# AI Tools for R

## Day 1 - Introduction to Data Analysis with R

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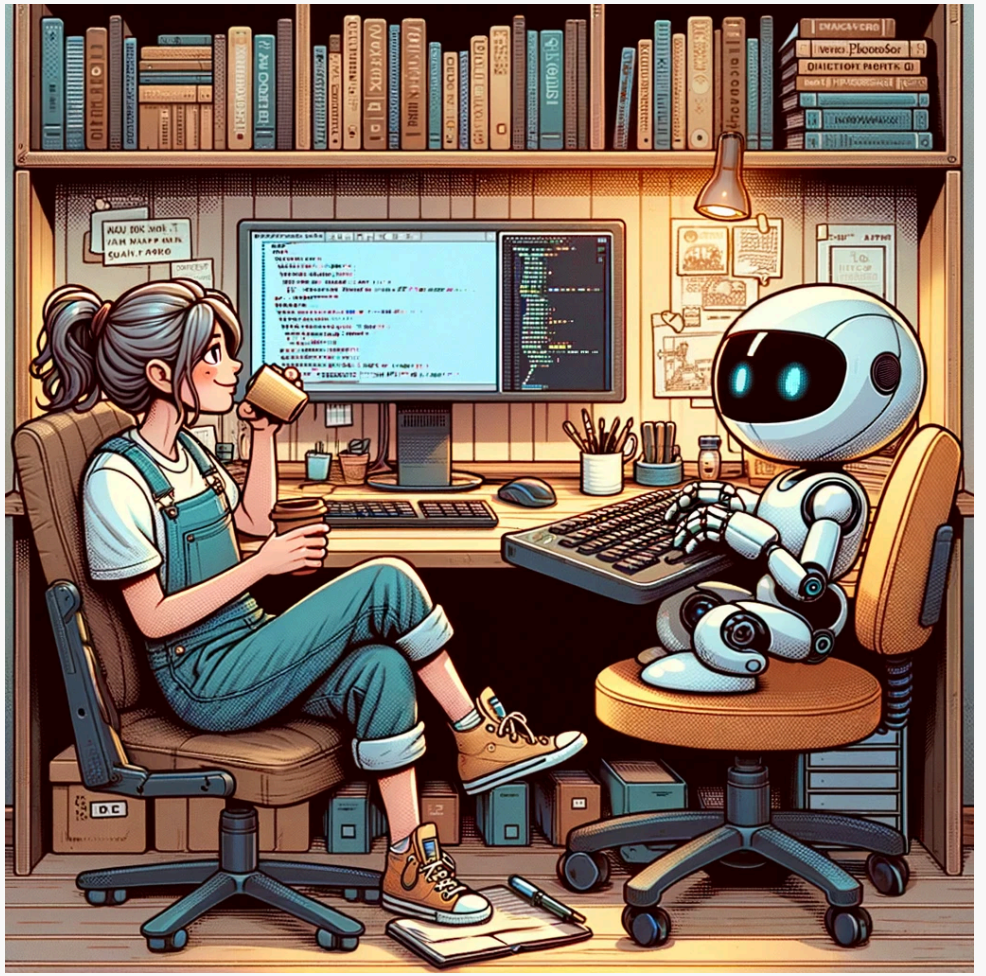
# Motivation

- AI tools assist programmers with
  - Coding
  - Debugging
  - Learning
  - ...
- Higher productivity and efficiency
- More motivation
- But careful: You still need to understand what's going on!



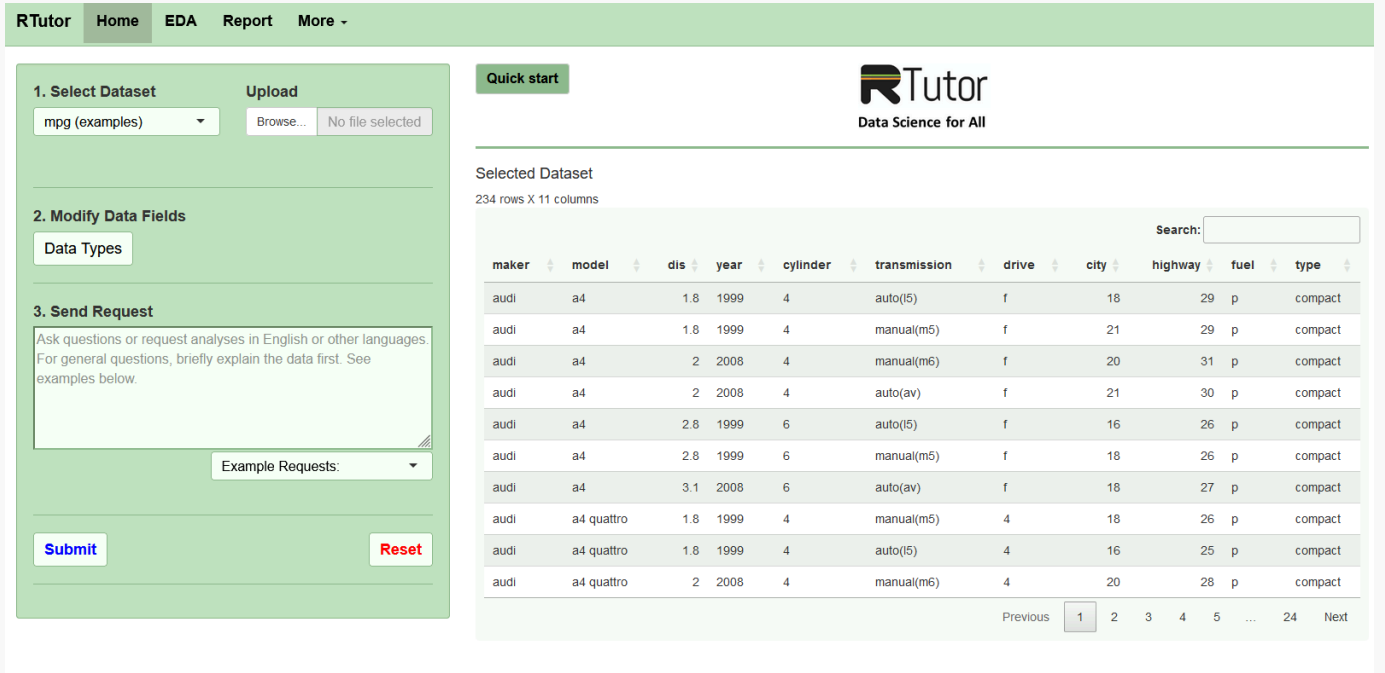
# Overview of tools

- **Browser-based chat bots** (ChatGPT, Bard, …)
  - General-purpose
- **Data-analysis tools** (Julius AI, RTutor, …)
  - Upload data and ask questions about it
  - Can also execute code
  - Chat with your data
- **Integrated AI tools** (GitHub Copilot, Codium AI, …)
  - Integrated directly in programming environment
  - Real-time suggestions, chat, debugging, …

Find the tools that best fit your workflow!

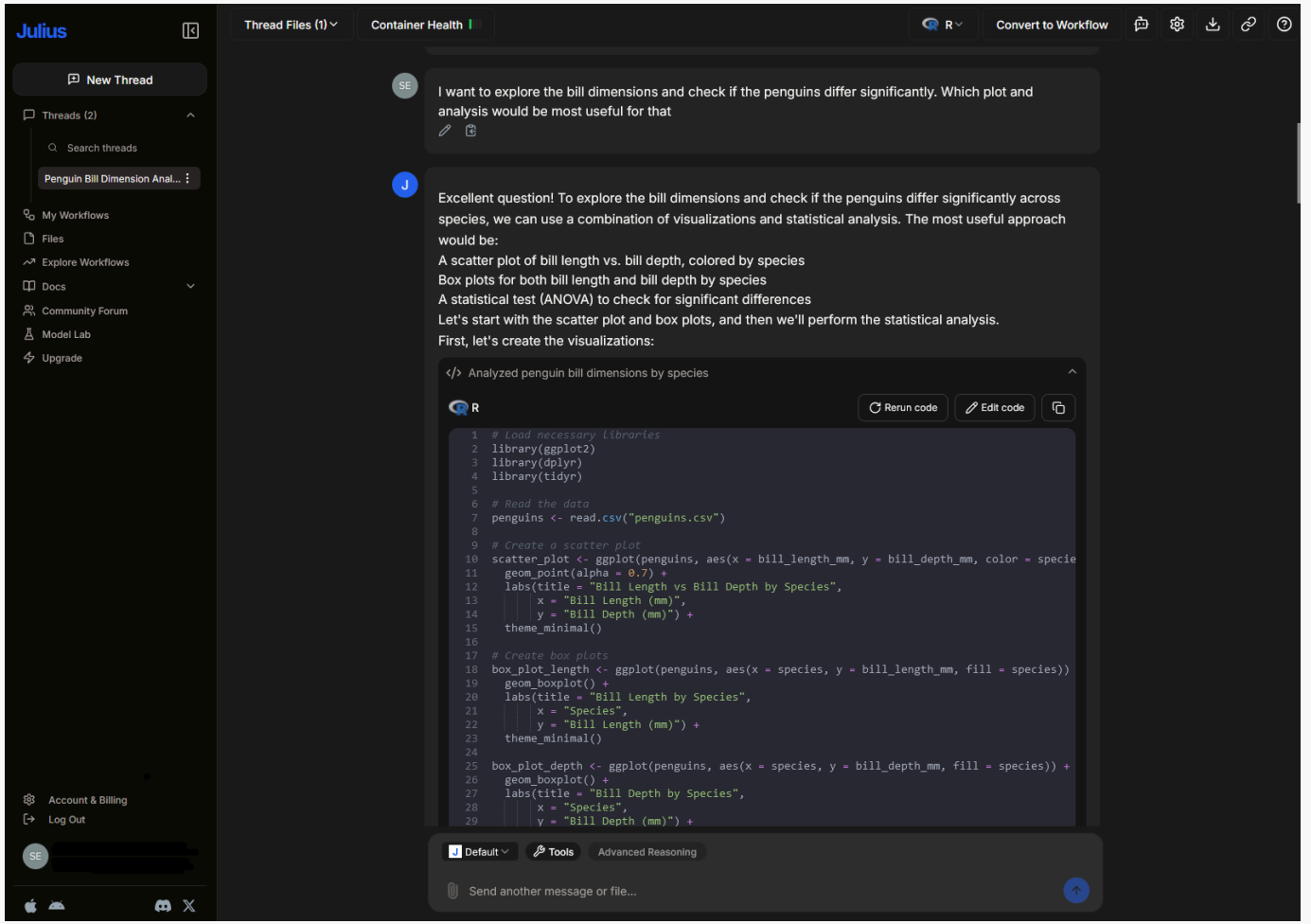
# R Tutor

- https://rtutor.ai/
- Free browser tool
- Upload data and ask questions about it
- Use the demo data



# Julius AI

- https://julius.ai/
- Try for free
- Basic plan ~20€ per months (-50% academic discount)
- Upload data and ask questions about it



# Github Copilot

- https://github.com/features/copilot
- Model based on GPT-4 and OpenAI's Codex
  - Specifically trained on source code
- Basic idea: Integrate directly into R Studio (or other IDEs)
- Works best for well-represented languages (Python, JS, ...)

# How to get GitHub Copilot

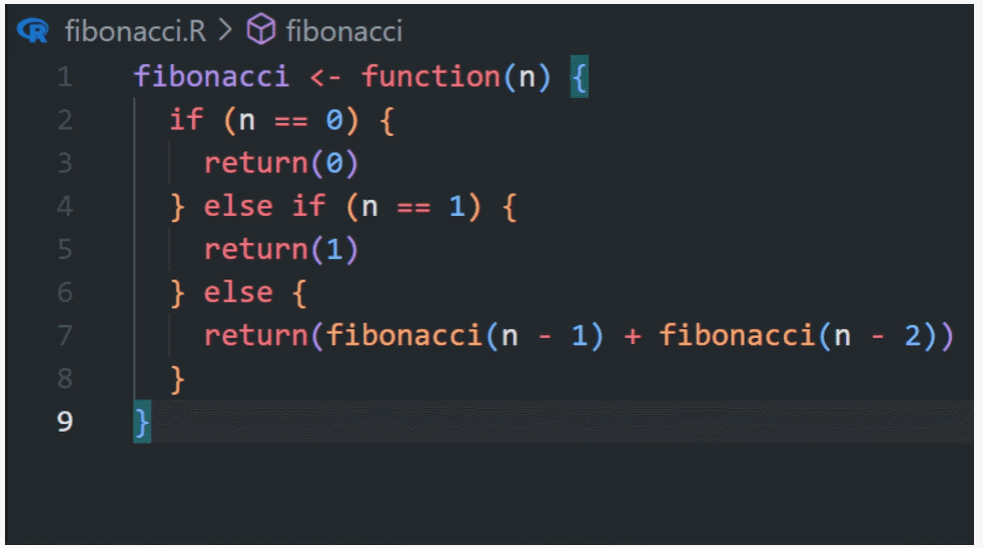
See this website for step-by-step guide and more information.

It's really easy, but you need:

- GitHub Account
- Active GH Copilot subscription (10$ per month)
  - Get it for free as an academic with an educational account
- IDE that supports Copilot
  - Full support: Visual Studio (Code), Vim, Neovim, JetBrains IDEs (e.g. PyCharm)
  - Limited support: RStudio, ?

# GH Copilot: Inline code suggestions

- Copilot tries to predict what you want to do next
- Suggestions are based on the context
  - Previous code
  - Comments
  - Variable and function names
  - …



# Get better suggestions

- Provide context
  - Open other files
  - Add top level comments explaining the purpose of the script
  - Name variables and functions properly
  - Copy-paste sample code and delete it later
- Be consistent
  - "Garbage in, garbage out"
  - Have a nice and consistent coding style

Nice side effect of using Copilot: More good-practice coding

# Chat with GH copilot in R Studio

- Available through the `chattr` package
- Chat with Copilot in the sidebar
- Also supports other LLMs (e.g. GPT4o, ...)

# Concerns to consider

- Privacy
  - Chose whether your prompts and suggestions will be used by Github (`Github -> Seetings -> Copilot -> Policies`)
  - Check privacy guidelines before you upload data
- Plagiarism
  - Block suggestions matching public code (`Github -> Seetings -> Copilot -> Policies`)
- Ethical concerns
  - For-profit tool trained on open-source
- Environmental concerns
  - Water and energy usage

# Usage guidelines

- No definite guidelines, but see examples listed here
- **Responsibility**
  - You are responsible for your scientific output
  - Stay critical, double-check
- **Transparency**
  - Make clear for which tasks you used which AI
- **Know relevant guidelines**
  - Journals
  - Your university
- **Still understand what is happening!**