

1096-92-1801

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Two-Sample Tests and Recursive Partitioning with Latent Responses: Application to HIV Genetics.

Clinical studies evaluating the efficacy of antiretroviral therapy in suppressing human immunodeficiency virus replication frequently use viral rebound to clinically indicate treatment failure. However, since viral load measurements are measured with error, there may be uncertainty regarding whether an observed increase in viral load is due to such error or to viral rebound. Therefore, analyses of such studies must accommodate a response that is not directly observable. In this paper we present a recursive partitioning method for a latent event that estimates the probability of occurrence of an event between successive (in time) pairs of observations, given an observed change in outcome measurements. The only required parametric assumptions relate to the estimation of the outcome measurements' error distribution. We evaluate the performance of our method using simulation studies, and provide an application based on HIV viral genetic data from the AIDS Clinical Trials Group 398 clinical study. (Received September 16, 2013)