Interactive Visual Data Exploration with Subjective Feedback

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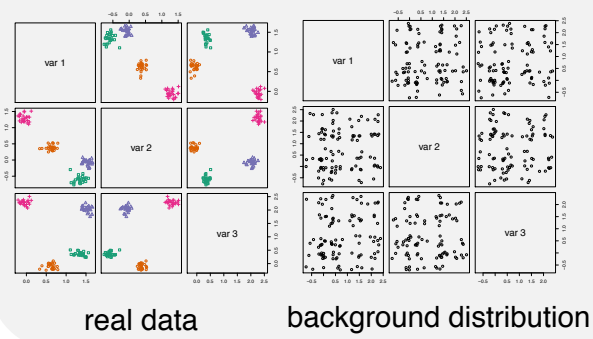
Summary. We introduce a novel generic method for interactive visual exploration of high-dimensional data. It is not based on the traditional dogma of manually zooming and rotating data. Instead, we initially present the user with an "interesting" projection of the data and then employ data randomisation with constraints to allow users to flexibly and intuitively express their interests or beliefs using visual interactions that correspond to exactly defined constraints. These constraints expressed by the user are then taken into account by a projection-finding algorithm to compute a new "interesting" projection, a process that can be iterated until the user runs out of time or finds that constraints explain everything she needs to find from the data.

+ **handling large data**
+ **handling high-dimensional data**
+ **making analytic comparisons**
- identifying patterns truly relevant for the user
- black boxes, incomprehensible for the user

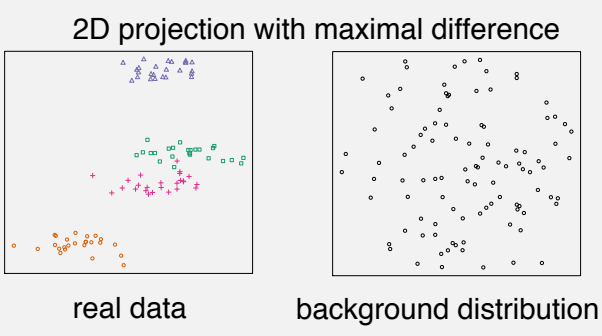
+ **huge background knowledge**
+ **spotting patterns**
- handling large, high-dimensional data
- making analytic comparisons

The data is **real vectors**.
User has a "**background model**" which is a distribution over possible data sets.
Sampling from (unconstrained) background distribution: (i) rotate each row (data point) of data matrix in random, (ii) shuffle values of data matrix uniformly in random, and (iii) rotate rows back.

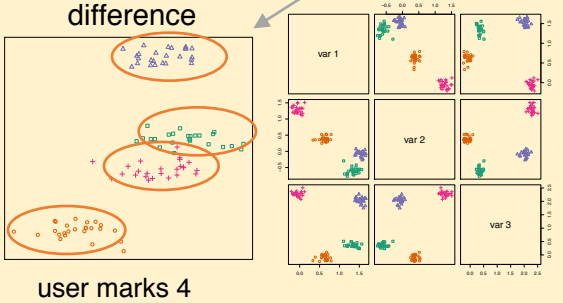
visualize difference between real data and background distribution

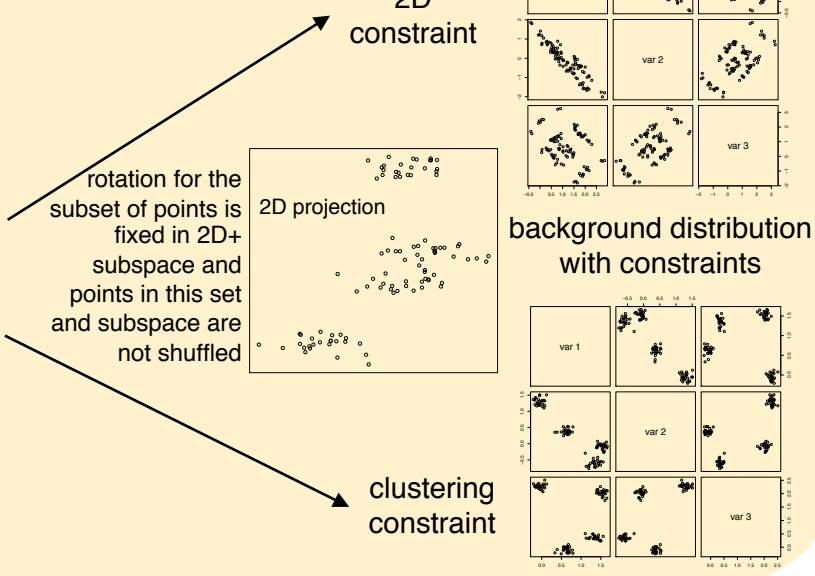


projection pursuit



user tells what he or she has absorbed from real data





update background distribution

iterate until done

Try our demo!

Kai Puolamäki, Bo Kang, Jefrey Lijffijt, Tijl De Bie. Interactive Visual Data Exploration with Subjective Feedback. ECML PKDD 2016, Part II, LNAI 9852, pp. 214-229, 2016.

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