



Changepoint Detection in Multinomial Logistic Regression with Application to Sky-Cloudiness Conditions in Canada

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Detecting changepoints in a sequence of continuous random variables has been extensively explored in both statistics and climatology literature. There is little, however, for studying the case with multicategory random variables. For instance, the sky-cloudiness condition in Canada is reported in tenths of the sky dome and thus has 11 categories (from 0 for clear sky, to 10 tenths for overcast). This study develops an overall likelihood-ratio test statistic for detecting a sudden change in the parameters of the continuation-ratio logit random intercept model for a sequence of multinomial variables. A method of partitioning the overall test statistic is also proposed, which allows one to assess the significance of the effect of the detected change on individual categories. An application of this new technique to real sky cloudiness data is also presented.