

Kevin Wang

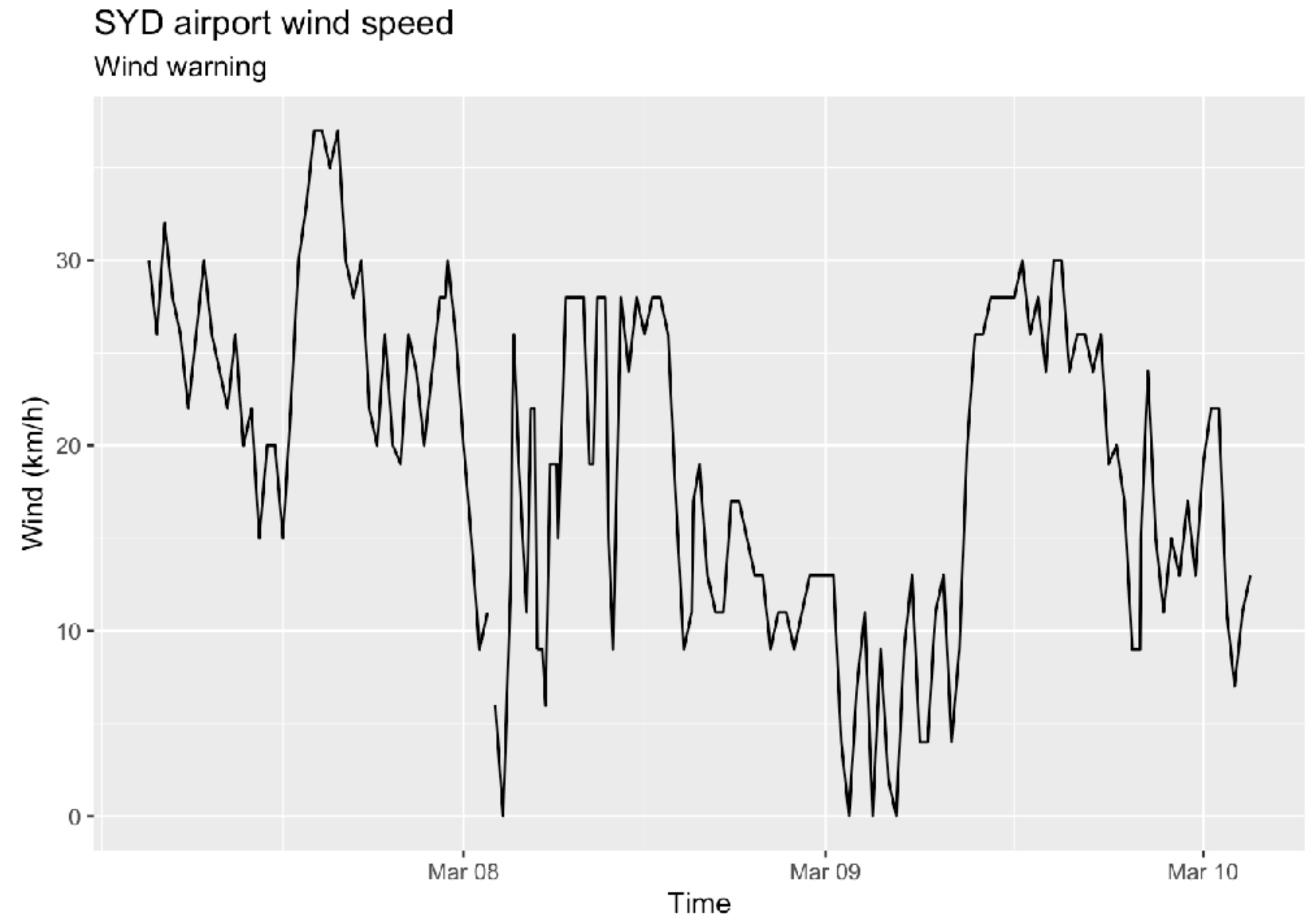
University of Sydney

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# Communicate your results using R and Shiny

# Bomrang RMD document

- ▶ Imagine that you are working at Sydney airport as a data scientist
- ▶ You are responsible for issuing wind speed warnings
- ▶ A wind speed warning should be issued whenever the windspeed reaches 30km/h (or above) in the past 72 hours



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## Bomrang inputs/outputs

- ▶ Loading R packages
- ▶ Fetch BOM data for Sydney airport for the past 72 hours
- ▶ Making a time series using ggplot2
- ▶ Knit a report and make interpretation

- 1. Should you do this every 72 hours or whenever your boss calls you to make this plot?**
- 2. What if Melbourne airport also wants a similar report?**

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# It is all about the inputs and outputs!

## ▶ Input:

- ▶ Time of data accession
- ▶ Location (Sydney airport or otherwise)

## ▶ Processing

- ▶ Loading R packages
- ▶ Decide if windspeed warning should be issued
- ▶ Making a ggplot

## ▶ Output

- ▶ The wind speed plot and the windspeed warning

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# It is all about the inputs and outputs!

determined by users

## ▶ Input:

- ▶ Time of data accession
- ▶ Location (Sydney airport or otherwise)

fixed!

## ▶ Processing

- ▶ Loading R packages
- ▶ Decide if windspeed warning should be issued
- ▶ Making a ggplot

changes based on inputs

## ▶ Output

- ▶ The wind speed plot and the windspeed warning

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## Shiny: a framework, a package, an app

- ▶ R-based framework to build dashboard applications
- ▶ Outputs will change immediately based on user inputs
- ▶ A Shiny app consists of a series of R scripts that manages the user inputs, data processing and the outputs.

**Even though it is a “R package”, it doesn’t always follow the syntax of R**

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## Rmarkdown and Shiny integration

- ▶ Shiny might look scary at first, but it is not!
- ▶ Uncomment the Shiny section in the provided RMarkdown file
- ▶ This is not a full Shiny app. **But** it gives you an idea of how inputs and outputs will be passed/managed in a full Shiny app



A black and white photograph of several wind turbines against a cloudy sky. The largest turbine is in the foreground on the left, with its blades extending towards the top left. Two smaller turbines are visible in the background, one in the center and one further back on the right.

# Demo 1

- ▶ The faithful Shiny app is a out-of-the-box Shiny app
- ▶ We will modify it into an app that issues windspeed warning



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## The most important lines in the Bomrang app

- ▶ Input (ui.R)
  - ▶ ``textInput(inputId = "location")``
- ▶ Processing (server.R)
  - ▶ ``output$wind_plot = renderPlot(...)``
- ▶ Output (ui.R)
  - ▶ ``plotOutput(outputId = "wind_plot")``



# Demo 2

Add a plot for  
``apparent_t``

► `ui.R`

► `server.R`

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# Reactive

- ▶ server.R
  - ▶ fetch data and make a windspeed plot
  - ▶ fetch data and make a temperature plot
- ▶ ui.R
  - ▶ display the windspeed plot
  - ▶ display the temperature plot

**We should only fetch the data once and send that data to both `renderPlot`**

A black and white photograph of several wind turbines against a cloudy sky. The largest turbine is in the foreground on the left, with its blades extending towards the top left. Two smaller turbines are visible in the background, one in the center and one further back on the right.

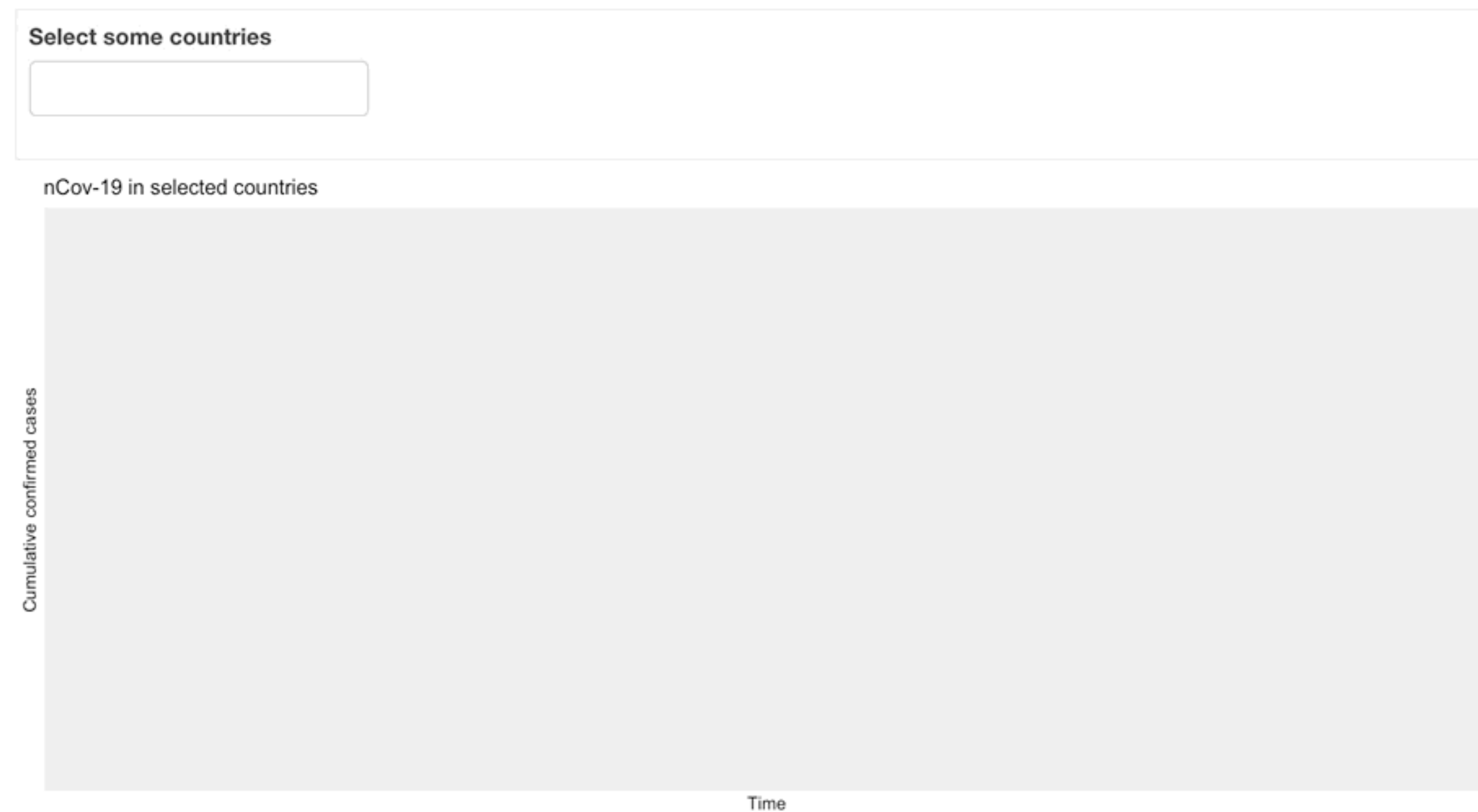
# Demo 3

``reactive`` is a function that reacts to inputs and pass those changes to others

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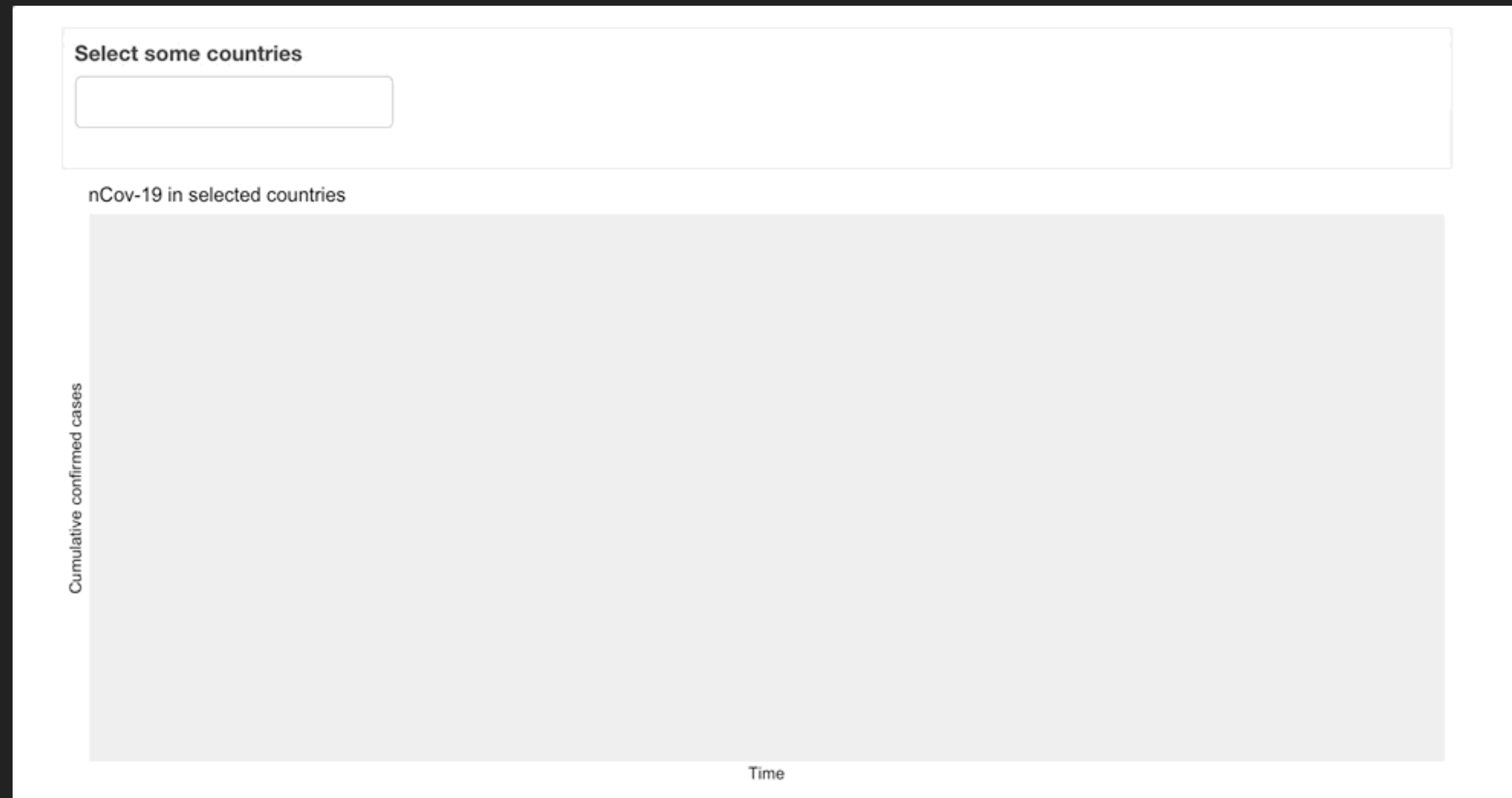
# Homework

- ▶ Make a Shiny app for nCov2019 based on the code I provided in `nCov.Rmd`.
- ▶ The `nCov2019` package from GitHub provides daily updated data. You can install it using `devtools::install_github("GuangchuangYu/nCov2019")`



# Competition

- Make a Shiny app for nCov2019



1. Submit a working nCov Shiny app at [https://github.com/kevinwang09/shiny\\_3888/issues/1](https://github.com/kevinwang09/shiny_3888/issues/1) to win a prize!
2. The app MUST be different to mine in at least one major and informative way.
3. Winner will win a prize.





# Demo 4

Sharing and  
deploying your  
app



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## Shiny apps are also reproducible

- ▶ You can host your Shiny app codes on GitHub!
  - ▶ [https://github.com/kevinwang09/ncov\\_3888](https://github.com/kevinwang09/ncov_3888)
  - ▶ ``shiny::runGitHub(repo = "ncov_3888", username = "kevinwang09")`` allows you to run an app locally, provided that you have all the packages installed.
- ▶ [shinyapps.io](https://shinyapps.io) can also host your app for you
  - ▶ Usage limits exist, so be careful you don't make your app too computationally intensive

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## A gallery of Shiny apps

- ▶ <https://shiny.rstudio.com/gallery/>
- ▶ <https://community.rstudio.com/tags/shiny-contest-2020>
- ▶ Google Cloud Cats and Dogs app

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# Do's

- ▶ Google
- ▶ Build a working app first before prettifying
- ▶ Manage your brackets
- ▶ Modularise your code, each function shouldn't be more than 50 lines

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## Don't

- ▶ Make an app that takes up a lot of resources (e.g. like the cats and dogs classification)
- ▶ Spend 90% of the time to make the app look pretty but only 10% of the time to check the correctness/generalizability