bayesCT: An R Package for Design and Analysis of Adaptive Bayesian Clinical Trials

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Overview

1. Why bayesCT?
2. Fundamental Ideas Behind Bayesian Adaptive Designs
3. Design and Simultion of Bayesian Adaptive Clinical Trials using bayesCT

Why bayesCT?

bayesCT R Package

Benefits:

- ease of developing an entire adaptive trial using this package.
- functions are simple to understand for regulatory agency (FDA).
- employable for trials with most common data types.
- ability for a smaller company with a single statistician to be able to develop an entire adaptive clinical trial code
- universal language used for describing Bayesian adaptive trials.

Fundamental Ideas Behind Bayesian Adaptive Designs

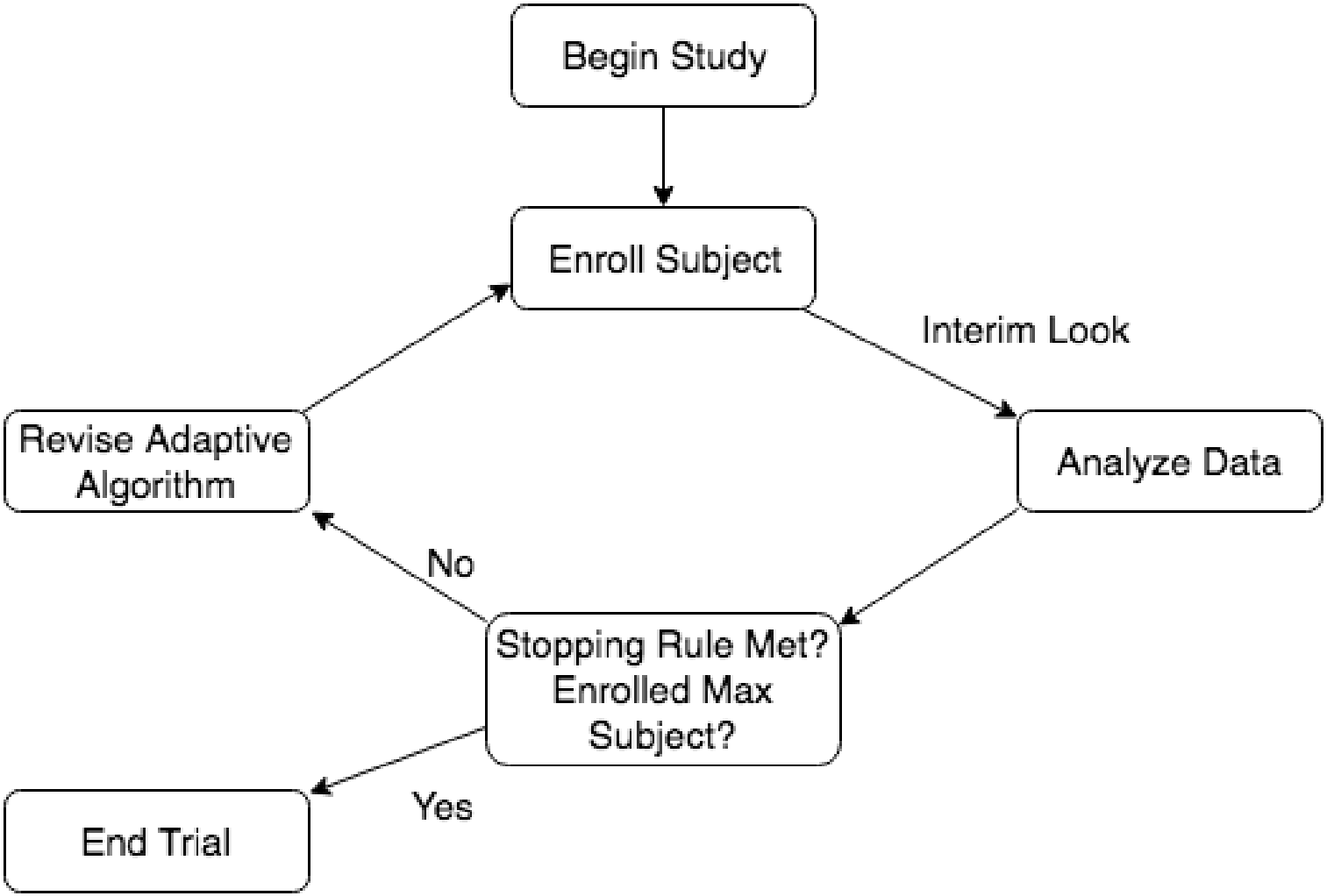
What does the Bayesian approach offer?

- Historical data from previous studies can be used to lesson sample size, reducing time and expense, as well as decreasing or eliminating patient exposure to sub-par treatments.
- Also allows use of data accumulated during the trial. Trial mechanics can adapt to new information.
- All inference derived from posterior; easy interpretation! Probability statements instead of p-values.
- Straightforward incorporation & accommodation of multiple sources of data (e.g. meta analysis), missing data, complex hierarchical modeling, longitudinal & spatial information, etc.

Adaption on-the-fly

- Randomize more subjects to better treatment; treatment effect may take time to manifest.
- Stop trial early for futility or success!
- Can drop unpromising treatment arms.
- Dynamically incorporate historical data.

Adaptive Process



Design and Simultion of Bayesian Adaptive Clinical Trials using bayesCT

bayesCT R Package

bayesCT R package available: https://thevaachandereng.github.io/bayesCT/

- CRAN release 0.99.1

Analysis types

- Single-arm: OPC trials, treatment data only
- Two-arm: treatment + control data

Function

- Incorporation of historical data
- Allow early stopping for futility and expected success
- Pipes for modular input & parallelization for fast computing

Data Types

- Binomial count data
- Continuous normal data
- Survival outcome data
- Linear Regression- in progress

Website

bayesCT 0.99.1 | Get started | Reference | Articles

bayesCT - Tool for Simulation and Analysis of Adaptive Bayesian Clinical Trials

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Overview

`bayesCT` is a R package for simulation and analysis of adaptive Bayesian randomzied controlled trials under a range of trial designs and outcome types. Currently, it supports Gaussian and binomial. The time-to-event data will be added shortly. The `bayesCT` package website is available here. Please note this package is still under development.

Installation

Prior to analyzing your data, the R package needs to be installed. The easiest way to install `bayesCT` is through CRAN:

```
install.packages("bayesCT")
```

There are other additional ways to download `bayesCT` . The first option is most useful if want to download a specific version of `bayesCT` (which can be found at https://github.com/thevaachandereng/bayesCT/releases):

```
devtools::install_github("thevaachandereng/bayesCT@vx.xx.x")

# or

devtools::install_version("bayesCT", version = "x.x.x", repos = "http://cran.us.r-project.org")
```

The second option is to download through GitHub:

```
devtools::install_github("thevaachandereng/bayesCT")
```

After successful installation, the package must be loaded into the working space:

```
library(bayesCT)
```

Usage

See the vignettes for usage instructions and example.

License

`bayesCT` is available under the open source GNU General Public License, version 3.

Links

Download from CRAN at https://cloud.r-project.org/package=bayesCT

Browse source code at https://github.com/thevaachandereng/bayesCT

Report a bug at https://github.com/thevaachandereng/bayesCT/issues/

License

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Developers

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Dev status

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