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# An Integrated Method for Analyzing the Function of Central Nervous System When Pooling Various Environments

by

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# An integrated method for analyzing the function of central nervous system when pooling various environments

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**Abstract**

To understand potential encoding mechanism of motor cortical neurons for control commands during reach-to-grasp movements, experiments to record neuronal activities have been conducted in many research laboratories. The most popular way to analyze these kind of data is to fit the Analysis of Variance (ANOVA) model using the firing rates of individual neurons. Chen et al. (2010) proposed to consider neural firing counts and temporal intervals respectively and apply Analysis of Covariance (ANCOVA) model. Due to the nature of the data, in this paper we propose to consider neural firing counts and temporal intervals respectively and apply an integrated method, called heterogeneous Poisson regression model, to categorize different neural activities. Three scenarios are discussed to show that the proposed heterogeneous Poisson regression model can overcome some disadvantages of the traditional Poisson regression model.

*Keywords:* firing counts, Poisson regression model, heterogeneous Poisson regression model

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