The American Statistical Association

San Francisco Bay Area Chapter

Since 1928

October, 1997

Joint Biostatistics and General Applications Program

"Some Medical Applications of Clustering and Classification Techniques"

Catherine Sugar, Statistics Department, Stanford University

Abstract

My talk will concern the research which I do at the interface of medicine and statistics, primarily computer-intensive and non-parametric statistics. This work, in turn, brings me into contact with some areas of engineering, particularly channel coding and rate-distortion theory. One application concerns the allocation of scare resources for medical care and associated problems of quantifying *quality of life* of patients in different *health states*. The main statistical approach I have used here has been k-means cluster analysis. The application of clustering to analyzing data from questionnaires, both cross-sectionally and longitudinally in time, have enabled me and the group with which I work to describe health states and the movement of patients among those states simply and powerfully in the contexts of depression and schizophrenia. Furthermore, this work has stimulated research in the gap between conventional statistical clustering and a similar area in engineering which goes by the name *vector quantization*. Another area in which I have worked concerns covariation of amino acids in the protease genes of patients with HIV/AIDS. It is well known that evolution and challenges from therapy both cause the virus to mutate substantially over time. Exactly how this happens is not simple to describe and is a fertile area for statistical inference and modeling. One other area of interest concerns classification as it applies to prognosis for patients with auto-immune diseases of the kidney. Medical interventions are possible here, but they are drastic and best not undertaken except for patients who really need them. On the other hand, for those who do they can be life-saving. Thus, to whom should they be applied? Regularized discriminant functions have served well here, as I shall explain, time permitting. All this work is interdisciplinary and collaborative which is part of its great appeal for me.

Date: Wednesday, October 22, 1997

Time: 3:30 - 4:00 PM Refreshments
4:00 - 5:00 PM Discussion

Place: Chiron Corporation, 4560 Horton St., Emeryville

Dinner: 6 PM , place to be announced at talk

Directions: See map.

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Union City CA

Position for medium sized attractive cancer research org. Provide statistical expertise, analysis and data mgt for designed research studies, generally in areas of prevention or case-control epidemiologic studies. MA in statistics or related discipline; 5 yrs progressively resp exp, health research a plus, SAS + other packages; gd communication skills; competitive salary; employer pd benefits, excellent time off. Fax (510-429-2550) or send resume to Leila L. Colmen, Northern California Cancer Center, P.O. Box 5033, Union City, CA 94587. EOE.

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Directions to Chiron:

From SFO/Peninsula:

Take the Bay Bridge to 80N towards Berkeley. When on 80, immediately move to the right and exit on **Powell**.

Turn **RIGHT** at the bottom of the offramp (signal). Go through the next signal (on Christie), over the Amtrack bridge and turn **RIGHT** at the next signal (Hollis). Proceed to 53rd street (next signal intersection) and turn **RIGHT**. Go 1/2 block down and turn **LEFT** into the Chiron parking lot. Enter through the glass front that looks somewhat like a wine barrel. The conference room is immediately inside on the right. The receptionist can direct you.

From Berkeley:

Take University west to the bay frontage road (just past (and parallel to) I80. Turn **LEFT** and go to **Powell**. Turn **LEFT** onto Powell and follow directions from SFO above.

From East Bay: Take appropriate freeway (24W to 580 to 80N or 880 to 580 to 80N) to arrive at **Powell** offramp on 80N and follow directions from SFO above.

Note: When you arrive at Chiron, it is likely that the parking lot will be full owing to ongoing construction. If this is the case, you should either a) park on Hollis or b) park in the lot located just off of Hollis and Powell. It is suggested that you plan to arrive early in anticipation of parking difficulties.

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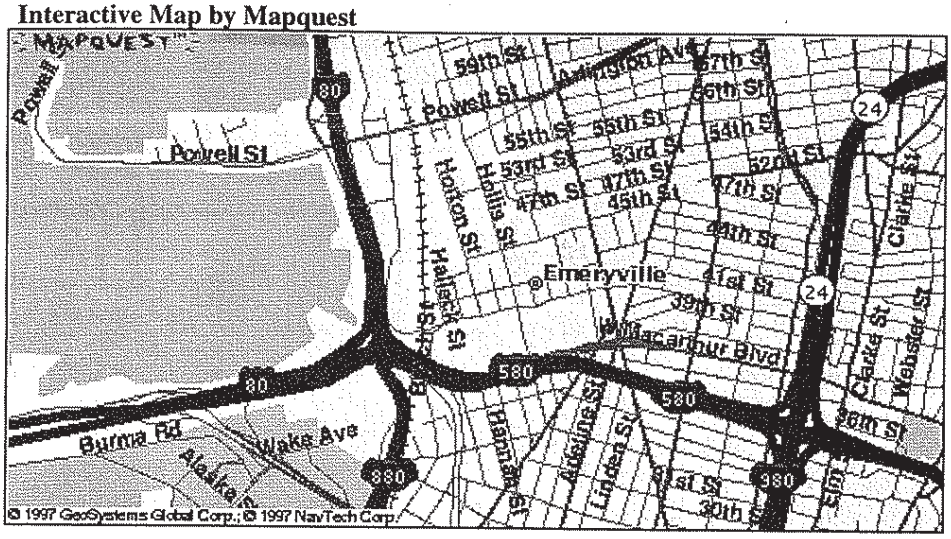

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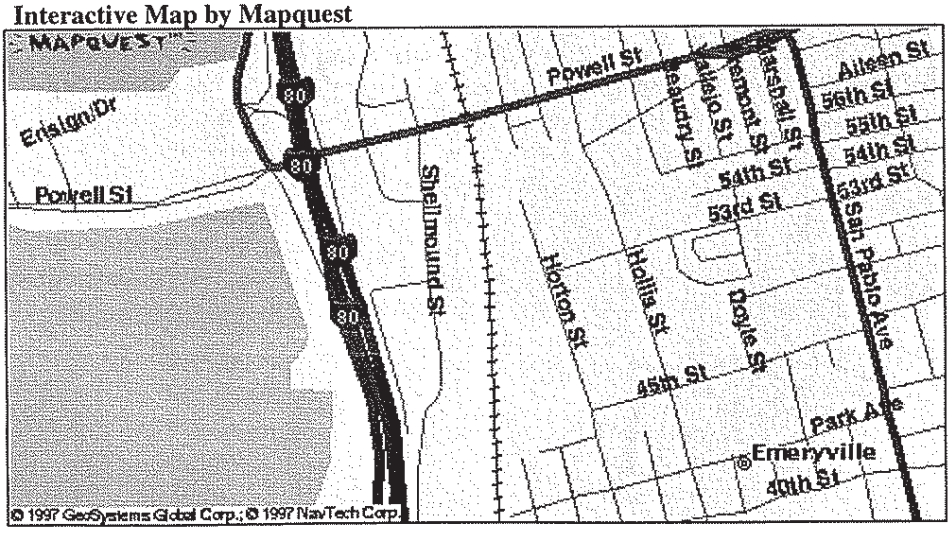

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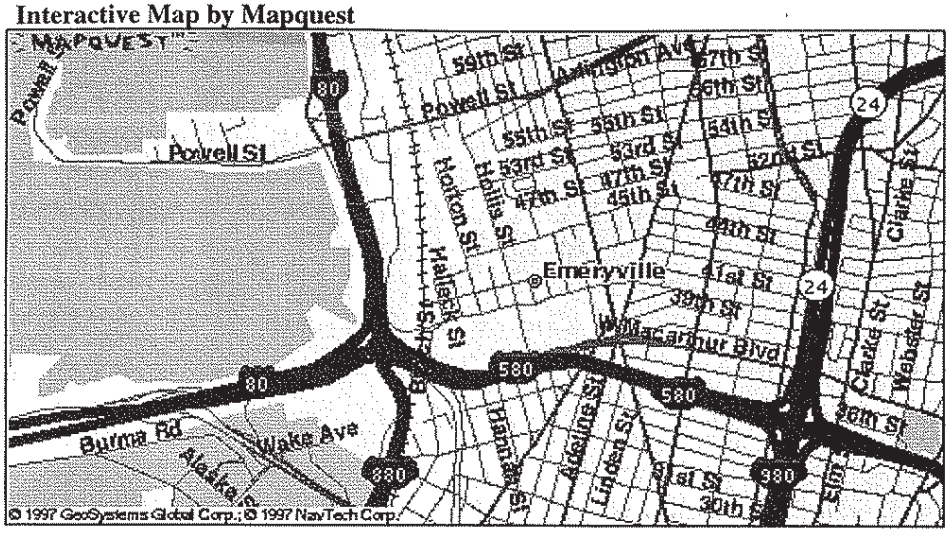

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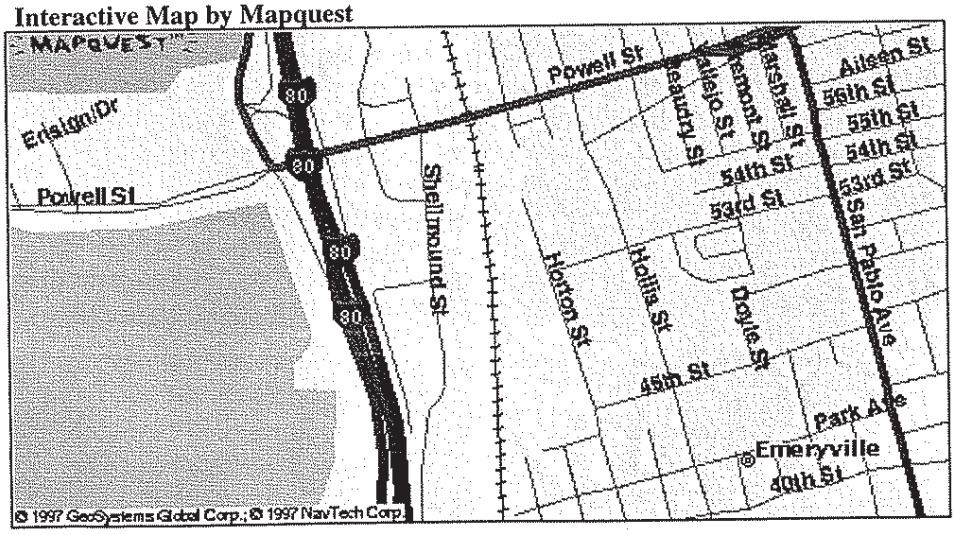

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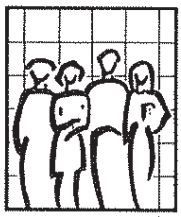

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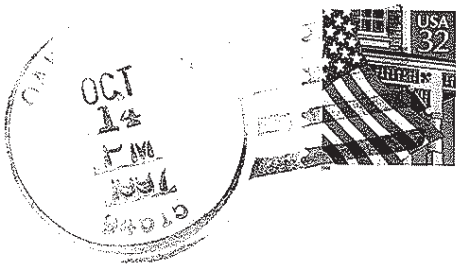

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