

## Goal

We present a Geo-casting routing protocol called **LoSeRO** for opportunistic networks that uses knowledge of the most frequently visited locations by a user to route messages. LoSeRO forwards messages to all users who have a mobility profile that intersects the packet's destination zone.

**Motivations:** i) Devices are capable of capturing and storing location information by using GPS service; ii) Recent studies have shown that mobility is positively correlated with the building of new social relationships.

## Locality Sensitive Routing Protocol

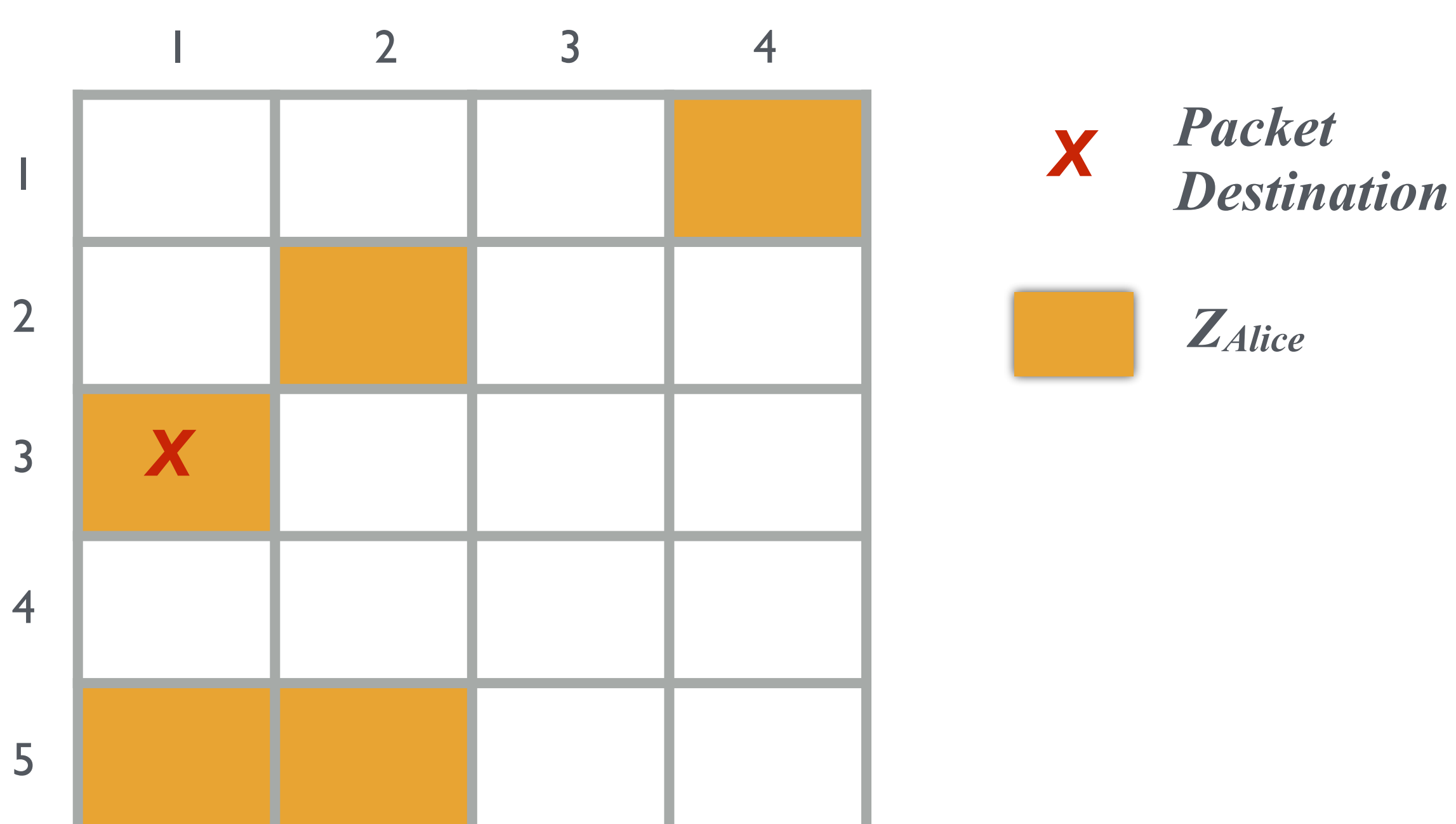
In LoSeRo, users move in a large geographic area, and a location inside the area can be uniquely identified by any user, for example, using GPS coordinates. Each user independently builds her mobility profile, called *MobyZone*, considering her own past mobility traces. The MobyZone of a user is the set of her most visited places.

### Forwarding condition:

$$\text{Belongs}(\mathcal{D}(M), Z_k) = \begin{cases} \text{true} & \text{if } \mathcal{D}(M) \subset Z_k \\ \text{false} & \text{Otherwise} \end{cases}$$

Where,  $Z_k$  is the MobyZone of an agent  $u_k$ , and  $\mathcal{D}(M)$  the set of places indicated in a message  $M$ .

### Network details:



### Mobility model:

Every agent visits a location and waits at that location for a period of time. Once the waiting time at the current location is finished, the agent visits a new location with a probability:

$$Pr_{new} = \rho S^{-\gamma}$$

$S$  is the number of distinct locations that a user has already visited. The parameters  $\rho$  and  $\gamma$  controls the probability of exploring an unvisited location.

## Simulations

### Metrics:

$$\text{Coverage} = \frac{|R(\mathcal{M}_c^i) \cap V(\mathcal{M}_c^i)|}{|V(\mathcal{M}_c^i)|}$$

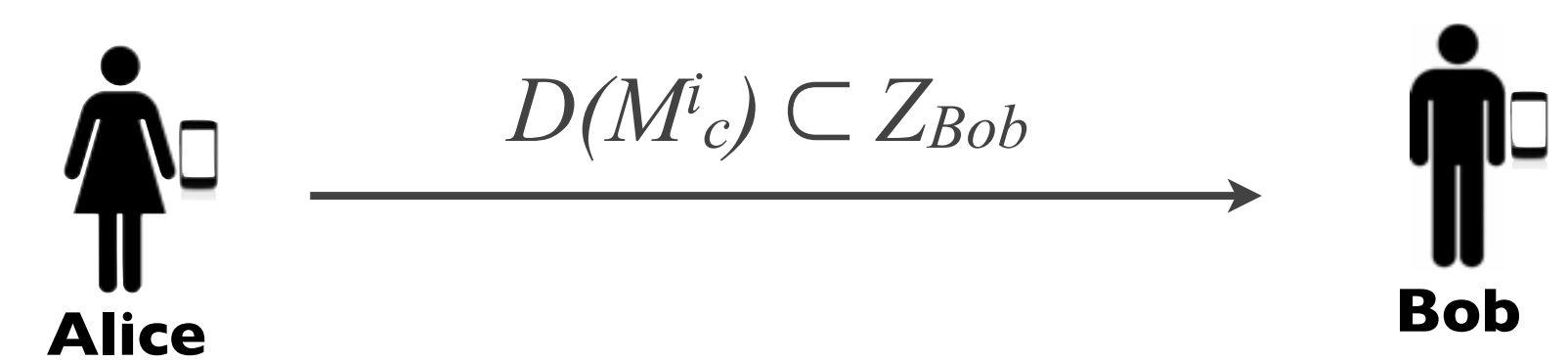
$$\text{Precision} = \frac{|R(\mathcal{M}_c^i) \cap V(\mathcal{M}_c^i)|}{|R(\mathcal{M}_c^i)|}$$

$$F\text{-Score} = 2 \cdot \frac{\text{prec} \times \text{cov}}{\text{prec} + \text{cov}}$$

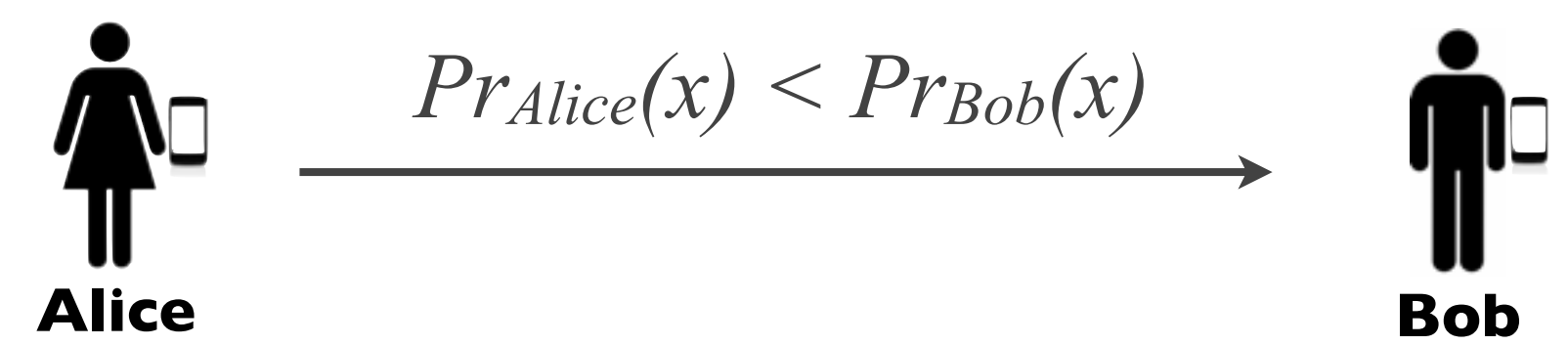
Let  $V(\mathcal{M}_c^i)$  be the set of agents that visits to all the places in  $\mathcal{D}(\mathcal{M}_c^i)$ .  $R(\mathcal{M}_c^i)$  be the set of agents that has received  $\mathcal{M}_c^i$  in the course of its spreading in a network.

### Routing Protocols:

#### Direct Delivery (DD)



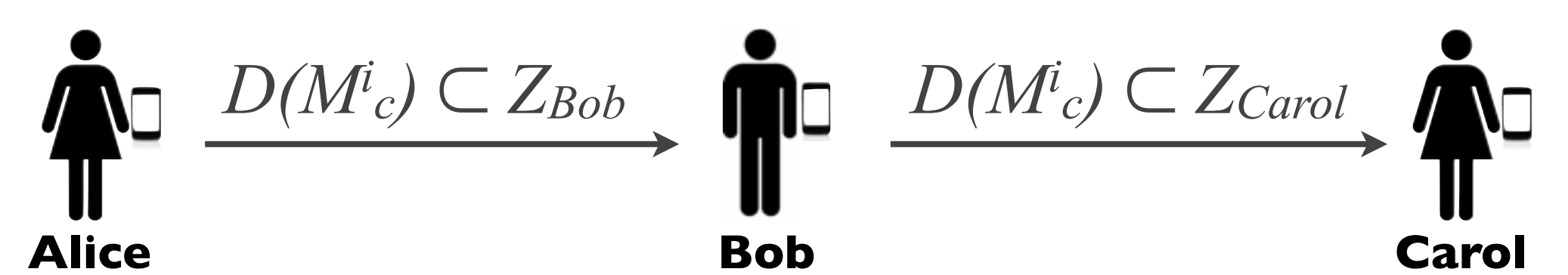
#### Probabilistic Forwarding (Pr)



#### Epidemic Protocol (EP)



#### LoSeRo with 2hops (L2)



### Results:

