



Data Mining in Social Sensing

Francesco Marcelloni

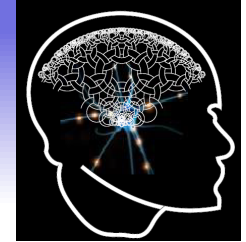
Computational Intelligence Group

Dipartimento di Ingegneria dell'Informazione

Università di Pisa

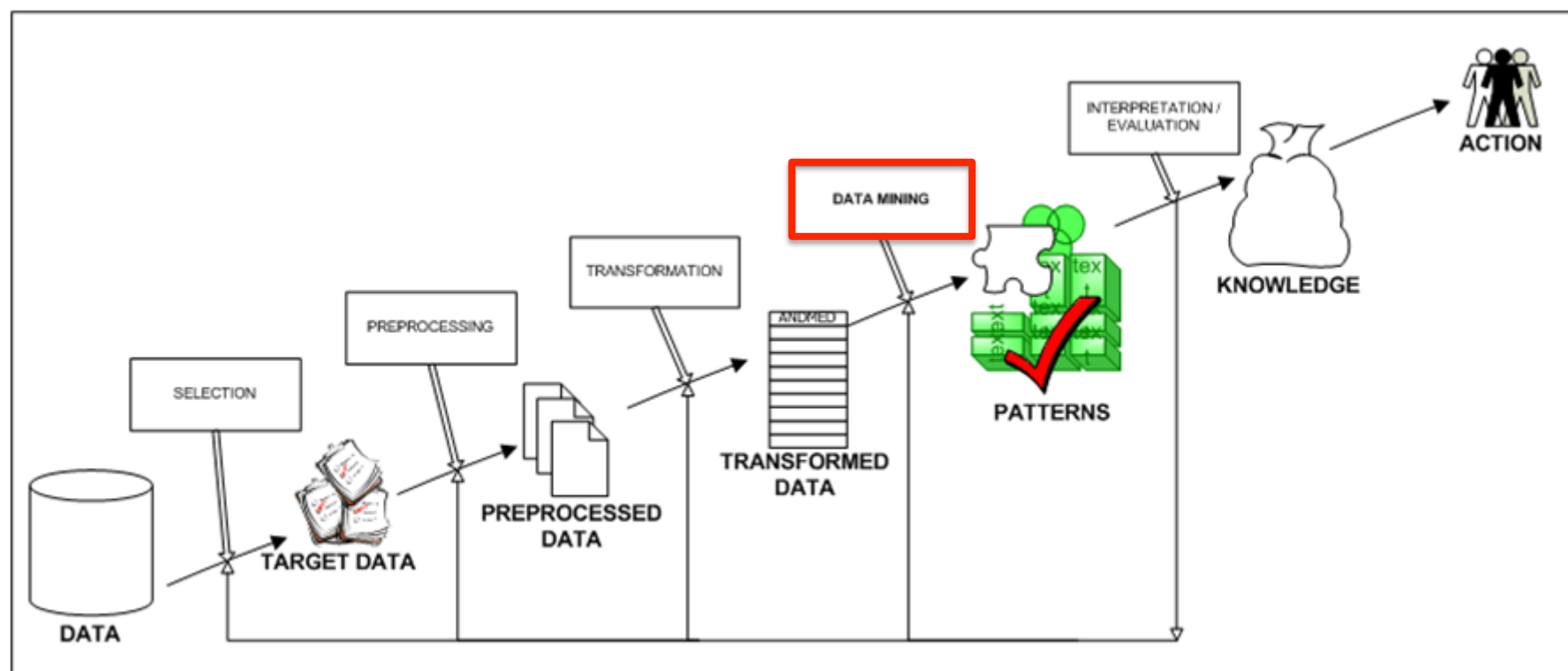


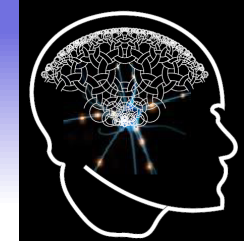
The CIG group



- **Computational Intelligence**: set of nature-inspired computational methodologies and approaches to address complex real-world problems (artificial neural networks, evolutionary computation and fuzzy logic).
- **20 years of experience** in the application of computational intelligence techniques
- 2 professors (Beatrice Lazzerini and myself), 1 researcher, 3 PostDoc, 2 PhD students
- **Several collaborations with companies** in the last years

The CIG Activities

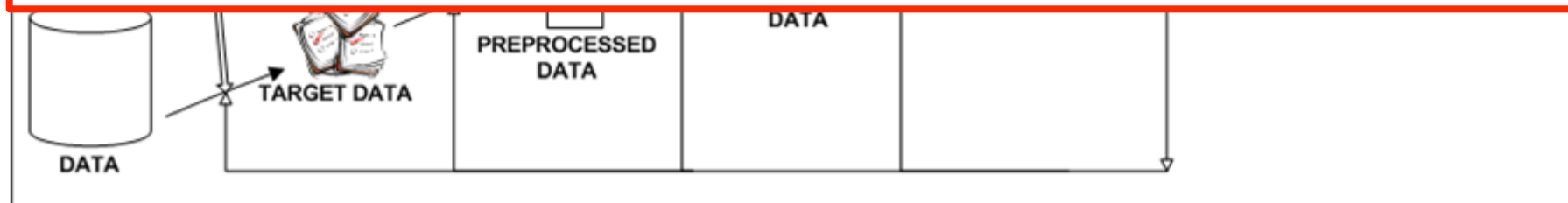




The CIG Activities

Data Mining

- Classification and Prediction
- Clustering
- Frequent Patterns, Associations and Correlations
- Outlier Detection
- ...

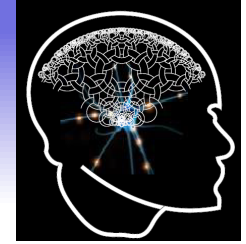




Pisa, 20 Settembre 2013



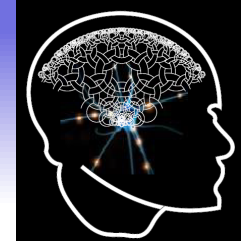
Some Recent Projects



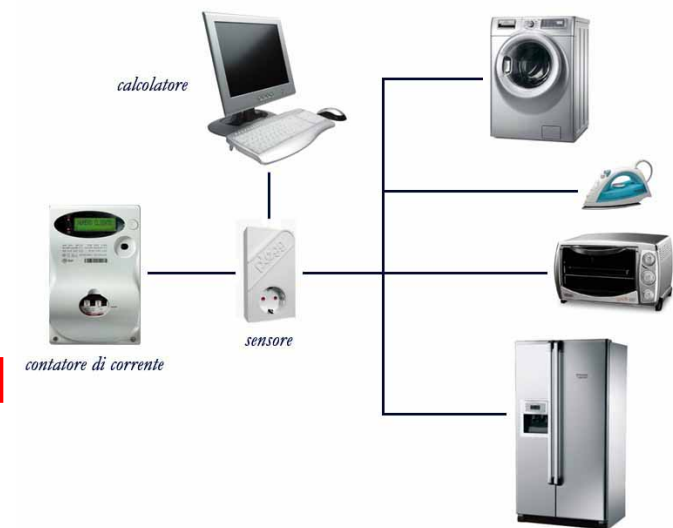
- **Conditioned-based maintenance**
 - Diagnosis of the causes of efficiency loss in photovoltaic energy systems
- Fault detection in rolling element bearings



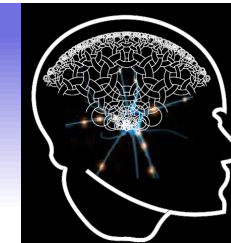
Some Recent Projects



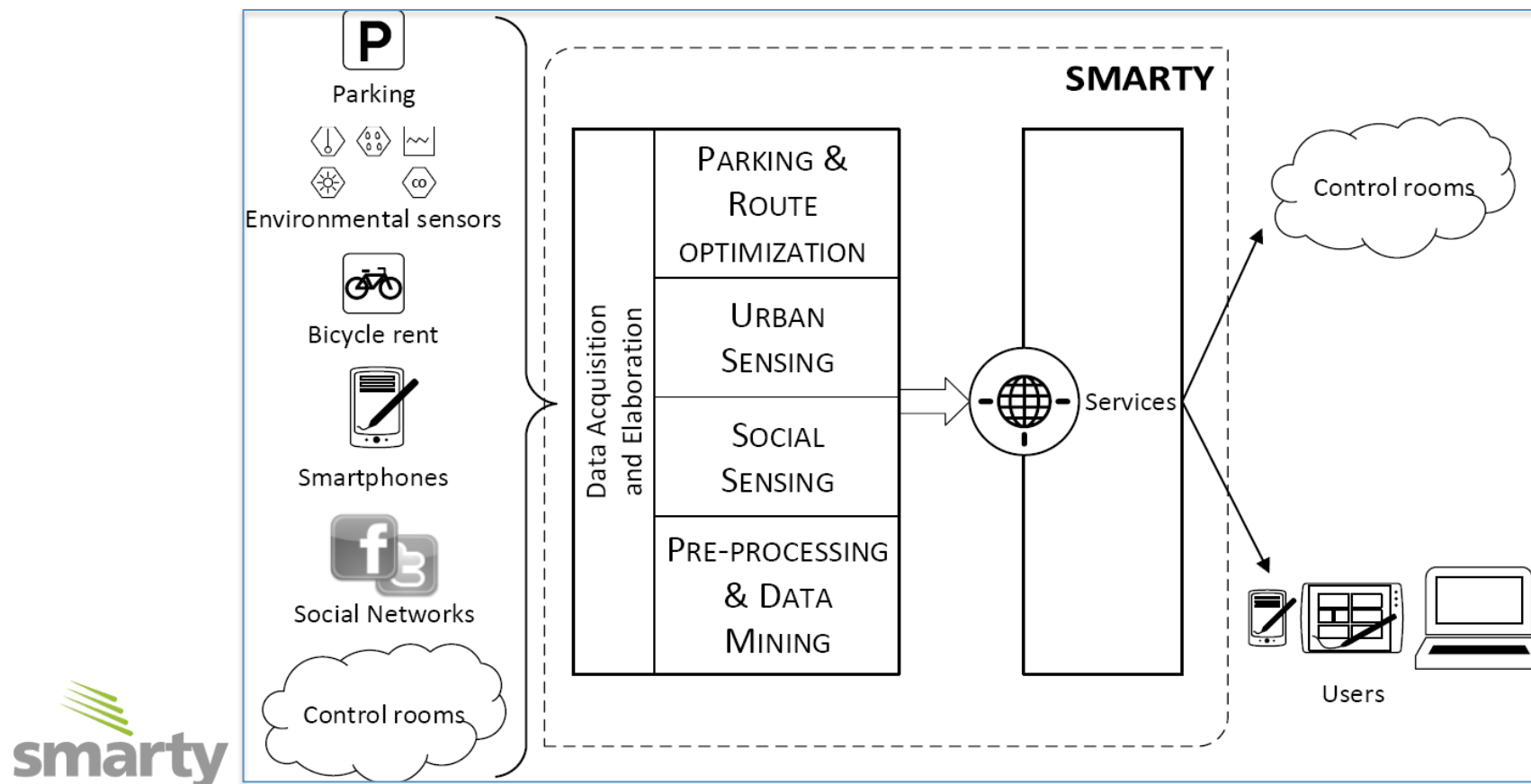
- **Signal Disaggregation**
 - A low-cost system to monitor the use of electrical energy in buildings by using a novel approach based on finite state machines with fuzzy transitions
 - **Eleven appliances recognized using a unique smart meter**



May 2011-May 2012 “E-tutor: A low-cost system to monitor the use of electrical energy in buildings”, funded by Fondazione Cassa di Risparmio di Lucca, Lucca, Italy.



The Smarty Project



“SMARTY - SMARt Transport for sustainable citY”, funded by the Tuscany Region in the framework of Bando Unico R&S - 2012



The Smarty Project



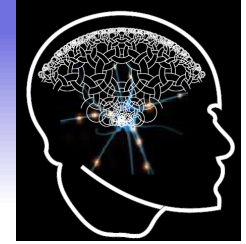
Smart Urban Parking



“SMARTY - SMARt Transport for sustainable citY”, funded by the Tuscany Region in the framework of Bando Unico R&S - 2012



The Smarty Project



GPS



Social Networks

C'è traffico!!!!!!:
mamma mia che traffico!:
Corteo di ciclisti bloccano la
strada. Ottimo. S'è creato un
traffico enorme



Accident/Traffic Detection

“SMARTY - SMARt Transport for sustainable citY”, funded by the Tuscany Region in the framework of Bando Unico R&S - 2012



Thank you very much

Francesco Marcelloni

Dipartimento di Ingegneria dell'Informazione

E-mail: f.marcelloni@iet.unipi.it

Tel: 050 2217678