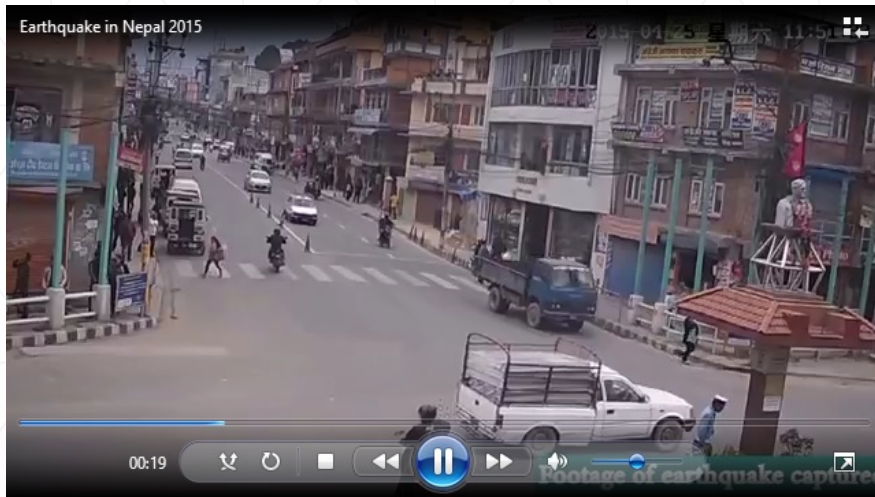


Community based multi-group activity prediction and member identification

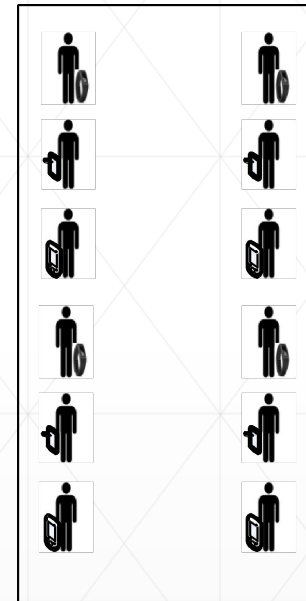
Snigdha Das

Indian Institute of Technology Kharagpur

A Natural Disaster: Earthquake

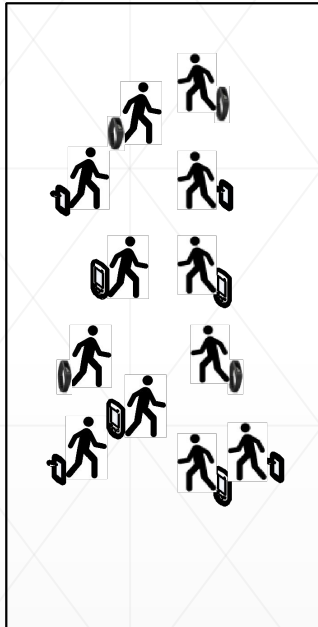


Pre-Earthquake Situation at Nepal
(25/4/2015 11:51:34)



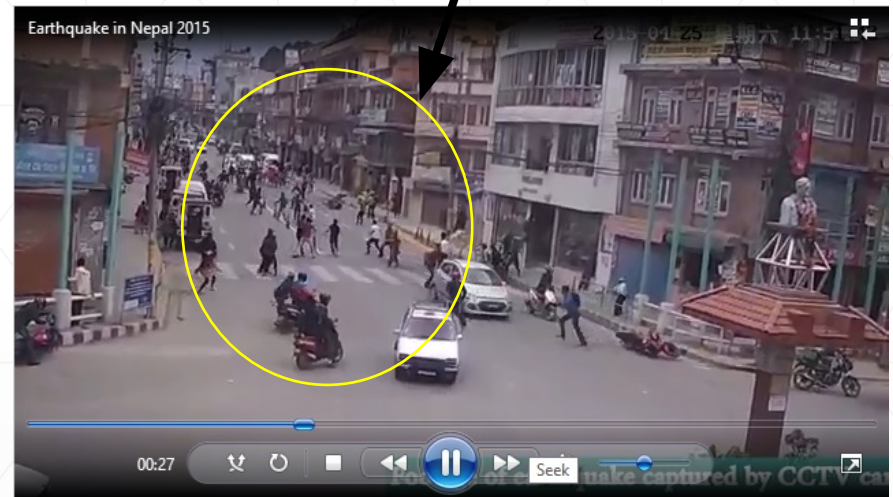
People's activity before Earthquake

A Natural Disaster: Earthquake



People's activity after Earthquake

People's Movement



Post-Earthquake Situation at Nepal
(25/4/2015 11:51:42)

Human Activity Recognition

Single Activity Recognition

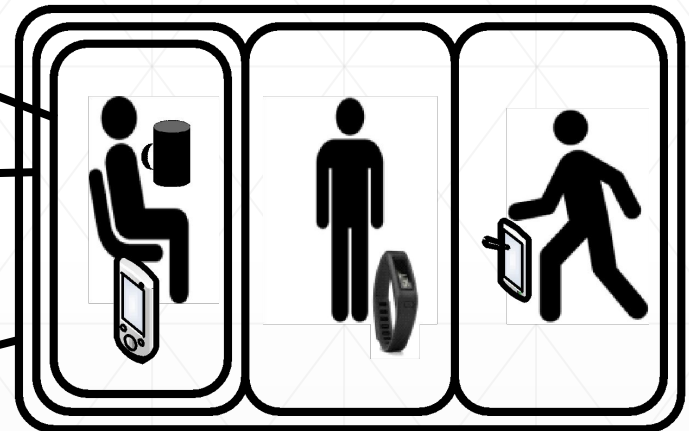
- $S1 = \{\text{sitting, standing, walking}\}$

Multiple Activity Recognition

- $S1 = \{\text{sitting, standing, walking}\}$
- $S2 = \{\text{sitting, standing, walking}\}$
- $S3 = \{\text{sitting, standing, walking}\}$

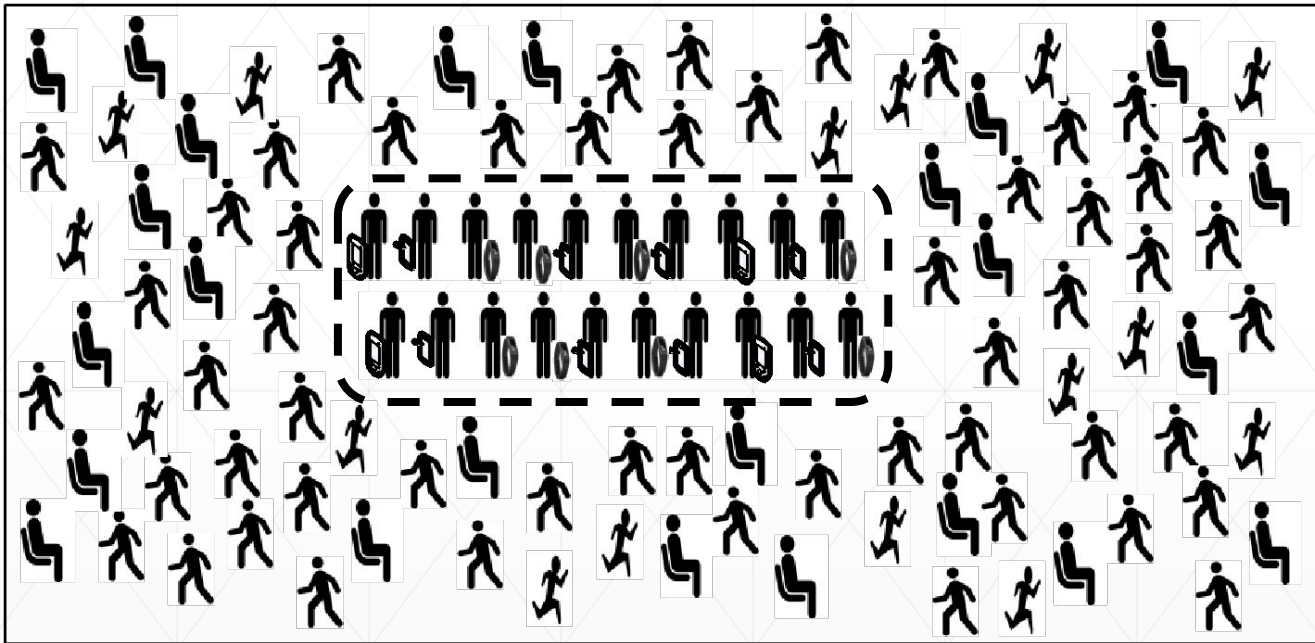
Group Activity Recognition

- $G1 = \{\text{coffee break, seminar}\}$



What is a Community?

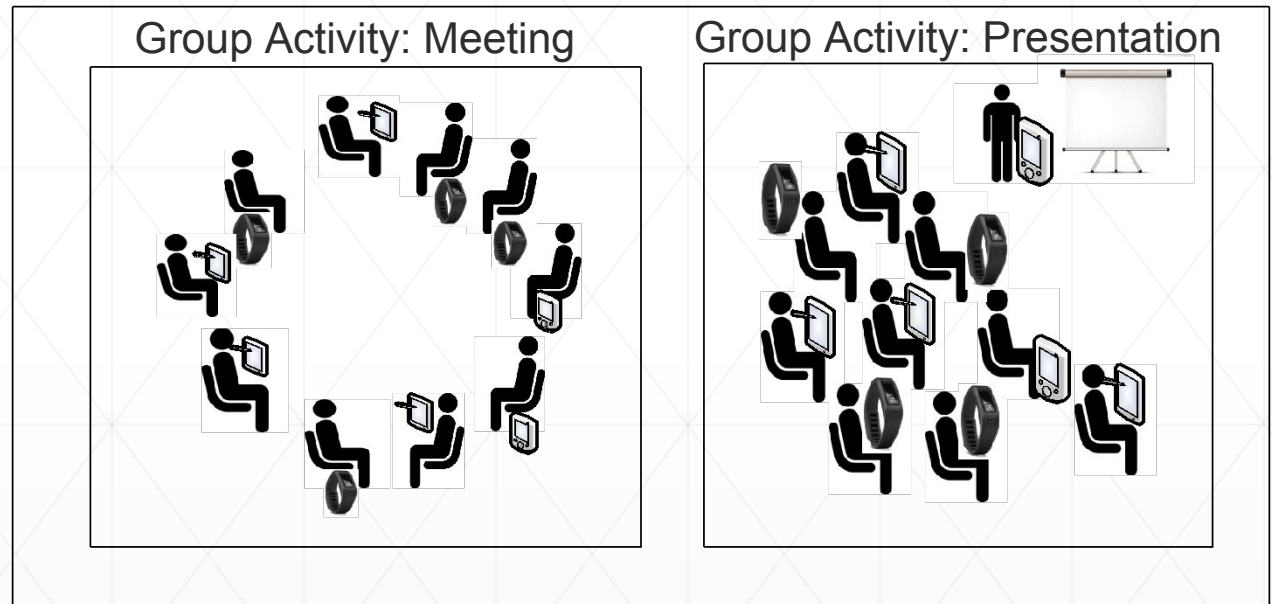
Population and community



A population with common characteristics

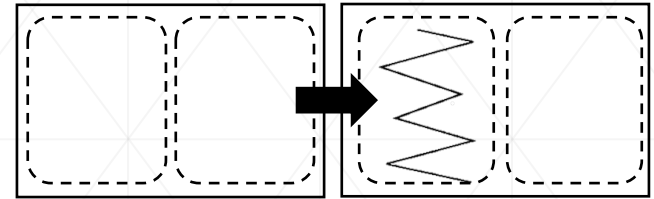
Group Formation

- Group Activity: Meeting
 - All members are sitting and discussing
- Group Activity: Presentation
 - All members are sitting except the presenter



Challenge: Given a population, how can we identify these two classes

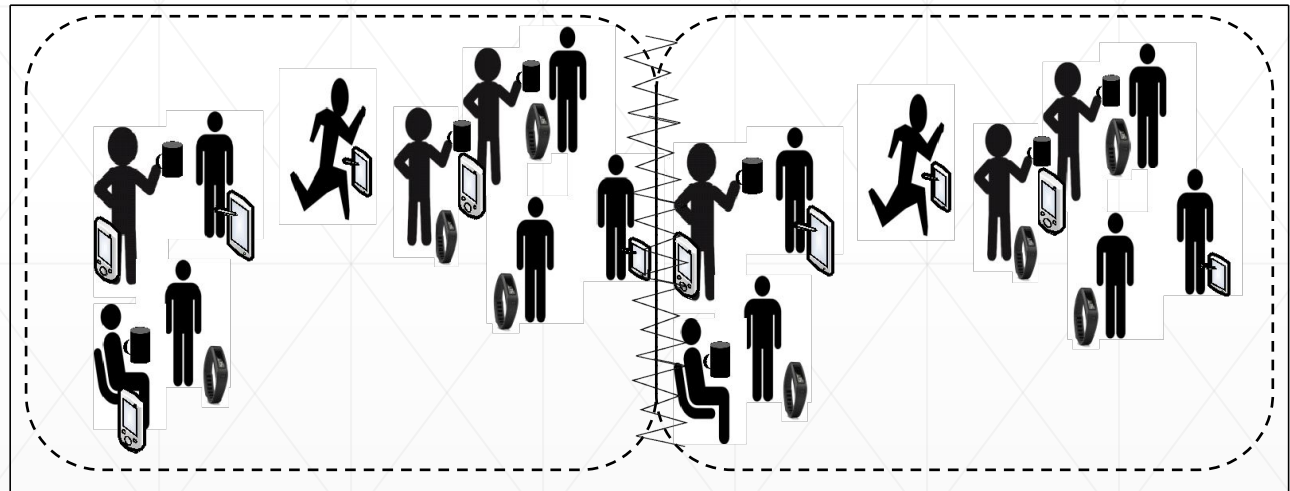
Group Transition



Group Activity:
Coffee Break

- Some people drinking coffee
- Some walking
- Some sitting
- Some standing
- Few running

Group Activity: Coffee Break



Challenge: Given a population, how can we identify the transition of groups

Current Limitation and Work Done

■ **Limitation:**

- Social dynamics-based user profiling may not be continuous
- Depends upon the users' interaction with the social network

■ **Solution:**

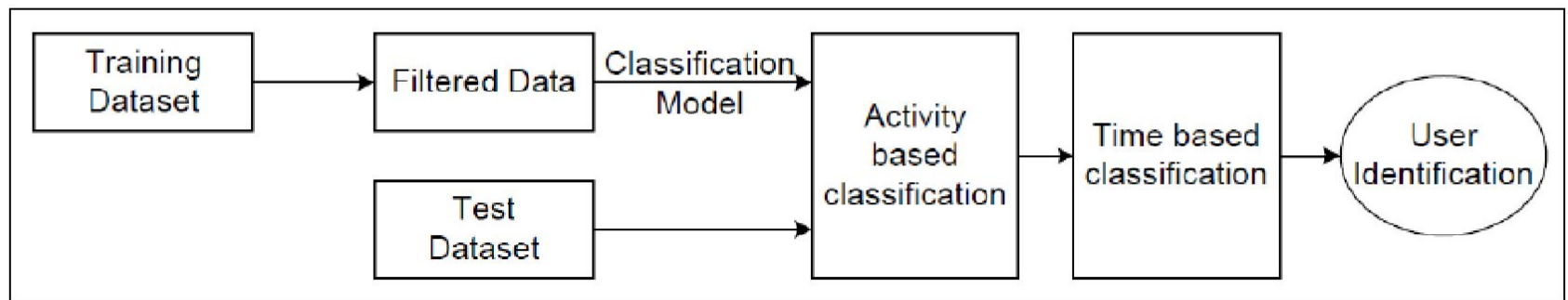
- Daily activity provides continuous signature of the users without involving them

■ **Work Done:**

- For identifying the members' of the community, our first step – User Identification
-

User Identification Model

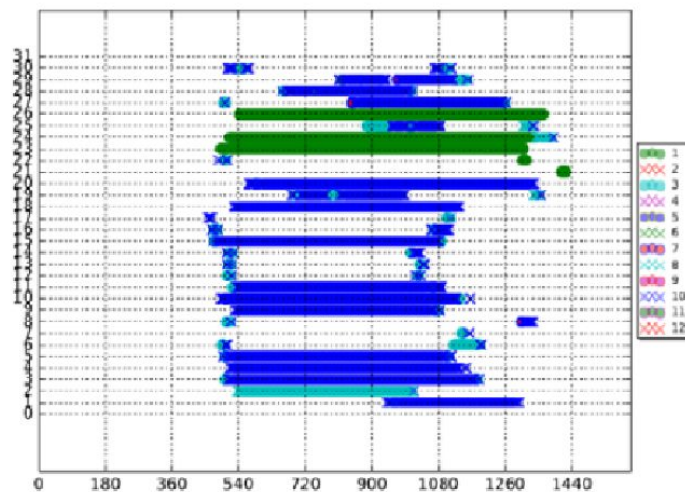
Figure 1: User Identification Model



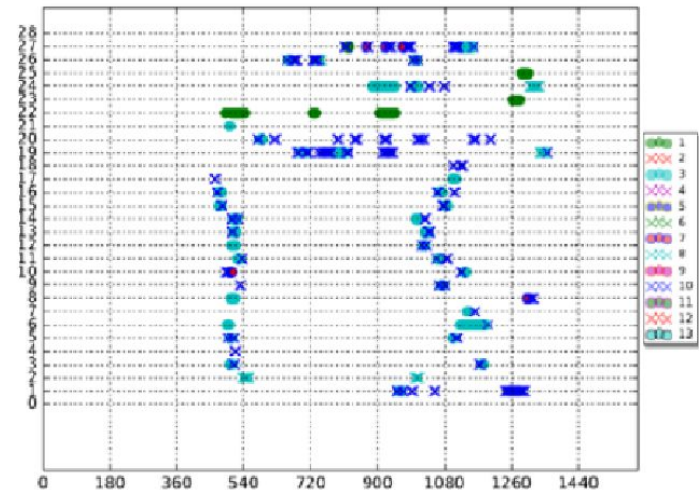
Two step classification: activity based and time based

Filtering Results

Figure 2: Filtering Results



Before Filtering



After Filtering

Activity patterns are more prominent

Model Accuracy

Table 1: Model Accuracy in % (using k-NN classifier)

Activity	Proposed Model	Baseline Model
Bike	85	69
Bus	82	65
Car	83	79
Subway	70	68
Walk	44	32

Our model outperforms for all the activities cases

Thank You

