

Challenges to Build Foundation to Use OST in Clinical Programming

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Disclaimer



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 - All information provided in this presentation is provided for information purposes only.

We will share the challenges to build a foundation to use Open-Source Technology (OST), particularly R.

- Current situation in our company
- Some initiatives to adopt R
- Prospects

Scope:

- In scope: Clinical programming and reporting
- Out of scope: Statistical analysis

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- Adopting OST is drawing attention in clinical reporting tasks recently.
 - R is one of the open-source programming languages and has strengths like:
 - Accessibility to various analysis methods and packages
 - Easy manipulation of graphics
 - Good integration with other software (e.g., HTML, LaTeX, ...)

R environment for clinical reporting is being implemented in our company...

- R server environment was constructed
- Some useful packages in clinical reporting in our company were developed and released
- Internal systems for analysis and reporting are updated to allow users to execute R codes as well as typical ones

Even Though Environment is Ready...



How do we use it?

How can we take advantages from them?

Why should we change the way to work?

**We need to develop
our capability
ASAP!!!**



What We Did to Develop Capability?



- Creating opportunities is important for capability development
 - There are seldom chances to use those new technology in usual works
 - Once having experiences to learn and adopt such open-source technologies, it can be accelerated even on other ones

Having R language study sessions



Learning by oneself can be promoted
once having learned the basis

Executing analysis using R



By applying the new language, the
advantages and disadvantages/difficulties
will be recognized more deeply

Initiatives – 1. Having R Language Study Sessions



Study sessions were held in 2020-2021.

- Time: 1 or 2 hours per session (7 times so far)
- Teacher: Internal clinical programmers
- Audience: Members of clinical programming department (New to R)
- Themes: R introduction, Data manipulation, Graphics, Shiny, R Markdown, etc..
- Method: Explanation + Hands-on

Example: Session for “R Introduction”



Rとは？

▪ R言語

オープン

▪ R使用法

FDAはSA
R Found

▪ GSKの

RStudio
現在の使

- Stage
- Stage

RStudioとは？

▪ RStudio

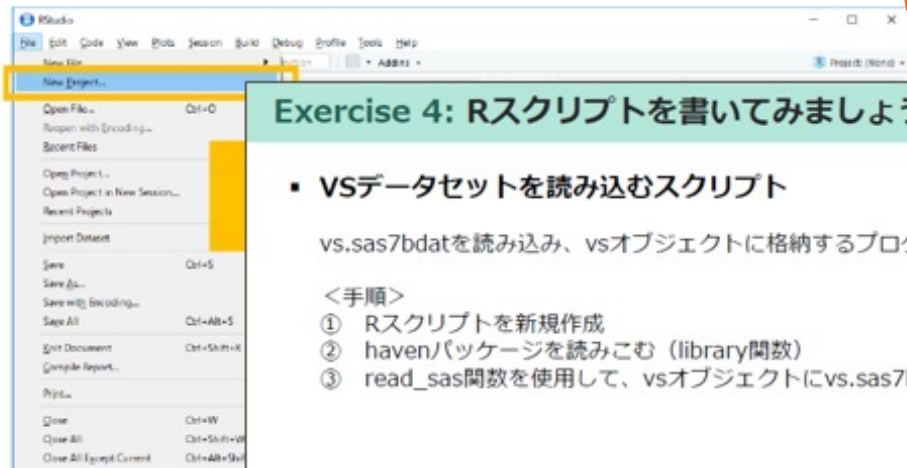
R言語のための統合開発環境。できること：

- Explore the C
- Write our first
- Discuss object
- Look at a fun

Introduction of R and its environment

Exercise 0: Rプロジェクト（作業場所）を作しましょう

Simple exercises with test dataset



Exercise 4: Rスクリプトを書いてみましょう

▪ VSデータセットを読み込むスクリプト

vs.sas7bdatを読み込み、vsオブジェクトに格納するプログラムを書いてみましょう！

<手順>

- ① Rスクリプトを新規作成
- ② havenパッケージを読みこむ（library関数）
- ③ read_sas関数を使用して、vsオブジェクトにvs.sas7bdatを読み込む

Example: Session for “Shiny”



What is Shiny?

- Easy web application creation
- Webアプリケーションオープンソース
- HTML, CSSができる
- <https://www.r-shiny.com/>

Exercise 1-4: Develop UI

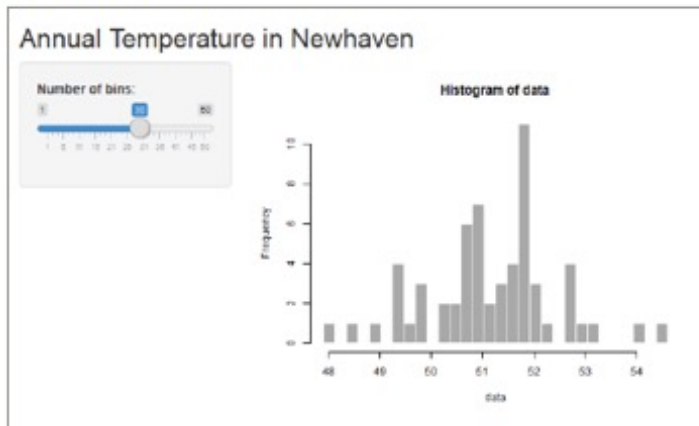
1. アプリのタイトルを表示する: `titlePanel()`
2. レイアウトを作成する: `sidebarLayout()`
 - 2-1. サイドパネルを作成する: `sidebarPanel()`
 - ヒストグラムのビンの数を変化
 - スライダーの値を“bins”オブジェクト
 - 2-2. メインパネルを作成する: `mainPanel()`
 - ヒストグラム本体 “histPlot”
 - ※ “histPlot”の中身は`renderPlot()`

Introduction of Shiny and its structure

共有画面を見ながら書いてみましょう

Created an app in hands-on work

Great Job!!!!



Reflection of Study Sessions



From **instructor's** perspective...

- Nobody should be left behind – Any questions were addressed in the time so that all members accomplished the exercises. To step up as a team was prioritized rather than finishing the sessions as planned.
- Checking alignment with company's objectives and official tutorials/textbooks are necessary so that attendees can easily access to further information

From **attendee's** perspective...

- It was good having this opportunity and the speed was just right
- Some troubles occurred in executing programs... preparation for the environment before the session is important

Initiatives – 2. Executing Analysis using R



- We are trying to use R in analysis and reporting (e.g., simple summary, statistical analysis).
- There are considerable questions and resolutions like...
 - How should we check their validity and accuracy?
 - Quality control (e.g., double programming) is performed using R and either typical language depending on their appropriateness
 - How can we create outputs?
 - R Markdown can generate high quality reports in various formats
- ▶ These findings will be analyzed and shared as a case study...accumulating small experiences will lead to further application of OST

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- Even though some learning sessions are held, the opportunity to use R in actual studies is still limited – Continuing the actions is important
 - The more members are familiar with the technology, the adoption and use will be the more accelerated
 - Planning to have additional sessions about R or any other technology in the future
 - Making the workplace easy to try to use new technology and share their experiences
 - Experiences bring us huge learnings

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- We shared our initiatives to adopt OST, particularly R
 - We continue to seek the way to take advantages from the new technologies
 - If you are also struggling... let's exchange the knowledge to each other to accelerate
 - If you have already done much... it would be very appreciated if you share how-to

► **Move forward together!**

Thank you