Appriction of Neural Networks to Discriminant Analysis

Mikinori Tsuiki and others

National Institute of Agro-Environmental Sciences

Abstract
(not received)

Pasture Production Prediction under Seven Different Patterns of Meteorological Conditions: Case Study for the Konsen Area (Hokkaido)

Masae Shiyomi, Tsuyoshi Akiyama, Tomoyuki Hakamata, Shinsuke Morinaga, and Michio Shibayama
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Abstract
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An Analysis of Seasonal Changes in Air Temperature for Prediction of the Changes in Agro-Ecosystems in Japan Caused by Global Warming

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Abstract
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Analyzing Survey Data of CIM(Computer Integrated Manufucturing)

Keiji Yajima

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Abstract
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Study of Maturity Indicators of Craniofacial Complex and Stature in Korean Children - Possibilities and problems of their adaptation -

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Abstract

In clinical orthodontic practice, many of the patients are in the growing and developing stage, and most of them are treated at the stage inclusive of puberty. Making diagnosis and decision of orthodontic treatment for the patient in the pubertal growth, it is necessary to evaluate the individual growth increment, direction and timing. It has long been recognized that an individual's chronologic age does not necessarily correlate well with his maturational age. Investigators have studied possible correlations between skeletal growth of the craniofacial complex and general skeletal growth of the body. Longitudinal or cross-sectional evaluation of maturity by means of pubertal development and the biological development such as bone age, dental age and menarche age could give reliable informations as to whether or not a certain period of pubertal growth has been attained.

The purpose of this study is to investigate the comparisons that exist between chronologic and skeletal ages within a Korean population to know strictly the degree of maturity about craniofacial complex.The subjects for this study consisted of 447 males and 339 females with normal occlusion on whom cephalograms, right and left wrist-hand radiograph and standing height were cross-sectionally taken from 6 to18 years. For an evaluation of individual bone maturation from wrist-hand radiograph,we have newly added one stage to Fishman's SMI(1982) which was originally applied for over 10 years old child from 1 to 11 stages.
Basic statistics summarized the changes in standing height and the craniofacial complex parameters from 6 to 18 years. Principle component analysis was done to select five parameters of linears to describe the craniofacial complex. For the purpose of quantification of SMI as qualitative data, the correspondence analysis was used. Then,we affirmed the relationship between craniofacial complex and the newly quantified scores of SMI by regression equation.

The results obtained were as follows.
1. SMI of females showed early maturation than males by almost 2.2 years, sexual difference was greatest during the time of maximum growth velocity from 4 to 5 of SMI.
2. Wide variation is demonstrated in the maturational development of craniofacial complex based on SMI.
3. After the quantification of SMI, relationship between the parameters of craniofacial complex , especially in Cd-Gn(mandibular length) and body height showed highly correlation.

On Clustering an Asymmetric Similarity Matrix

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Abstract

We encounter an asymmetric similarity matrix in some situations, such as in analyzing the degree of the communications from a place to other place. Each elements of this matrix is interpreted as the degree of similarity from one object to the other object. In this paper, a new model is proposed. In this model, the degree of communication between two places is assumed to be proportional to the number of nodes of each places and to value of a decreasing function of distance between these places.

And it is assumed that the structural relations raises the degree of asymmetric similarity. An estimator of the symmetric components is estimated as the minimum value of two corresponding elements. The degree of asymmetry is expressed with a row effect and a column effect, which indicate the sensitivity of the sender and the receiver respectively.

Sensitivity Analysis in Covariance Structure Analysis with Equality Constraints

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Shingo Watadani Sanyo Gakuen College

Abstract
(not received)

Evaluating the Adjoint Projection Pursuit Regression through its Applications

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Abstract
(not received)

Table 1.

	eigenvalue	percentage	percentage cum.	correl. ratio between 2 groups
1	0.22644	21.0	21.0	-0.368
2	0.13316	12.4	33.4	0.101
3	0.10870	10.1	43.5	-0.075
4	0.09276	8.6	52.1	0.165
5	0.08165	7.6	59.7	-0.382
6	0.07274	6.7	66.4	-0.156
7	0.06962	6.5	72.9	-0.108
8	0.06325	5.9	78.8	0.136
9	0.06013	5.6	84.4	0.067
10	0.05315	4.9	89.3	
11	0.04392	4.1	93.4	
12	0.02915	2.7	96.1	
13	0.02283	2.1	98.2	
14	0.01936	1.8	100.0	
multiple reg. coeff.(correl.ratio) (with 1,4,5)				0.555
m.r.c. adjusted for deg. of freedom				0.532

Table 2.

independent variables	code item categ.	partial correl. (item) coeff.
ability to understand the questions	A1,A2	0.250
clarity of response	B1,B2	0.188
degree of awareness of the necessity of one's own existence within the family	E1,E2	0.369
peace of mind within the family	F1,F2	0.182
degree of satisfaction with financial status	G1,G2,G3	0.468
Character1:punctilious	L1,L2	0.271
Character2:ability to make good relationships	M1,M2	0.345
daily routine	S1,S2	0.254
ADL: hearing ability	T1,T2	0.314
ADL: ability to look after oneself	X1,X2	0.198
physical condition (in general)	U1,U2	0.166
ill or not	W2,W1	0.230
history of cerebral illness (cerebral haemorrhage etc.)	Z2,Z1	0.199
multiple correlation coefficient (correlation ratio)		0.739
multiple correl. coef. adjusted for the degree of freedom		0.546

[1]

One Method of Classification based on an Analysis of the Structural Relationship between Independent Variables

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Abstract

In this paper we will present one method for the classification ofindividuals concerning whom a number of independent variables have beenmeasured. In order to classify individuals the method of discriminant analysis isgenerally used. In this paper, we will limit the number of groups to two; inwhich case discriminant analysis derives the same result as multipleregression analysis. When discriminant analysis or multiple regression analysis are used, it is not clear what the structural relationship between the independent variables is, and also which variables are more effective for thediscrimination on the basis of the structure of the variables. Then, we will try first to understand the structure of independent variables by the method of correspondence analysis; secondly, we will tryto assign individuals to two groups by the method of multiple regression analysis taking as independent variables the scores derived by the correspondence analysis. There, we will be able to choose some eigen-vectors which are more effective in discriminating the two groups. That is, we will calculate the linear equation model according tothe multiple regression model. Then, we can easily choose some eigenvectors which are more effective for the discrimination, and by looking at the positions (coordinates) of the independent variables on the axes chosen, we can understand which variables are more effective than others in discriminating the groups withreference to the structural relationship between the variables. We will present it by one example.

This study is concerned with the discrimination of two groups, one which is normal and one in which there is considerable evidence of senile dementia. The independent variables are 13 items which relate to physical condition, activity in daily life, the degree of awareness of family and social life, etc.. Each item contains two or three categories. The result we will present here is based upon the study of 87 elderly males.

First, we will apply the method of correspondence analysis to this data. The eigenvalues and percentage of variance (ratio of the contribution are shown in Table 1.

Secondly, we will apply the method of multiple regression analysis taking as independent variables the sample scores which correspond to each eigenvalue resulting from the correspondence analysis.

In Table 1 we will add each correlation ratio (equal to the correlation coefficient) between these two groups using these sample scores.

From this result we can see that the 1st and 5th eigenvectors are effective in discriminating the two groups. Then, we will present the disposition of the independent variables on the 1st and 5th axes in Fig. 1 and the sample scores on the same axes in Fig. 2.

And, taking three sample scores which correspond to the 1st, 5th and 4th eigenvalues we obtain 0.555 as the multiple regression coefficient. This coefficient is satisfactory.

Thus, we are able to understand the structural relationship between the independent variables and to clarify which variable is particulary effective in discriminating the two groups by referring to the structure of all the variables.

As reference, in Table 2 we will present the partial correlation coefficient of each independent variable when we only apply multiple regression model with these variables.

[1]

A Study of Cluster Analysis

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Abstract
(not received)

Some Variations of Correspondence Analysis

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Abstract

The purpose of this paper is to introduce several variations of correspondence analysis which are proposed by D'Ambra and Lauro(1989a,b).

We first discuss one of the variations, non-symmetrical correspondence analysis (NSCA) for two-way contingency tables. NSCA is a method to study association structure between an explanatory variable and a response variable based on a decomposition of Goodman-Kruskal's tau coefficient. In NSCA, two variables play non-symmetrical role, though they do symmetrically in the ordinary CA. (Thus, it seems similar to principal component analysis rather than CA.)

Second, two extensions of NSCA are developed to analyze three-way tables using a flattening of the table. It is interesting that these extensions can be applied to multi-way data where variables can be distinguish into explanatory or response.

Finally, to compare these variations with the ordinary CA, we apply them to data which is result of a survey of urban dwellers' attitudes toward their environment. If you need, we present a floppy disk which gives detail of the survey and the data tables.

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Abstract

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