

Dipartimento di Matematica e Statistica 10 ed 11 Luglio, ore 10

Presso il Dipartimento di Matematica e Statistica, della Facoltà di Economia e Commercio, dell'Università "Federico II" di Monte Sant'Angelo a via Cinthia, si terrà un ciclo di due seminari del prof. **Alfred Inselberg** dell'università di Tel Aviv, sull'utilizzo di tecniche di rappresentazione di dati multidimensionali mediante coordinate parallele.

Abstract

MULTIDIMENSIONAL VISUALIZATION AND IT'S APPLICATIONS

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People working on multivariate (multidimensional) problems will benefit by understanding the underlying geometry; that is, learning what is possible and what is not. For example, in 1917 the physicist Ehrenfest showed that planetary orbits are stable only in dimension 3. Another dimensionality result is that rotating bodies have an axis of rotation only in odd-integer dimensions. The applications presented here will be more down to earth!

With a system of parallel coordinates a one-to-one mapping between subsets of N-space and subsets of 2-space is obtained. This leads to synthetic constructions algorithms in N-space involving intersections, proximity, interior point construction, "Line and Plane Topologies" useful in Computer Vision and Geometric Modeling, as well as Collision Avoidance Algorithms for Air Traffic Control. Applications to Visual Data Mining

are illustrated with real datasets on Process Control, VLSI production, Financial, Feature Extraction from LandSat Data etc. A new geometric Automatic Classifier (see figure published in a paper) demonstrated on several high-dimensional datasets. Time permitting, a Decision Support system capable of doing Feasibility, Trade-Off and Sensitivity Analyses will be included.

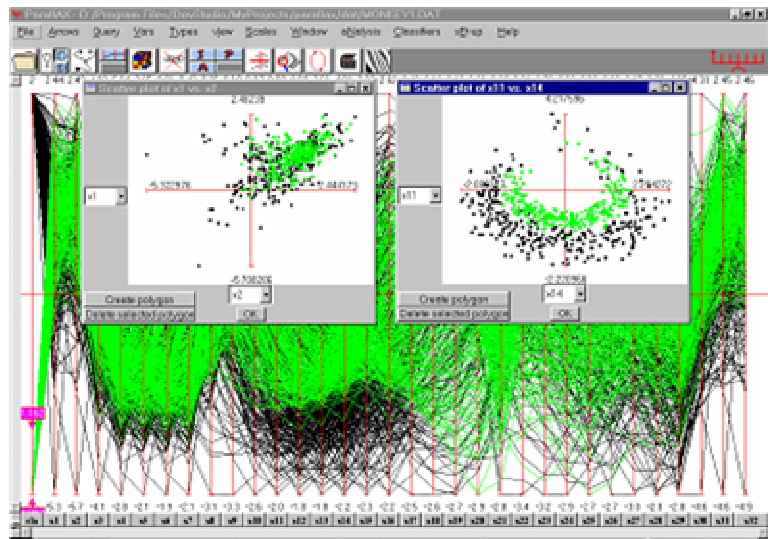


Figure for "The Automated Multidimensional Detective" by A. Inselberg and T. Avidan – "Monkey neural dataset": measurements with 32 parameters from two neurons (the 2 classes) in a monkey's brain. A rule distinguishing data items from each class is sought. The **Nested Cavities (NC)** classifier found a rule with one iteration. The plot x_1 vs. x_2 of the first (in the original order) pair of variables shows little separation between the two (differently colored) classes. By contrast, dimensionality selection chose x_{11} ; x_{14} as the best pair to show the separation. Finding this manually would require the construction and search through 496 pairwise plots.

PS. Do not be intimidated by this formal description. The speaker is also well known for his numerological anecdotes and palindromic digressions!