

TYPE I ERROR RATE FOR TWO-SAMPLE TESTS IN STATISTICAL SHAPE ANALYSIS

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Abstract

Nowadays, with the help of advanced imaging techniques the image or shape of an organ or organism can be used as input data. Therefore, the statistical analysis of shape has recently become more important in the medical and biological sciences. Methods related to two-sample tests have been developed for statistical shape analysis, giving rise to considerable interest in research that evaluates the performance of these tests. In this study, two sample procedures are used to compare the mean shapes from the statistical shape analysis literature according to type I error rate.

Keywords: Statistical shape analysis, two-sample tests, type I error rate.

2000 AMS Classification:

1. Introduction

In the biological and medical sciences, morphometric methods are frequently preferred for examining the morphologic structures of organs or organisms with regard to diseases or environmental factors. Therefore, the statistical analysis of shapes has recently become more important in the medical and biological sciences. Data sets include qualitative and quantitative measurements for use in the statistical analyses associated with medical research. Nowadays, with the help of advanced imaging techniques the image or shape of an organ or organism can be used as input data [1].

Shape is defined as all the geometrical information that remains when location, scale and rotational effects are filtered from an object [2], [3], [4], [5]. Statistical shape analysis is a geometrical analysis of the statistics measured from sets of shapes that determines the features of similar shapes or of different groups comprising similar shapes. Distance between shapes, mean shape and shape variation can be predicted and obtained using statistical shape analysis [3]. A comparison of shapes between groups can also be done at a particular significance level.

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