

Accepted Manuscript

A novel power-based approach to Gaussian kernel selection in the kernel-based association test

Xiang Zhan, Debashis Ghosh

PII: S1572-3127(16)30031-4

DOI: <http://dx.doi.org/10.1016/j.stamet.2016.09.003>

Reference: STAMET 549

To appear in: *Statistical Methodology*

Received date: 26 January 2016

Accepted date: 28 September 2016

Please cite this article as: X. Zhan, D. Ghosh, A novel power-based approach to Gaussian kernel selection in the kernel-based association test, *Statistical Methodology* (2016), <http://dx.doi.org/10.1016/j.stamet.2016.09.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



A Novel Power-Based Approach to Gaussian Kernel Selection in the Kernel-Based Association Test

Xiang Zhan^{a,*}, Debashis Ghosh^b

^a*Public Health Sciences Division, Fred Hutchinson Cancer Research Center, Seattle, WA 98109, USA*

^b*Department of Biostatistics and Informatics, University of Colorado, Aurora, CO 80045, USA*

Abstract

Kernel-based association test (KAT) is a widely used tool in genetics association analysis. The performance of such a test depends on the choice of kernel. In this paper, we study the statistical power of a KAT using a Gaussian kernel. We explicitly develop a notion of analytical power function in this family of tests. We propose a novel approach to select the kernel so as to maximize the analytical power function of the test at a given test level (an upper bound on the probability of making a type I error). We assess some theoretical properties of our optimal estimator, and compare its performance with some similar existing alternatives using simulation studies. Neuroimaging data from an Alzheimer's disease study is also used to illustrate the proposed kernel selection methodology.

Keywords: Consistency; Gaussian kernel; Kernel-based association test; Kernel selection; Power function

*Corresponding author. Tel.: +1 8143213493.

Email addresses: xzhan@fhcrc.org (Xiang Zhan), debashis.ghosh@ucdenver.edu (Debashis Ghosh)

Download English Version:

<https://daneshyari.com/en/article/7547668>

Download Persian Version:

<https://daneshyari.com/article/7547668>

[Daneshyari.com](https://daneshyari.com)