

***Individual events and collective phenomena in
large-scale retail: spatio-temporal analysis of
sales data***

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Summary

- Individual events in retail sales are usually considered separately
 - E.g. churning customers
- Yet, analyzing the distribution of such events in SPACE and TIME can add significant knowledge

The process

- Define and Extract the events for each customer, separately
- Apply spatio-temporal clustering to find groups of customers with co-located events
- Interpret results to infer causes of the mass-events found

Context

- COOP retail sales (Unicoop Tirreno)
- Data spanning 2 years
 - 01/Jan/2007 – 28/Feb/2009
- Individual events considered:
 - Churn
 - Fidelity to bio products
 - Fidelity pasta with COOP brand
 - Switch to CFL light bulbs

Two clustering approaches

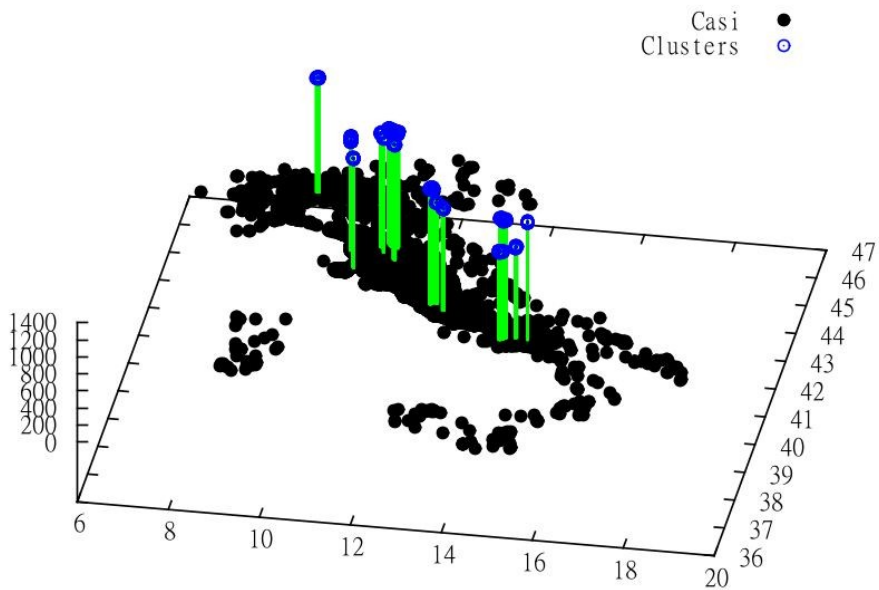
SaTScan: Statistical tool, designed for epidemic studies. Finds areas with density of events larger than outside.

DBScan: Data mining tool. Finds areas with high density of events.

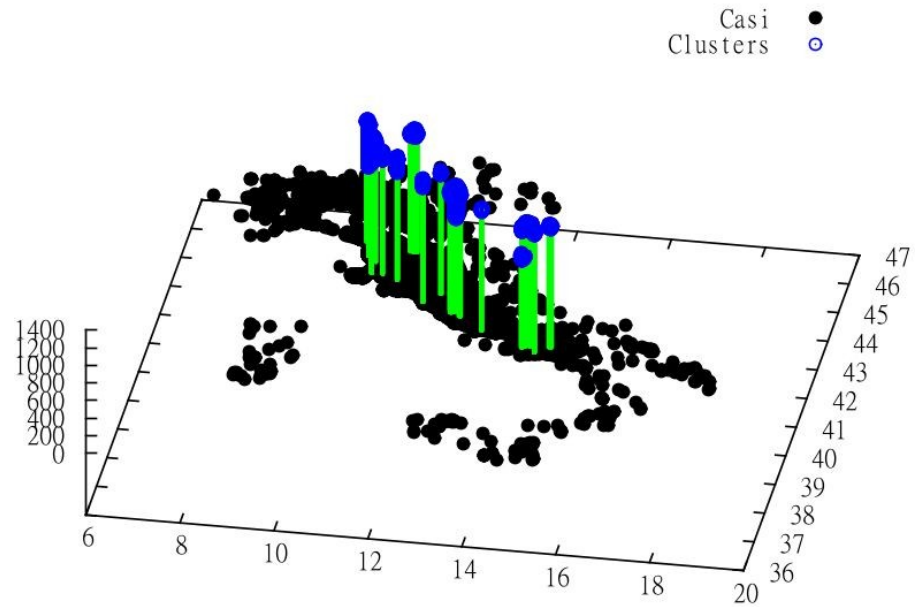
Results

Churn

SaTScan



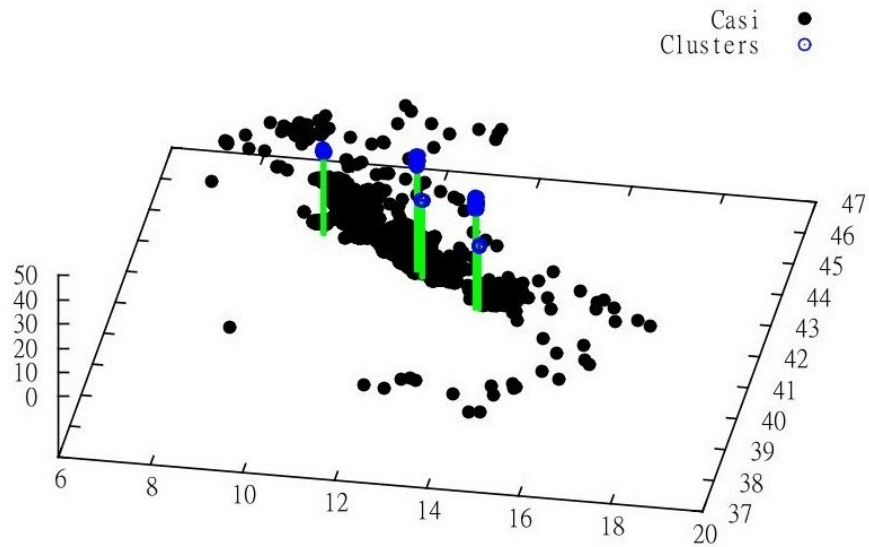
DBScan



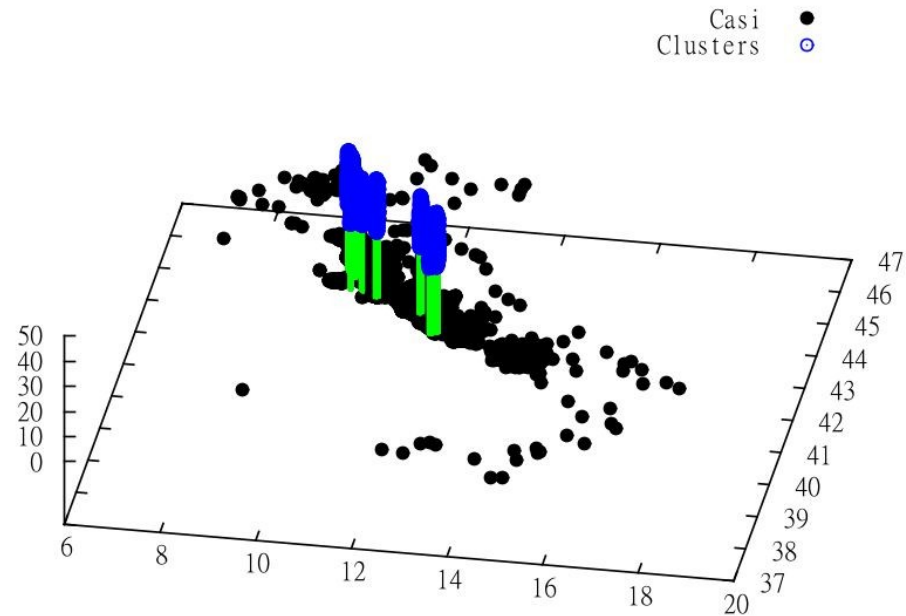
Results

Fidelity to bio products

SaTScan



DBScan

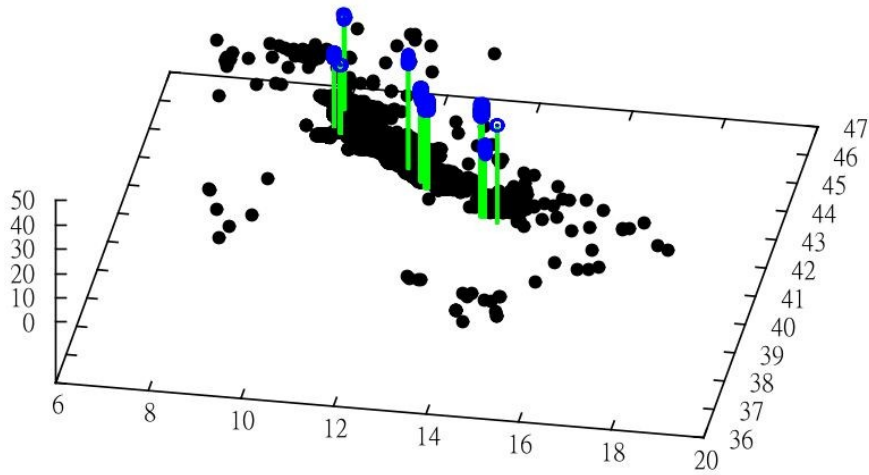


Results

Fidelity to pasta with COOP brand

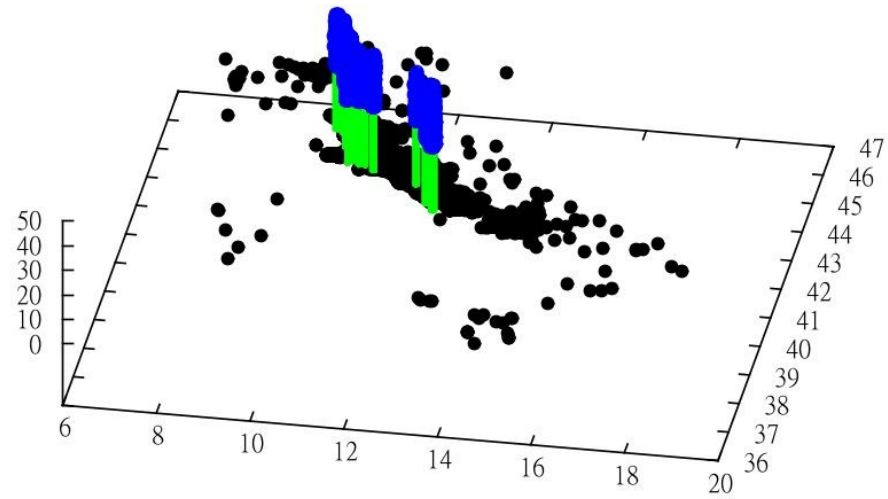
SaTScan

Casi ●
Clusters ○



DBScan

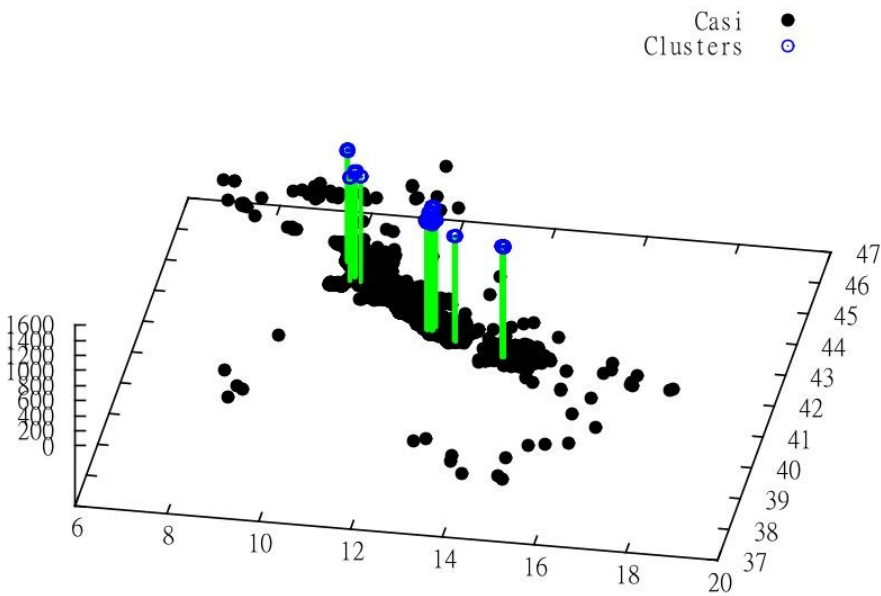
Casi ●
Clusters ○



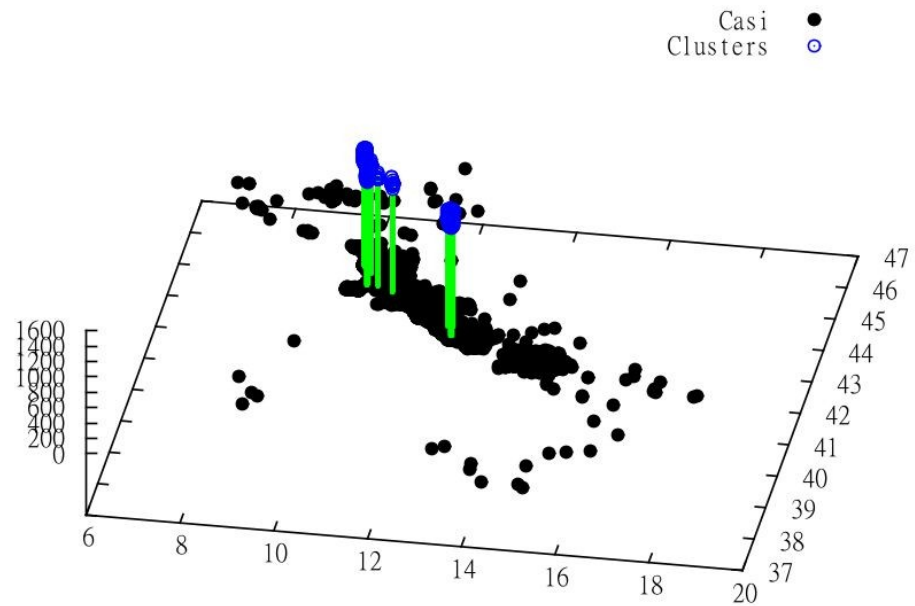
Results

Switch to CFL light bulbs

SaTScan



DBScan



Interpretation of results

SaTScan - churn 1/2



The shop closed, and no nearby COOP alternatives were available in that period.

Interpretation of results

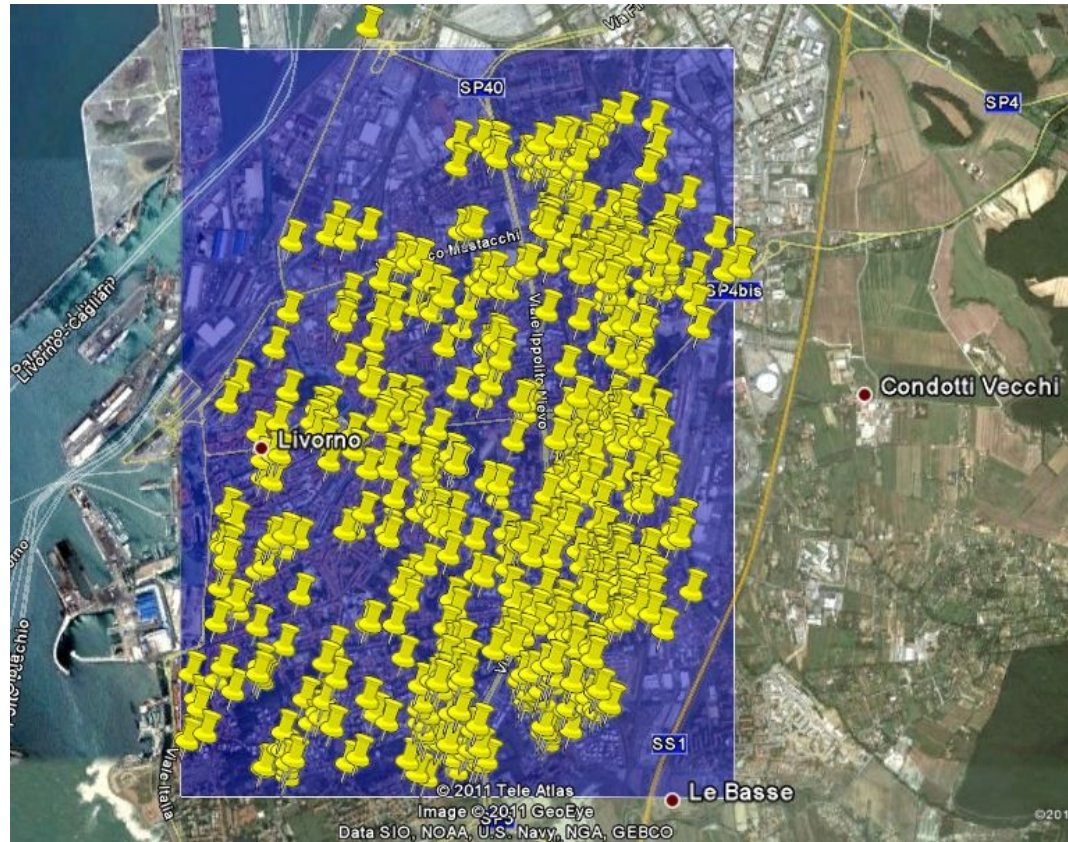
SaTScan - churn 2/2



A competitor (a mall) opened a branch nearby, easily accessible from the city through main roads.

Interpretation of results

SaTScan - pasta COOP



Large cluster in Livorno (Leghorn), probably due to the large impact of COOP in general and as a brand in the area.

What next?

- Traditional churn (based on individual) and collective churn analyses can be combined
 - The first looks for models of defection
 - The second helps spotting abrupt defections, due to external causes and not to customer evolution