Statistical Outputs from mobile phone data at Istat

First results with highlights for WP5 – Essnet on BD

Roberta Radini– Istat

WP5 – Essnet on BD
Madrid, 21st March 2018

Joint work with:

Fabrizio de Fausti
Tiziana Tuoto
Luca Valentino

Istat

Outline

Statistical Outputs from mobile phone data

- ✓ Population estimates
- ✓ Mobility – Commuting patterns

First results

Next steps

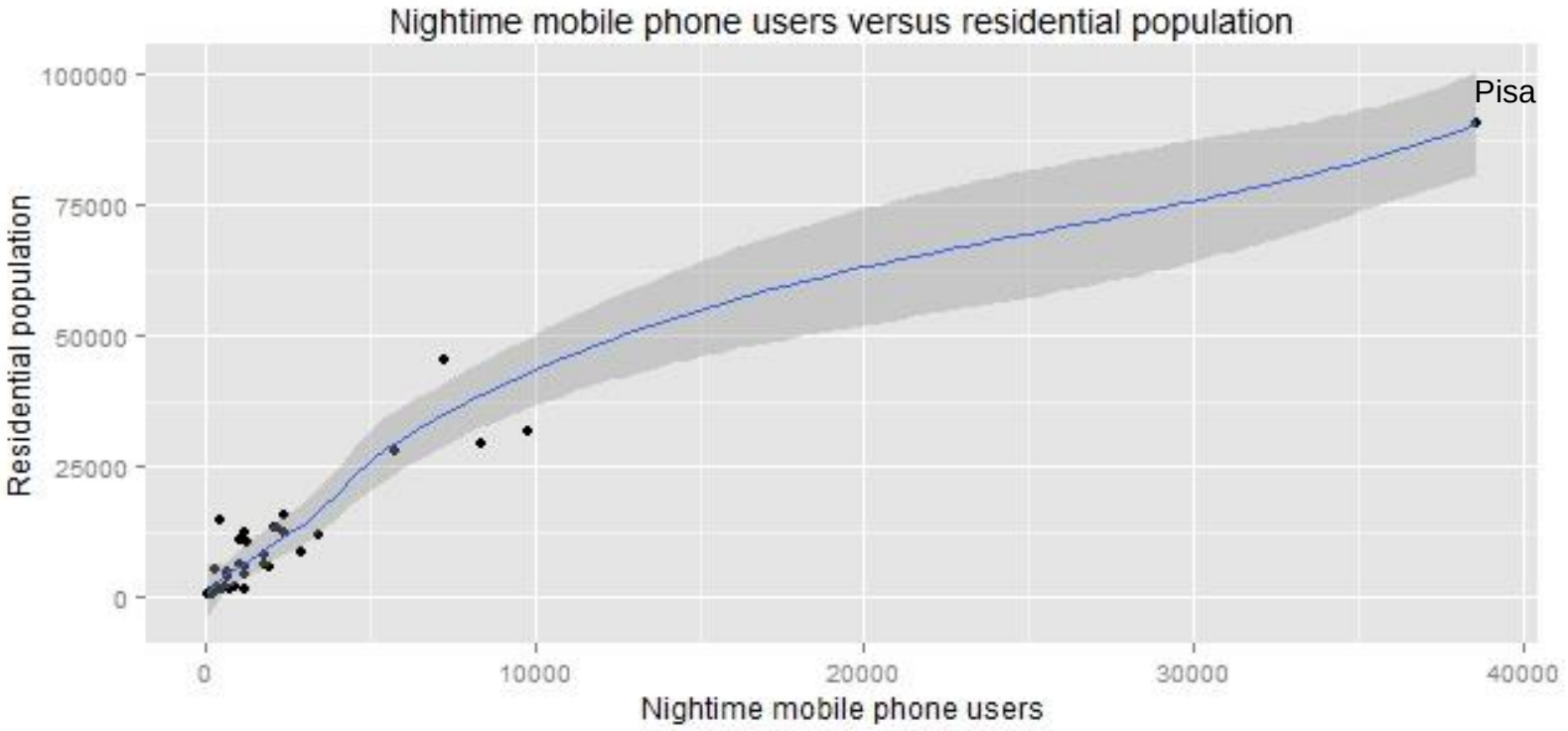
Population estimates in a NSI

- ✓ Traditional data sources: administrative data and census
- ✓ The challange: Census transformation program

MPD provide info on the presence/activity of MP users at a given date (with detailed time) and a very small spatial scale

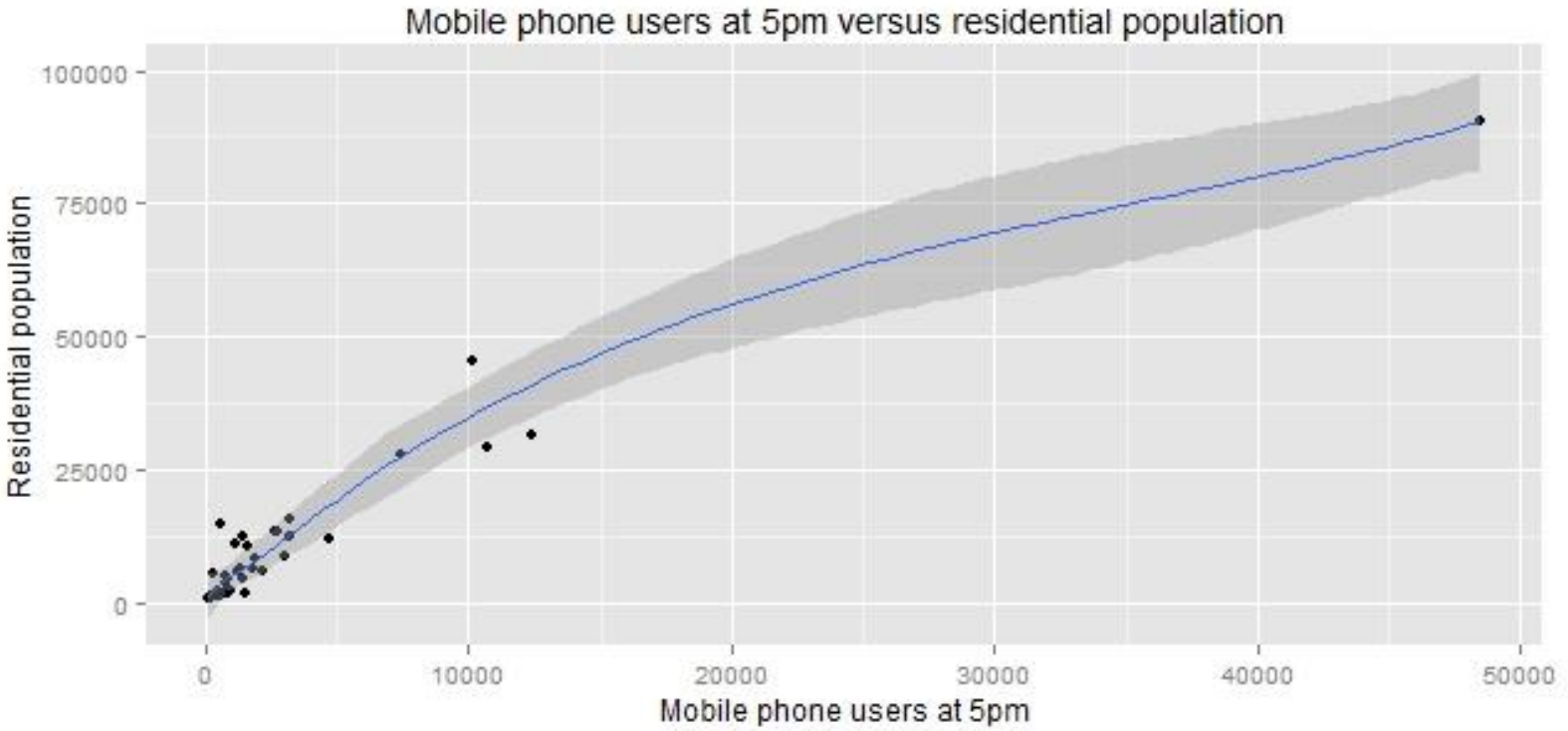
We investigated the correlation between MPD and population density estimates taking into account residents at different daytimes on different days

Population estimates: how MPD predict residential population



R^2 0.88

Population estimates: how MPD predict residential population



R^2 0.89

Population estimates

Basic assumptions:

- ✓ High level of MP penetration rate
- ✓ High level of MP coverage over the field
- ✓ Known MP operator market share

A simple method for population estimates:

$$\widehat{N}_a = n_a / p_a$$

- n_a is the aggregates MP counts in the area a (aggregation via BSA, as explained yesterday)
- p_a denotes the market share of the MPO in the area a, assumed as known.

Areas at risk of under/over coverage

In the Census transformation program, the MPD allow us to identify areas that might be problematic for census counts

Risk of coverage	Number of municipalities
High risk of under cov	8
Moderate risk of under cov	8
No risk	6
Moderate risk of over cov	11
High risk of over cov	4

Moreover, the MPD provide auxiliary info at small area level

Istat

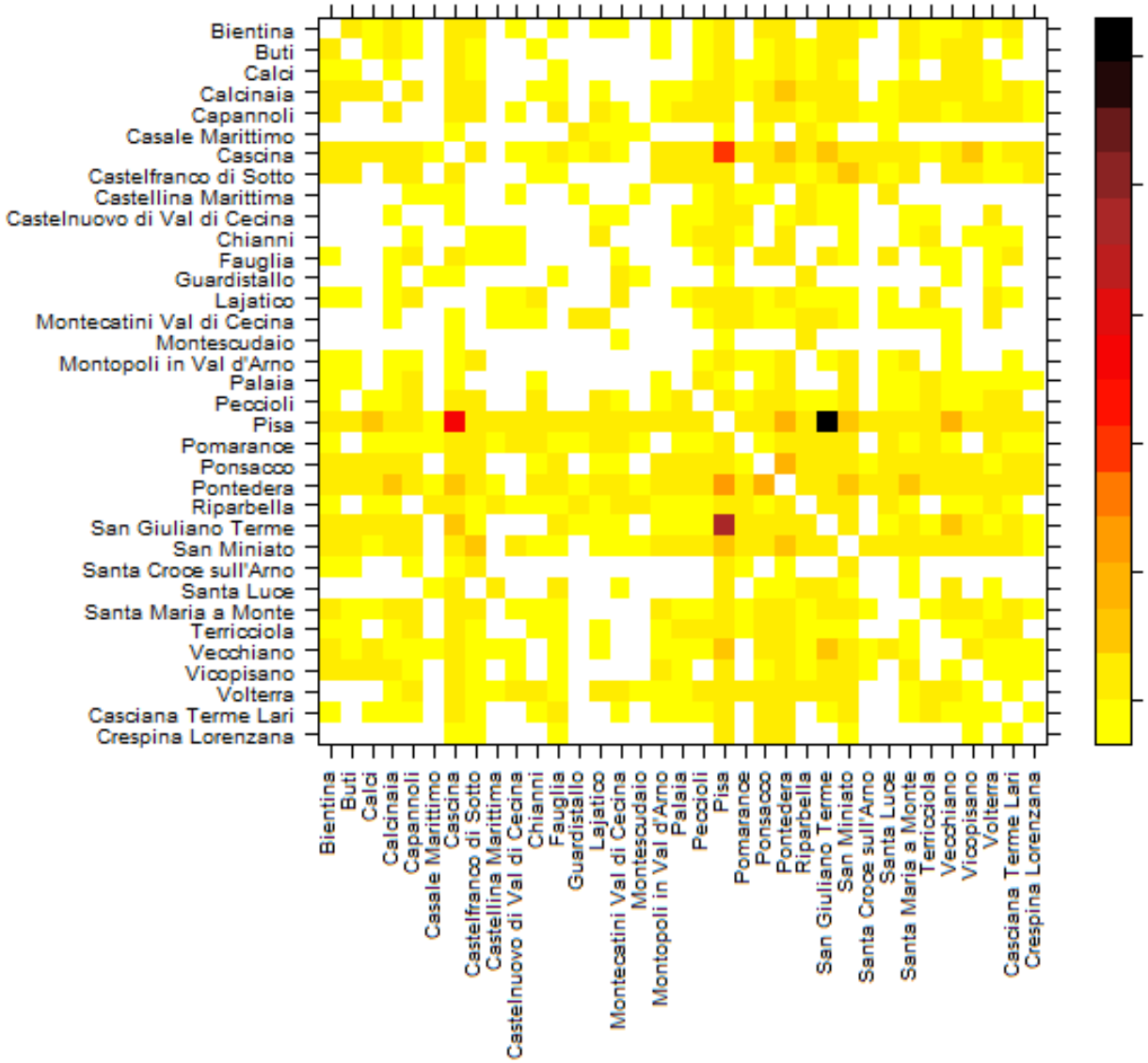
Mobility: OD Matrix

First analysis based on nighttime and daytime population

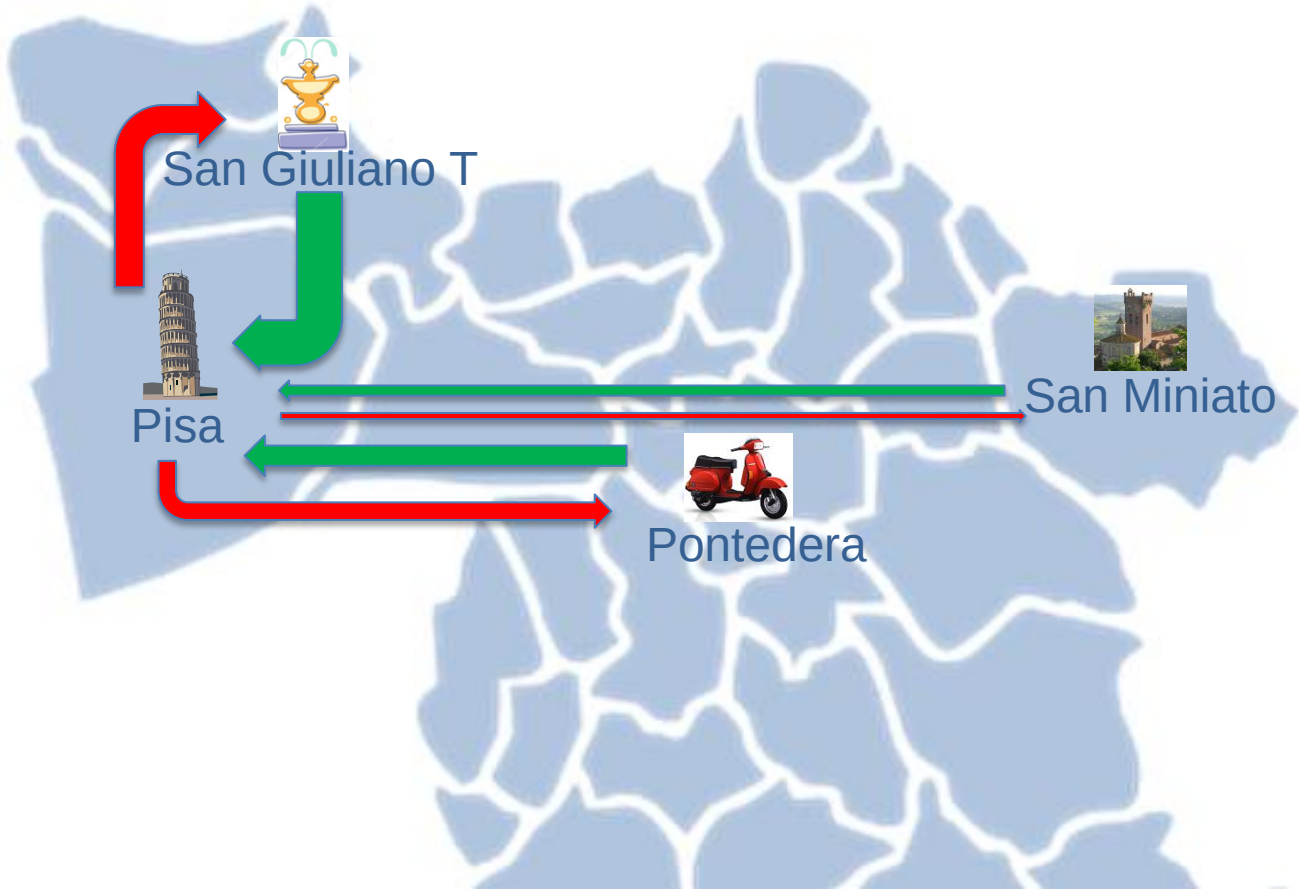
We are able to define the OD Matrix for the Pisa Province

First results: about 30% of the nighttime population moves within the province, while 70% remains in the same nighttime municipality

OD Matrix


Bientina
Buti
Calci
Calcinaia
Capannoli
Casale Marittimo
Cascina
Castelfranco di Sotto
Castellina Marittima
Castelnuovo di Val di Cecina
Chianni
Fauglia
Guardistallo
Lajatico
Montecatini Val di Cecina
Montescudaio
Montopoli in Val d'Arno
Palaia
Peccioli
Pisa
Pomarance
Ponsacco
Pontedera
Riparbella
San Giuliano Terme
San Miniato
Santa Croce sull'Arno
Santa Luce
Santa Maria a Monte
Terricciola
Vecchiano
Vicopisano
Volterra
Casciana Terme Lari
Crespina Lorenzana

Mobility



Concluding remarks and next steps

Concluding remarks:

- Potentialities of MPD for official statistics in population estimates and mobility analyses
- High correlations thanks to the small scale localization

Next steps

- Comparison with other classification methods, e.g. the Sociometer
- Comparison with the ecological estimates, proposed in this Essnet

Further investigations: relations with other demographics like the deprivation level of an area and tourism statistics