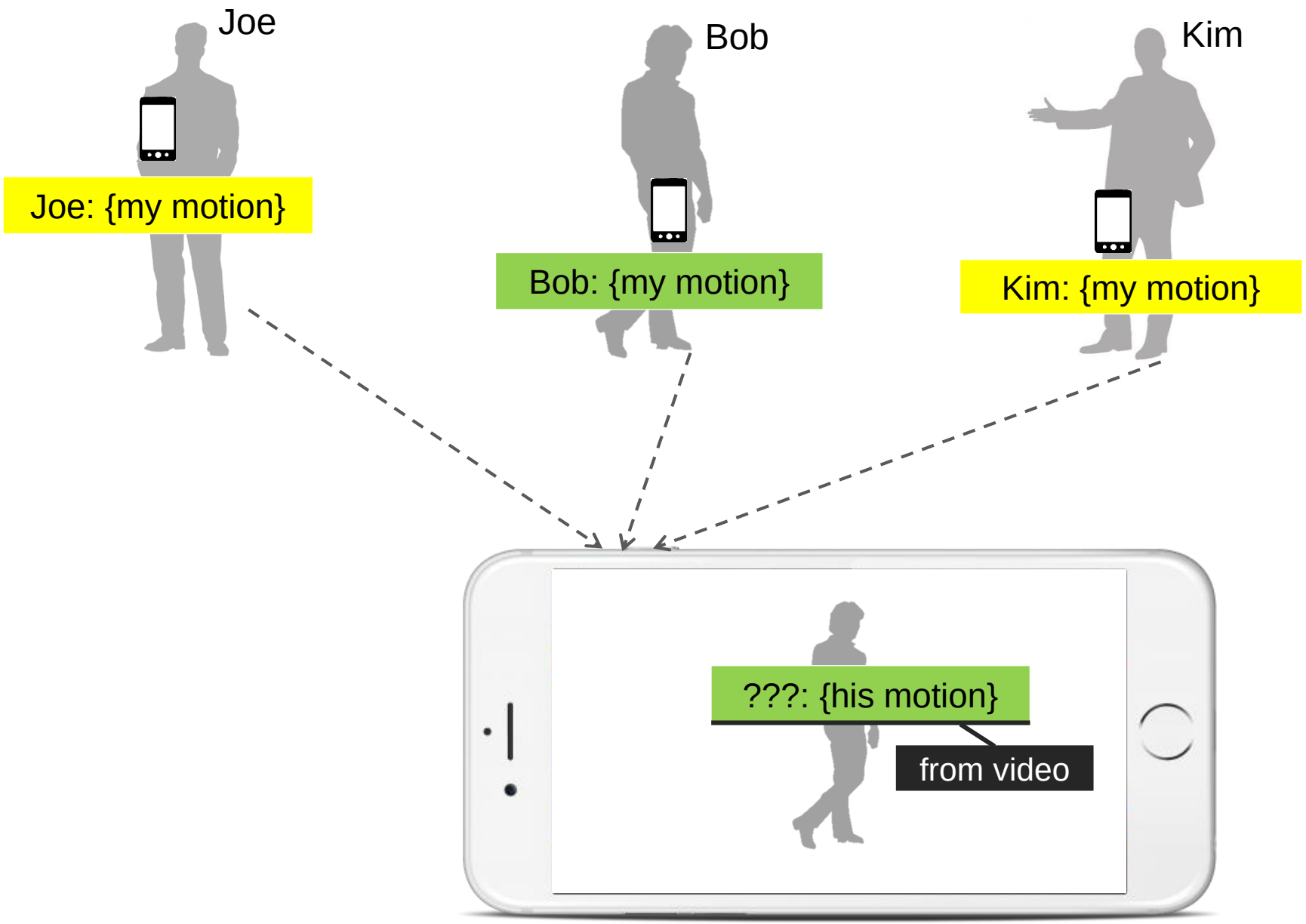
Questions, Comments?

Thank You

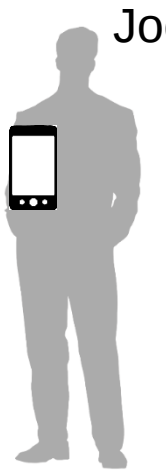
Augmented Reality

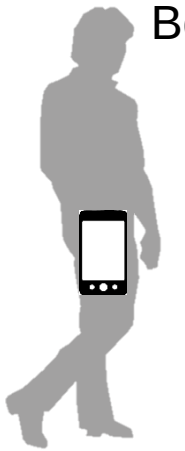


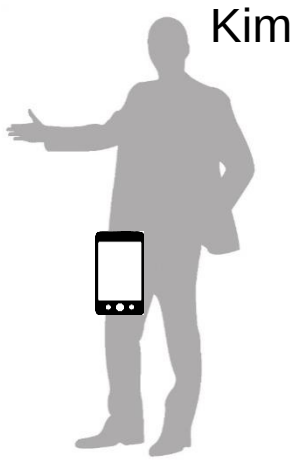
Augmented Reality



Augmented Reality







location: (X,Y)

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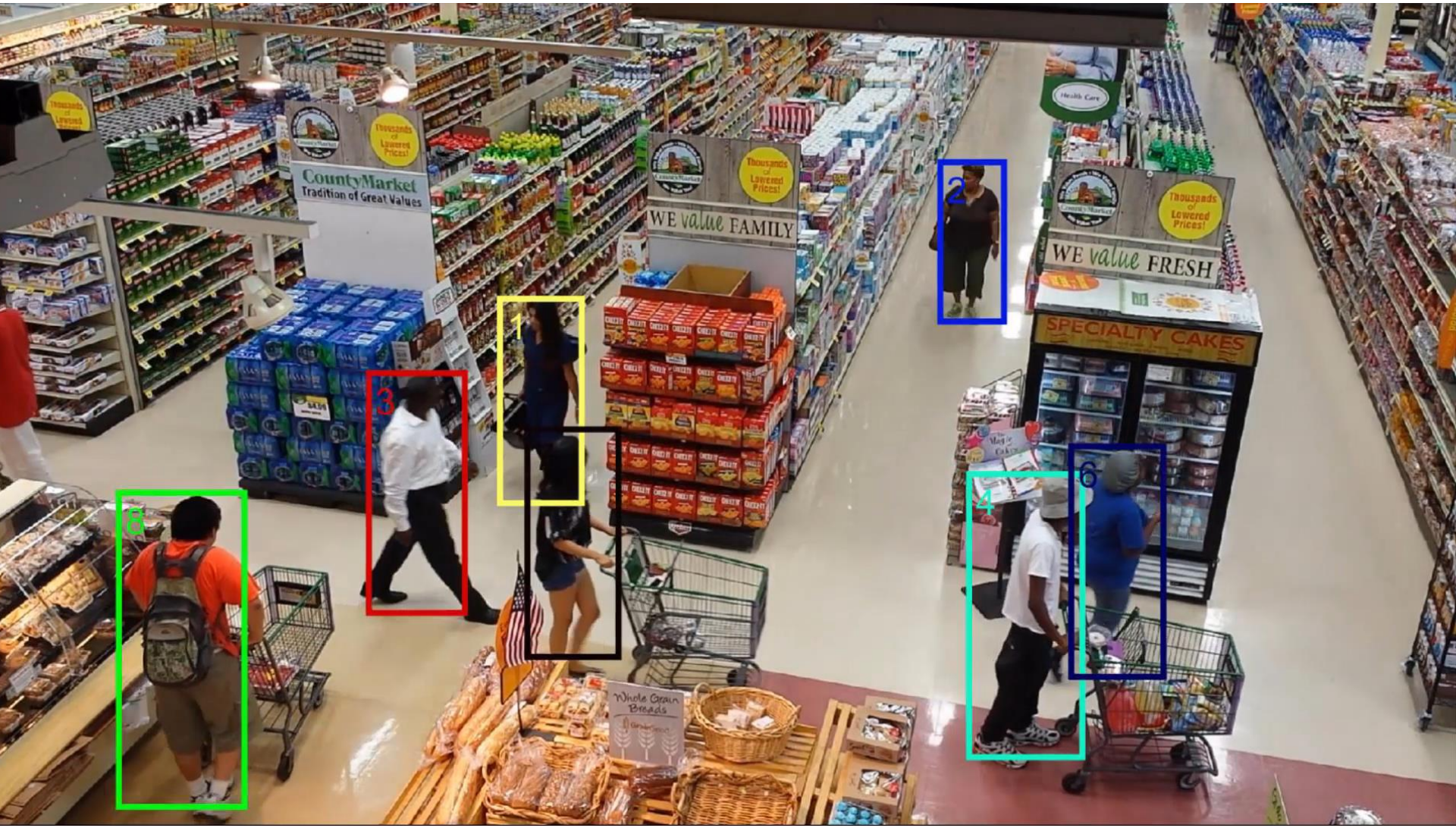
Motion as address

Tracking


CountyMarket
Tradition of Great Values
WE value FAMILY
WE value FRESH
SPECIALTY CAKES
Whole Grain Breads
1
2
3
4
6
8

Mapping to World Coordinate System