Pioneer Journal of Theoretical and Applied Statistics
Volume 1, Issue 2, Pages 85-97 (April 2011)

ISSN: 2230-9837

MEASURING THE ACCURACY OF LDA BASED ON SKEW-NORMAL DISTRIBUTION BY THE RELATIVE CONDITION NUMBER

H. Saberi Najafi and A. Zeinal

Received January 6, 2011

Abstract

Linear Discriminant Analysis (LDA) is a well known scheme for feature extraction and dimension reduction. LDA finds a transformation matrix which is readily computed by solving a generalized eigenvalue problem.
The accuracy of LDA can be measured by the maximum of the relative condition numbers for the generalized eigenvalue problem.
In this paper, we use this measure to investigate how LDA works, when the data are based on Skew-Normal distribution. We conclude that departing from the normal distribution can increase the maximum of the relative condition numbers, and consequently we gain a good index for evaluating LDA. We also find the factors affecting this index.

Keywords and phrases: condition number, factorial design, generalized eigenvalue problem, linear discriminant analysis, pattern recognition, skew-normal distribution.