**Change Point Estimation in R**

This repository contains R scripts for the estimation of change points using various segmented models, including binary (logistic), count (Poisson) and continuous outcomes. The proposed To-SNR method is implemented alongside existing methods for comparison.

**Scripts Overview**

1. **Logistic Model**
   * logistic-1cpt.R: Implements a logistic segmented model for a one-change-point scenario using the To-SNR method, Muggeo's method (from the segmented package), and Fong's method (from the chngpt package).
   * logistic-2cpt.R: Implements a logistic segmented model for a two-change-points scenario using the To-SNR method and Muggeo's method (from the segmented package).
2. **Poisson Model**
   * poisson-1cpt.R: Implements a Poisson segmented model for a one-change-point scenario using the To-SNR method and Muggeo's method (from the segmented package).
   * poisson-4cpt.R: Implements a Poisson segmented model for a four-change-points scenario using the To-SNR method and Muggeo's method (from the segmented package).
3. **Model with Continuous Outcomes**
   * continuous-1cpt.R: Implements a segmented model with continuous outcomes for a one-change-point scenario using the To-SNR method.
   * continuous-4cpt.R: Implements a segmented model with continuous outcomes for a four-change-points scenario using the To-SNR method.
4. **Hypothesis Testing**
   * hypothesis-testing-logistic.R: Conducts hypothesis testing for the logistic segmented model using the proposed average score-type test, compared with the Davies test (from the segmented package), maximum score test, and maximum likelihood ratio test (both from the chngpt package).
   * hypothesis-testing-poisson.R: Conducts hypothesis testing for the Poisson segmented model using the proposed average-score test and compares it with the Davies test (from the segmented package).
5. **Data Preparation and Analysis For BMC2 Registry (Application)**
   * pci-dataclean.R: Data cleaning and analysis for the Blue Cross Blue Shield of Michigan Cardiovascular Consortium (BMC2) Registry.
   * ci-hypothesis-testing-steps.R: Hypothesis testing steps for determining the number of change points in the final model.

**Important Note**

Due to contractual agreements between participating institutions and the BMC2 registry, the raw data cannot be shared with external agencies.

**Usage**

To use these scripts, ensure you have the necessary R packages installed (segmented and chngpt packages). Run each script in R or RStudio, modifying parameters as needed for your specific analysis.