Shiny

What is Shiny?

- Shiny is a R package that makes it easy to build interactive web applications (apps) straight from R.
- Usually such presentations are shown as a Research and Analysis finding.
- Presenting the findings with an interactive view has much greater influence than any other type presentation.

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Structure of Shiny App

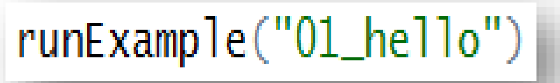
- Shiny apps have two components:
  - a user-interface script
  - a server script
- The user-interface (ui) script controls the layout and appearance of your app. It is defined in a source script named ui.R.
- The server.R script contains the instructions that your computer needs to build your app.
- As of version 0.10.2, Shiny supports single-file applications. You no longer need to build separate server.R and ui.R files for your app; you can just create a file called app.R (or any name to the file) that contains both the server and UI components.

Running an App of Shiny

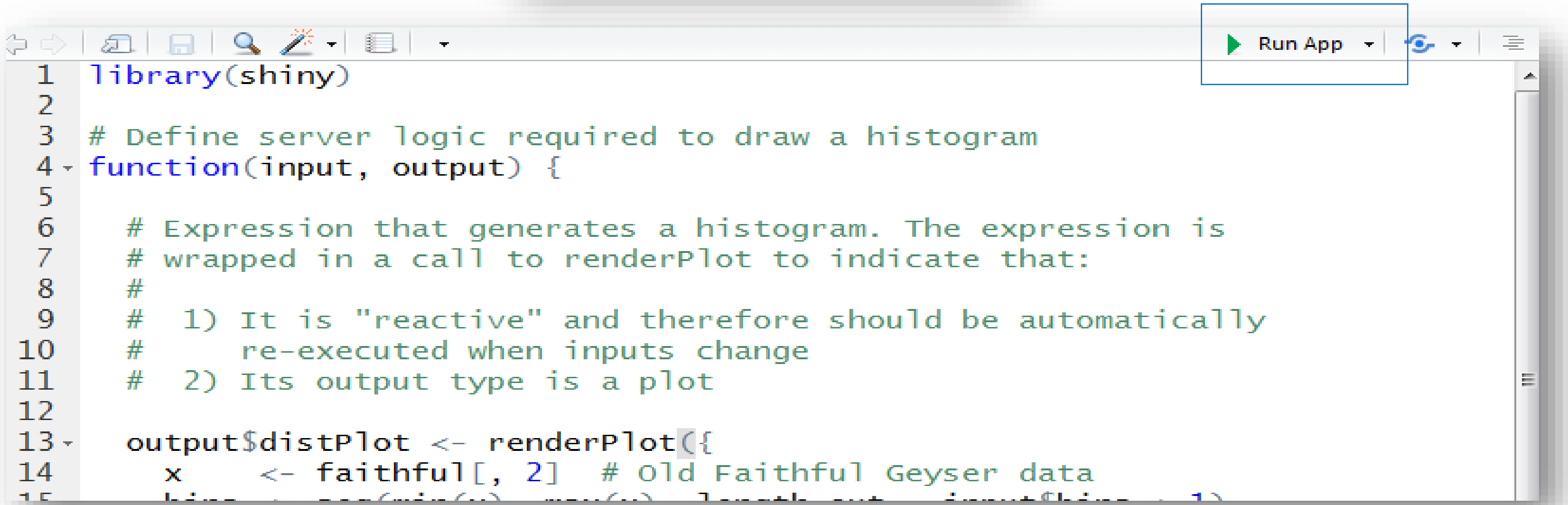
There are two ways by which a Shiny App can be run:

1. You can run a Shiny app by giving the name of its directory to the function runApp like

2. Click on the “RunApp” button provided on the smart editor window



```
runExample("01_hello")
```



```
library(shiny)

# Define server logic required to draw a histogram
function(input, output) {

  # Expression that generates a histogram. The expression is
  # wrapped in a call to renderPlot to indicate that:
  #
  #  1) It is "reactive" and therefore should be automatically
  #     re-executed when inputs change
  #  2) Its output type is a plot

  output$distPlot <- renderPlot({
    x    <- faithful[, 2]  # Old Faithful Geyser data
```

Layout

- Shiny ui.R scripts use the functions like fluidPage and pageWithSidebar to create a display that automatically adjusts to the dimensions of your user’s browser window.
- You lay out your app by placing elements in these functions

fluidPage Elements

- titlePanel and sidebarLayout are the two most popular elements to add to fluidPage. They create a basic Shiny app with a sidebar.
- sidebarLayout always takes two arguments:
    - sidebarPanel function output
    - mainPanel function output

titlePanel & sidebarLayout functions

- titlePanel(title, windowTitle = title)
  - title : title to be displayed
  - windowTitle : The title that should be displayed by the browser window
- sidebarLayout(sidebarPanel, mainPanel, position = c("left", "right"), fluid = TRUE)
  - sidebarPanel : sidebarPanel function call containing input controls
  - mainPanel : mainPanel function call containing outputs
  - position : The position of the sidebar relative to the main area ("left" or "right")
  - fluid : TRUE to use fluid layout; FALSE to use fixed layout

sidebarPanel & mainPanel functions

- sidebarPanel(..., width = 4)
  - UI elements to include on the sidebar
  - The width of the sidebar. For fluid layouts this is out of 12 total units; for fixed layouts it is out of whatever the width of the sidebar's parent column is.
- mainPanel(..., width = 8)
  - Output elements to include in the main panel
  - The width of the main panel. For fluid layouts this is out of 12 total units; for fixed layouts it is out of whatever the width of the main panel's parent column is.

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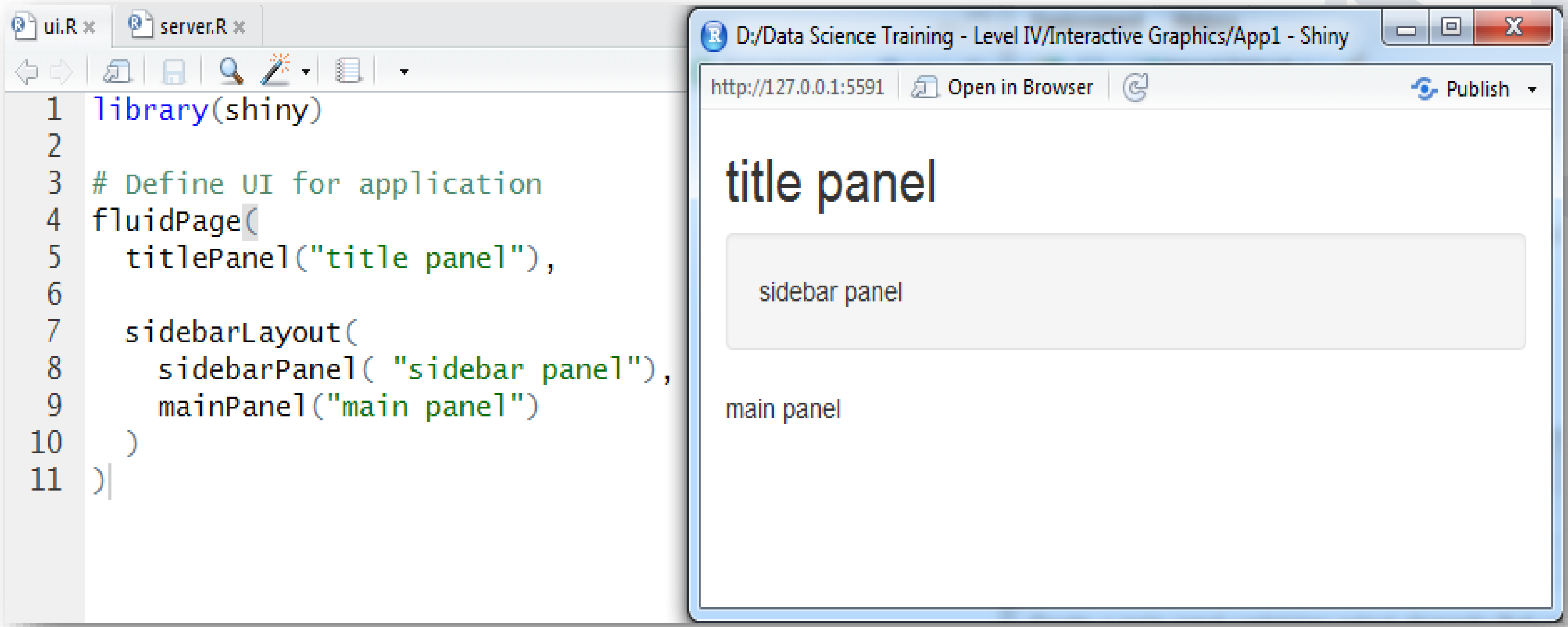
Example



```r
library(shiny)

# Define UI for application
fluidPage(
  titlePanel("title panel"),

  sidebarLayout(
    sidebarPanel( "sidebar panel"),
    mainPanel("main panel")
  )
)
```

D:/Data Science Training - Level IV/Interactive Graphics/App1 - Shiny
http://127.0.0.1:5591
Open in Browser
Publish

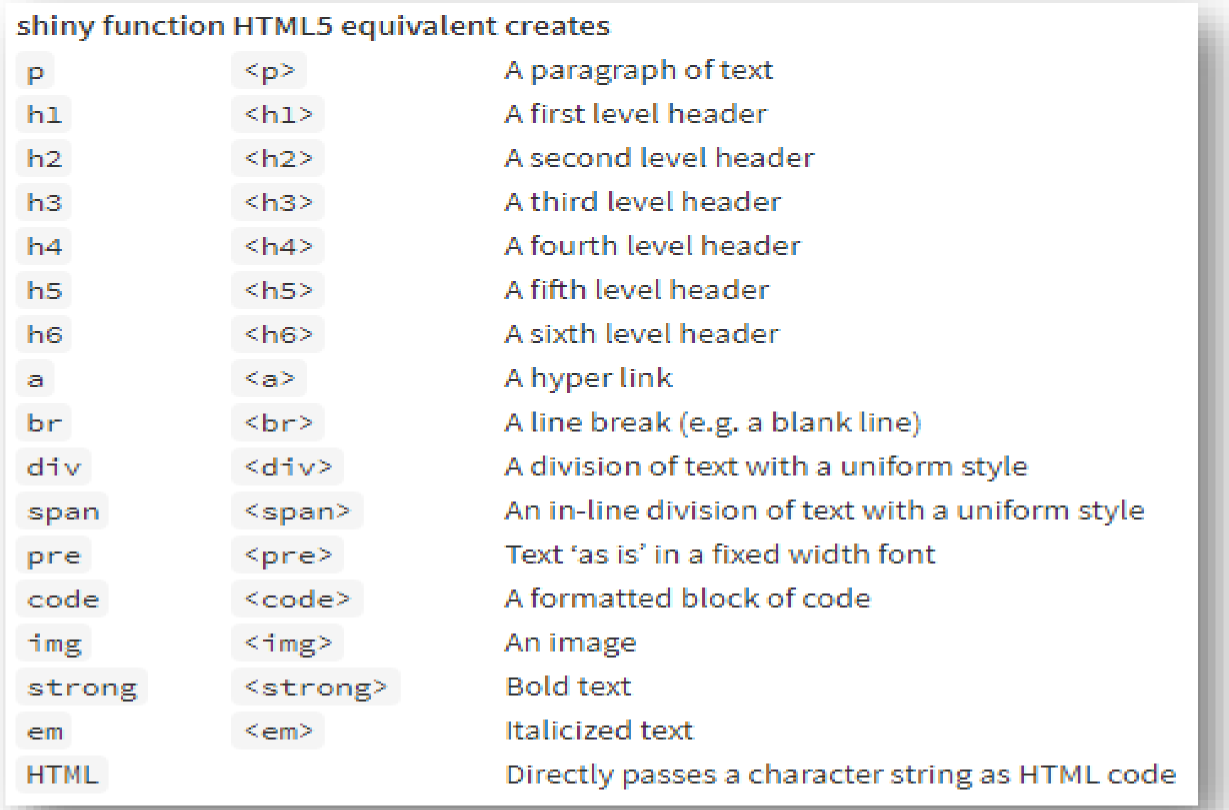
title panel

sidebar panel

main panel

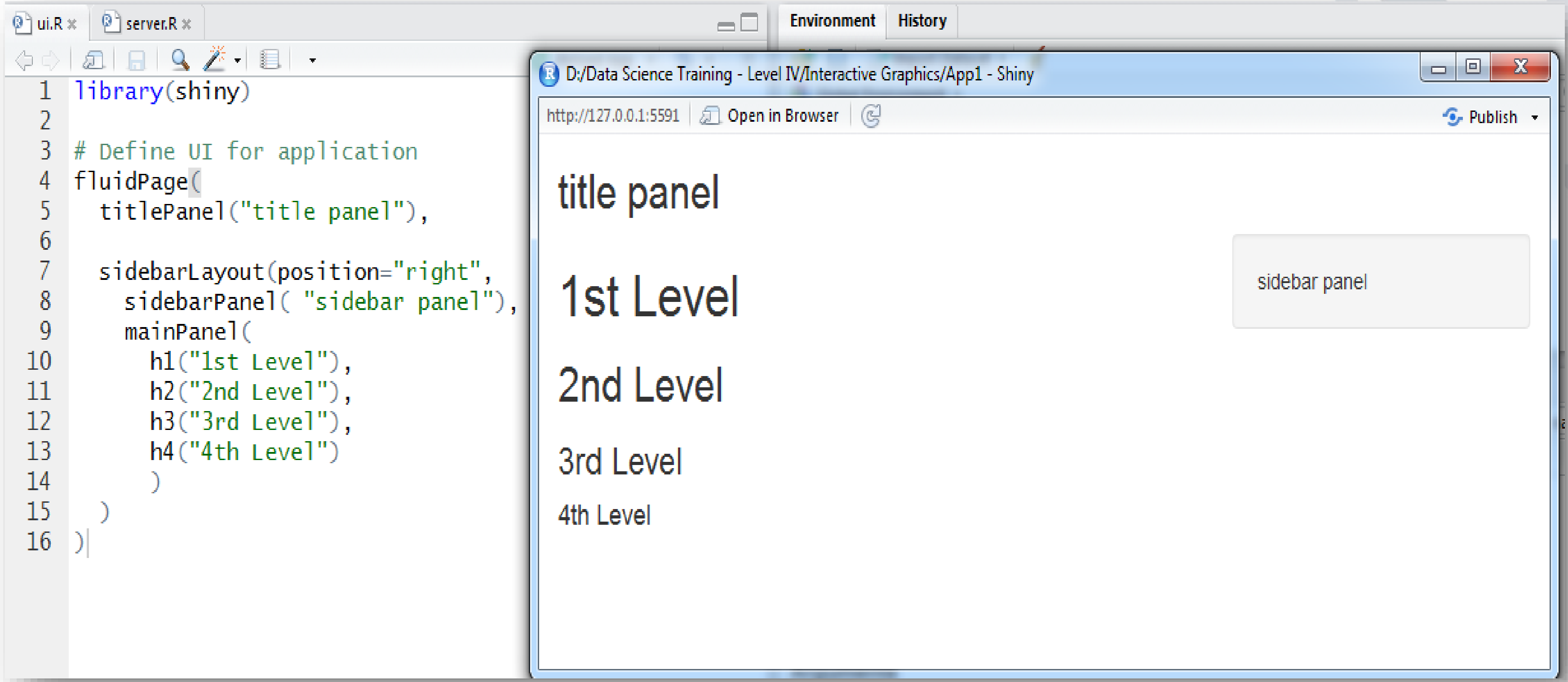
Enhancing text with HTML

- You can add content to your Shiny app by placing it inside any of the panel functions



shiny function	HTML5 equivalent	creates
p	`<p>`	A paragraph of text
h1	`<h1>`	A first level header
h2	`<h2>`	A second level header
h3	`<h3>`	A third level header
h4	`<h4>`	A fourth level header
h5	`<h5>`	A fifth level header
h6	`<h6>`	A sixth level header
a	`<a>`	A hyper link
br	`<br>`	A line break (e.g. a blank line)
div	`<div>`	A division of text with a uniform style
span	`<span>`	An in-line division of text with a uniform style
pre	`<pre>`	Text 'as is' in a fixed width font
code	`<code>`	A formatted block of code
img	`<img>`	An image
strong	`<strong>`	Bold text
em	`<em>`	Italicized text
HTML		Directly passes a character string as HTML code

Example



```r
library(shiny)

# Define UI for application
fluidPage(
  titlePanel("title panel"),

  sidebarLayout(position="right",
    sidebarPanel( "sidebar panel"),
    mainPanel(
      h1("1st Level"),
      h2("2nd Level"),
      h3("3rd Level"),
      h4("4th Level")
      )
  )
)
```

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http://127.0.0.1:5591

title panel

1st Level

2nd Level

3rd Level

4th Level

sidebar panel

Control Widgets

- Shiny comes with a family of pre-built widgets, each created with a transparently named R function

function	**widget**
actionButton	Action Button
checkboxGroupInput	A group of check boxes
checkboxInput	A single check box
dateInput	A calendar to aid date selection
dateRangeInput	A pair of calendars for selecting a date range
fileInput	A file upload control wizard
helpText	Help text that can be added to an input form
numericInput	A field to enter numbers
radioButtons	A set of radio buttons
selectInput	A box with choices to select from
sliderInput	A slider bar
submitButton	A submit button
textInput	A field to enter text

Widget Function Usage

- You can add widgets to your web page in the same way as you add other types of HTML content
- To add a widget to your app, place a widget function in sidebarPanel or mainPanel in your ui.R file or UI related function call
- First two arguments of any widget functions are
    - inputId: The user will not see this name, but can use it to access the widget's value. The name should be a character string
    - label: This label will appear with the widget in your app. It should be a character string, but it can be an empty string ""
- The remaining arguments may vary from widget to widget

About server.R

- This file should contain a anonymous function with two arguments input and output
- The argument input is a list-like object. It stores the current values of all of the widgets in your app. These values will be saved under the names that you gave the widgets in ui.R.
- The argument output is also a list-like object that stores instructions for building the R objects in your app.

Render Functions

renderImage	images (saved as a link to a source file)
renderPlot	plots
renderPrint	any printed output
renderTable	data frame, matrix, other table like structures
renderText	character strings
renderUI	a Shiny tag object or HTML

- Each render* function takes a single argument: an R expression surrounded by braces, {}.
- The expression can be one simple line of text, or it can involve many lines of code, as if it were a complicated function call.
- Shiny will run the instructions when you first launch your app, and then Shiny will re-run the instructions every time it needs to update your object.
- For this to work, your expression should return the object you have in mind (a piece of text, a plot, a data frame, etc). You will get an error if the expression does not return an object, or if it returns the wrong type of object.

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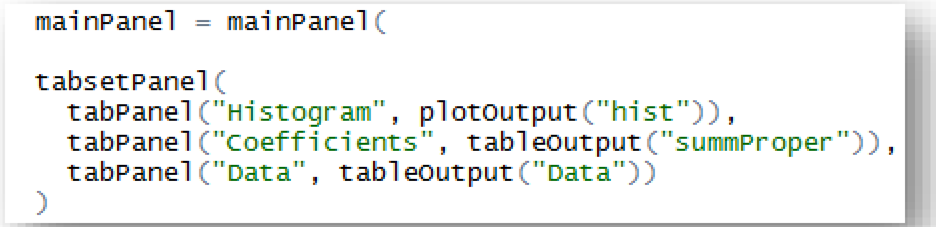
Tabsets

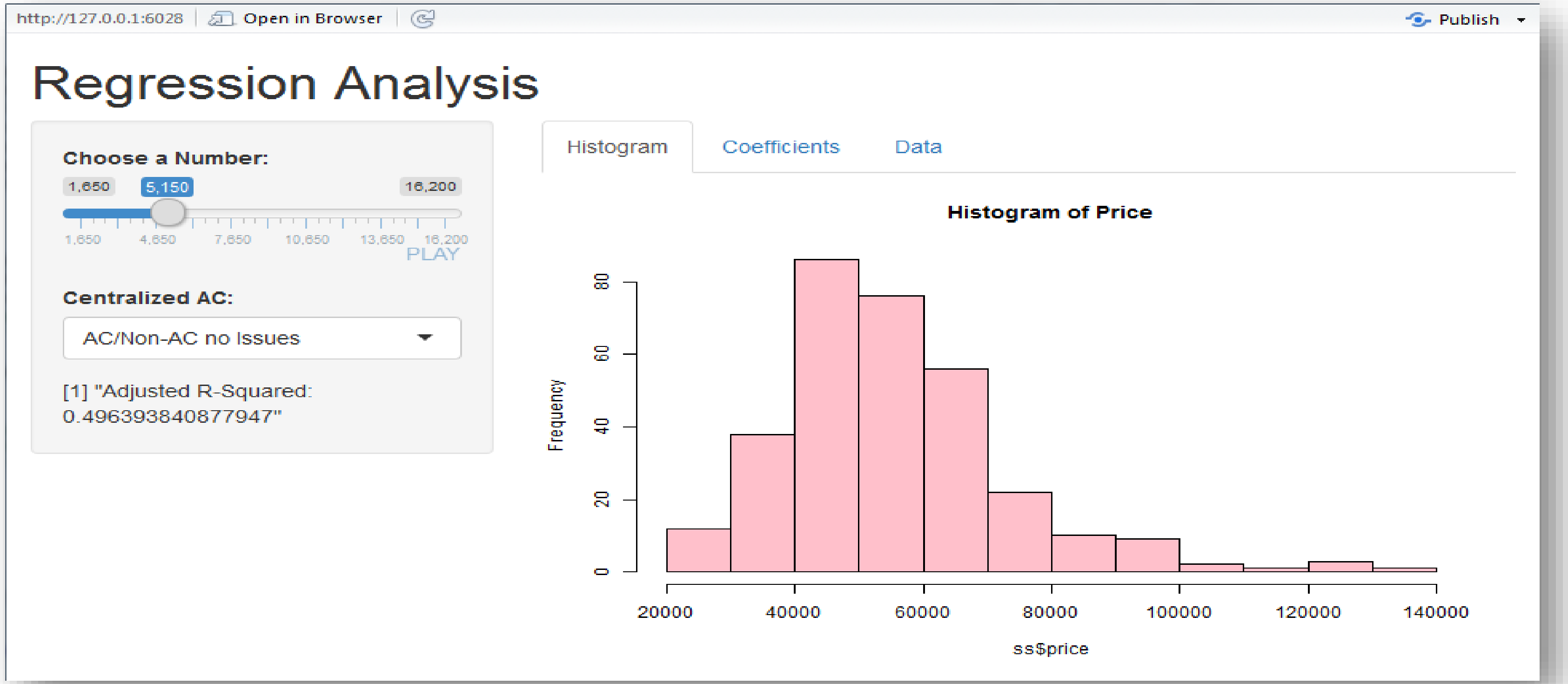
- In order to display multiple outputs in different tabs simultaneously, tabsets widget can be used
- Tabsets are created by calling the `tabsetPanel` function with a list of tabs created by the `tabPanel` function.
- Each tab panel is provided a list of output elements which are rendered vertically within the tab.

Tabsets Example



```
mainPanel = mainPanel(

tabsetPanel(
  tabPanel("Histogram", plotOutput("hist")),
  tabPanel("Coefficients", tableOutput("summProper")),
  tabPanel("Data", tableOutput("Data"))
)
```



```
[1] "Adjusted R-Squared: 0.496393840877947"
```