

# Evaluation of the Smart Space Approach in Mobile Data Processing

Sergey Marchenkov, Pavel Vanag, Dmitry Korzun

Petrozavodsk State University  
Department of Computer Science



This demo is supported by grant KA179 of Karelia ENPI - joint program of the European Union, Russian Federation and the Republic of Finland

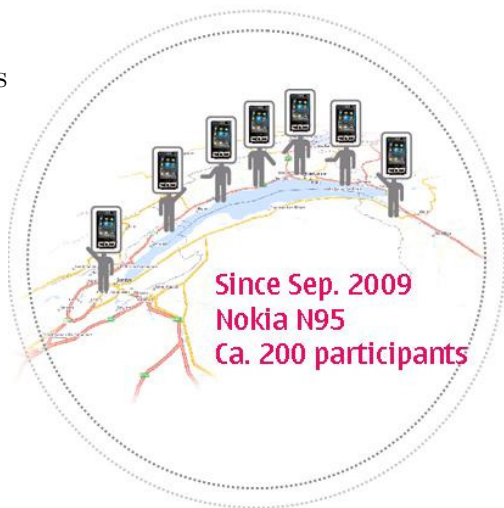


11<sup>th</sup> FRUCT conference

April 23–27, Saint-Petersburg, Russia

# Lausanne Data Collection Campaign by Nokia Research Center

- Nearly 200 individuals
- Duration of 17 months
- Continuously collected spatial data
- Social interaction data
- Phone use data



# Mobile Data Challenge by Nokia Research Center

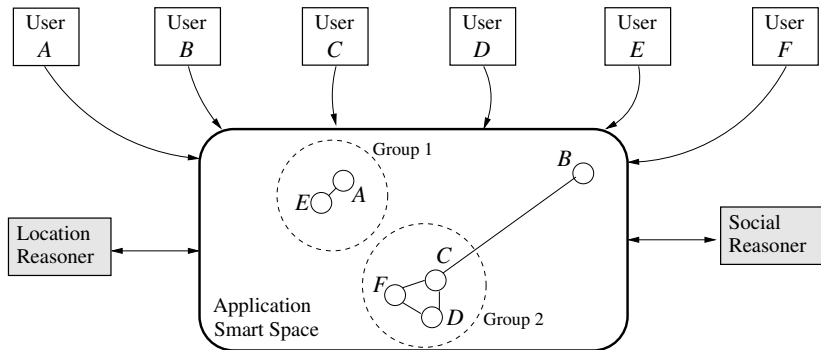
- Releases the Lausanne data (MDC Data Set) for the research community
- Two alternative tracks: Open Track and Dedicated Track
- Almost 500 challenge tasks were registered



# Characteristics of the MDC Data Set provided for our research

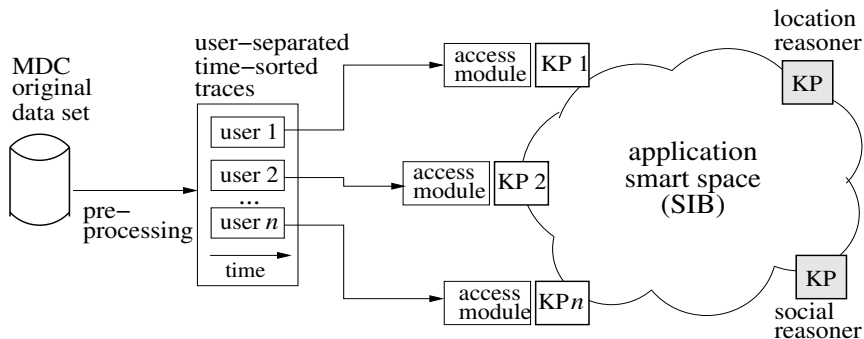
- Data on 38 individuals
- Data size 17.7 GB
- 13 types of data (accel, gps et al.)

## Scenario: “Who is near?”



- Mobile users A, . . . , F share sensed data
- Reasoners derive operational knowledge

# Architecture



- User KP  $i$  simulates user  $i$  by reading own trace produced from the MDC data set for  $n$  users
- Reasoner KPs operates as in the real scenario

## User KP: imitation of specific mobile user

```
User's location has changed in SS
-----
Time: Thu Oct  8 18:56:41 2009
Current user's position:
lat: 46.51
long: 6.56
alt: 473.5
-----
User's location has changed in SS
-----
Time: Thu Oct  8 18:56:51 2009
Current user's position:
lat: 46.51
long: 6.56
alt: 438.0
-----
```

Current time

Current  
coordinates

# Location Reasoner: analysis of user locations

```
-----  
Getting coordinates of my user...
```

```
Getting coordinates of other users...
```

```
-----  
Analysis of coordinates...
```

```
Sleeping...
```

```
-----  
Getting coordinates of my user...
```

```
Getting coordinates of other users...
```

```
-----  
Analysis of coordinates...
```

```
Sleeping...
```

Getting location  
data of users

Analysis of  
coordinates list

Definition of close  
users



## Location Reasoner: definition of closest users

```
-----  
Getting coordinates of my user...
```

```
Getting coordinates of other users...  
-----
```


```
Analysis of coordinates...
```

```
005 is close to my user
```

```
002 is close to my user
```

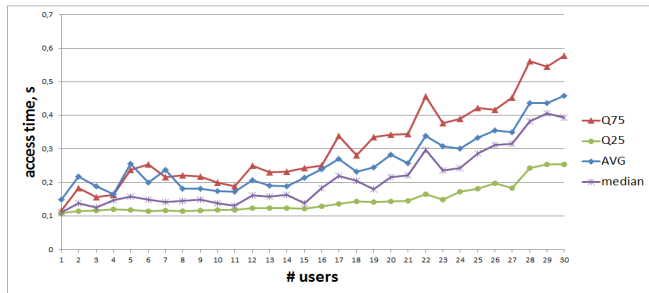
```
Sleeping...
```

Users who  
are close

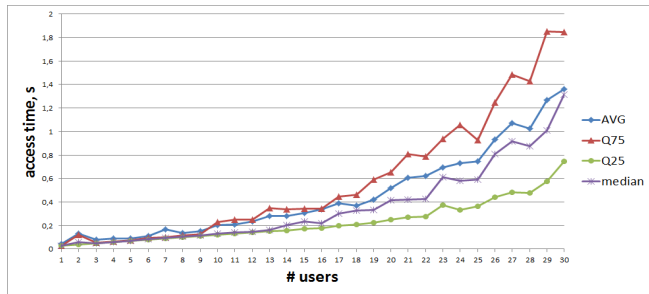


Radius of restricts the area, in which users are close (radius is set programmatically)

# Performance evaluation



Access time of User KP



Access time of reasoner KP