Week 07: Rshiny (Leaflet)

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and

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Outline

- Overall goal
  - Understand and be able to use R package Leaflet
- Shiny (Leaflet)
  - Overview
  - Features of Leaflet
  - Installing Leaflet
  - Dataset for these slides
  - Data Dictionary
  - Code walk through for Leaflet map
  - Online resources for understanding Leaflet

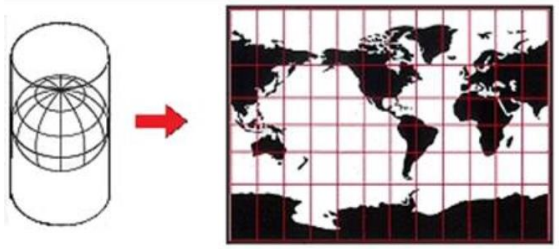
Overview of Leaflet

- Leaflet is an open-source JavaScript library for interactive maps.

- Leaflet allows us to “easily” create Leaflet maps from R.

Features of Leaflet

- Interactive panning/zooming
- Compose maps using arbitrary combinations of map tiles, markers, polygons, lines, popups, and GeoJSON
- Create maps right from the R console or RStudio
- Embed maps in knitr/R Markdown documents and Shiny apps
- Easily render spatial objects from the sp or sf packages, or data frames with latitude / longitude columns
- Use map bounds and mouse events to drive Shiny logic
- Display maps in non spherical mercator projections



- Augment map features using chosen plugins from leaflet plugins repository

GeoJSON and JSON

```
{
  "type": "Feature",
  "geometry": {
    "type": "Point",
    "coordinates": [125.6, 10.1]
  },
  "properties": {
    "name": "Dinagat Islands"
  }
}
```

- GeoJSON
- JSON editor

Installing Leaflet

- From the R console run the following command

  install.packages(“leaflet”)

- To load Leaflet use the library command

  library(leaflet)

Also load “shinythemes”

- From the R console run the following command

  install.packages(“shinythemes”)

- To load Leaflet use the library command

  library(shinythemes)

Dataset for These Slides

Crime_Incidents_in_2017.csv

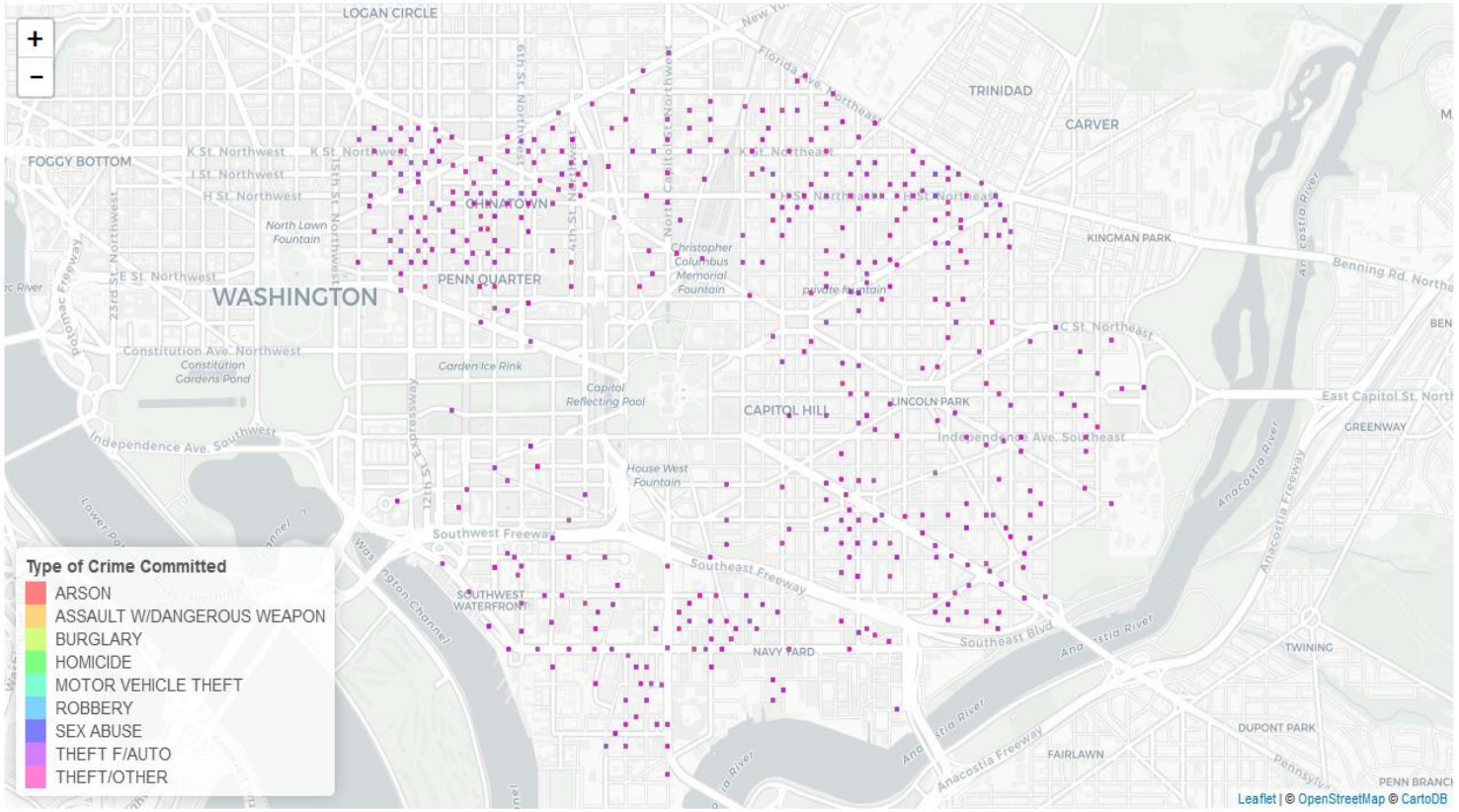
The dataset contains a subset of locations and attributes of incidents reported in the ASAP (Analytical Services Application) crime report database by the District of Columbia Metropolitan Police Department (MPD).

Data Dictionary

CCN	Crime case number
REPORT_DAT	The report date for each crime case
SHIFT	The time slot for each crime case
METHOD	The criminal method for each crime case
OFFENSE	The type of each crime case
BLOCK	The block in which each crime case happened
WARD	The ward in which each crime case happened
DISTRICT	The police district in which each crime case happened
NEIGHBORHOOD_CLUSTER	The neighborhood cluster in which each crime case happened
LATITUDE	The latitude of each criminal position
LONGITUDE	The longitude of each criminal position
START_DATE	The start date of each crime case
END_DATE	The end date of each crime case
OBJECTID	Object ID

Patterns of Crimes in Washington DC

Map



Choose A CSV File Please

Browse... Crime_Incidents_in_2017.csv

Upload complete

Time Slot:

- [ ] DAY
- [ ] EVENING
- [x] MIDNIGHT

Please Select The Time Slot You Want To Analyze For Criminal Patterns

You Can Choose More Than One

DC Police Districts:

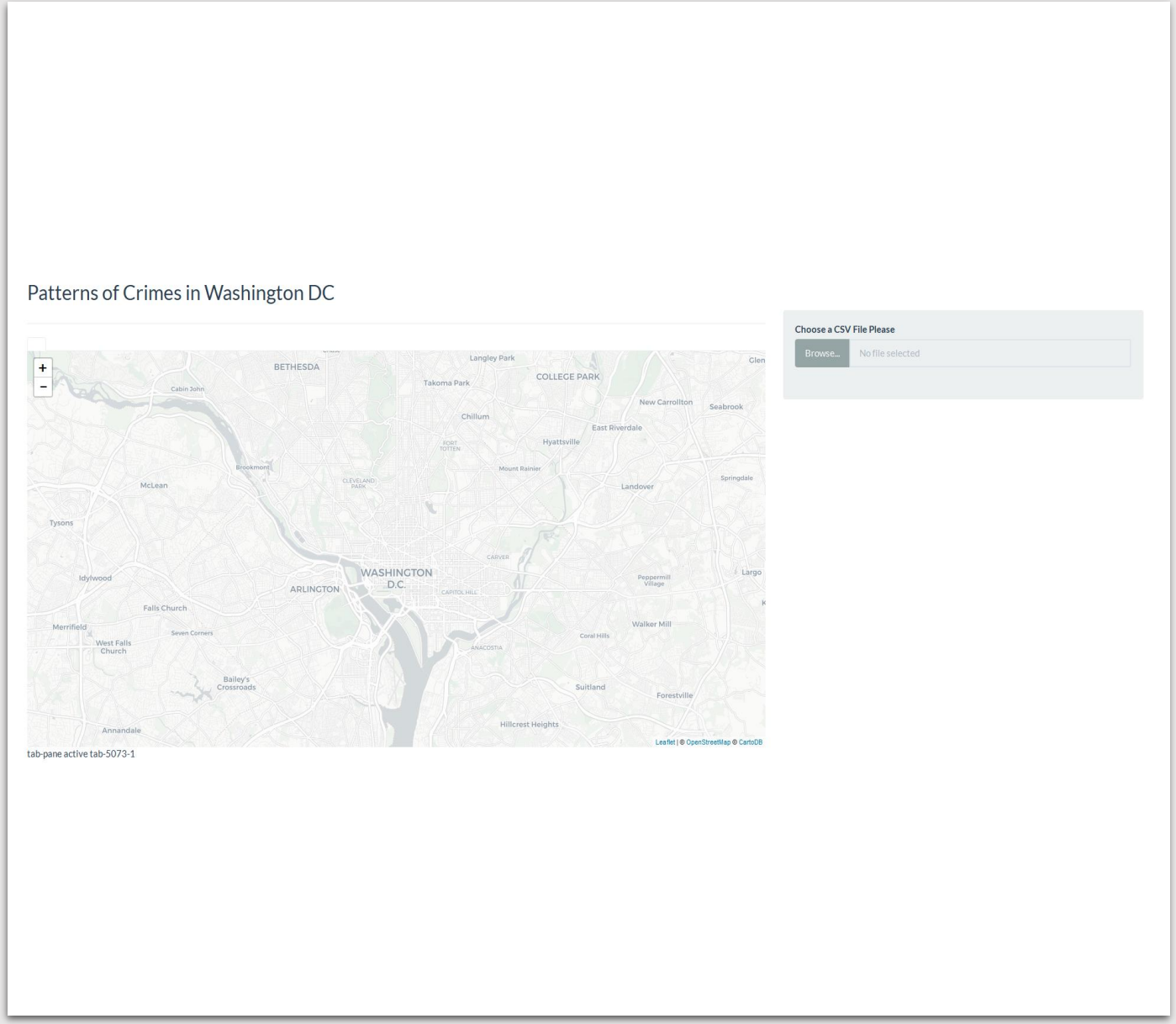
- [x] District 1
- [ ] District 2
- [ ] District 3
- [ ] District 4
- [ ] District 5
- [ ] District 6
- [ ] District 7

Please Select The Police Districts You Want To Analyze For Criminal Patterns

You Can Choose More Than One

ui.R (v1)

- Application title
- Sidebar
  - Read file
- Main panel
  - DC Map with no marker

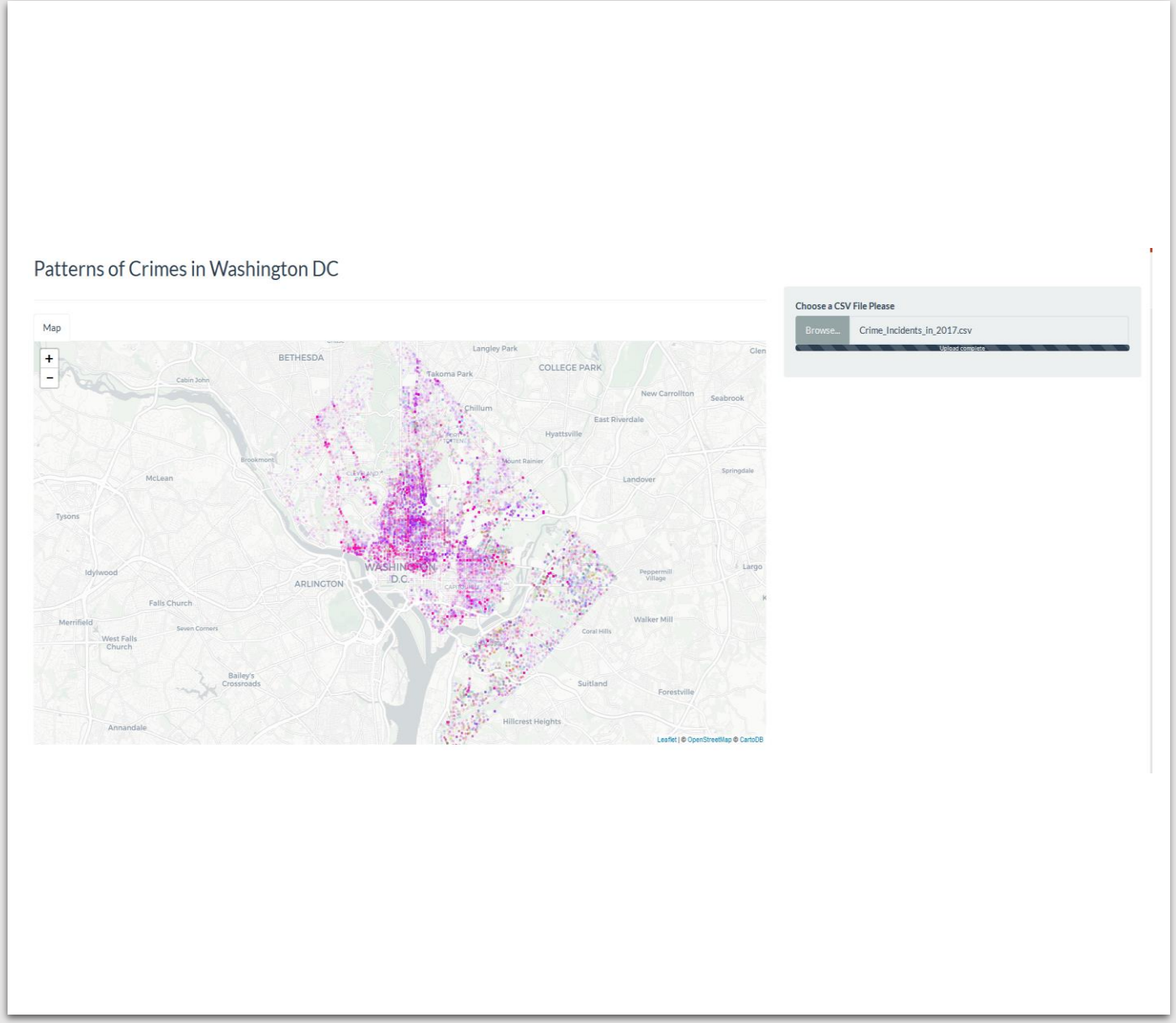


server.R (v1)

- Define server that analyzes the patterns of crimes in DC
- Create a map output variable
- Create the leaflet function
- Set the default view
- Provide tiles

ui.R (v2)

- Application title
- Sidebar
  - Read file
- Main panel
  - **Tab Panel**
  - **DC Map with markers**

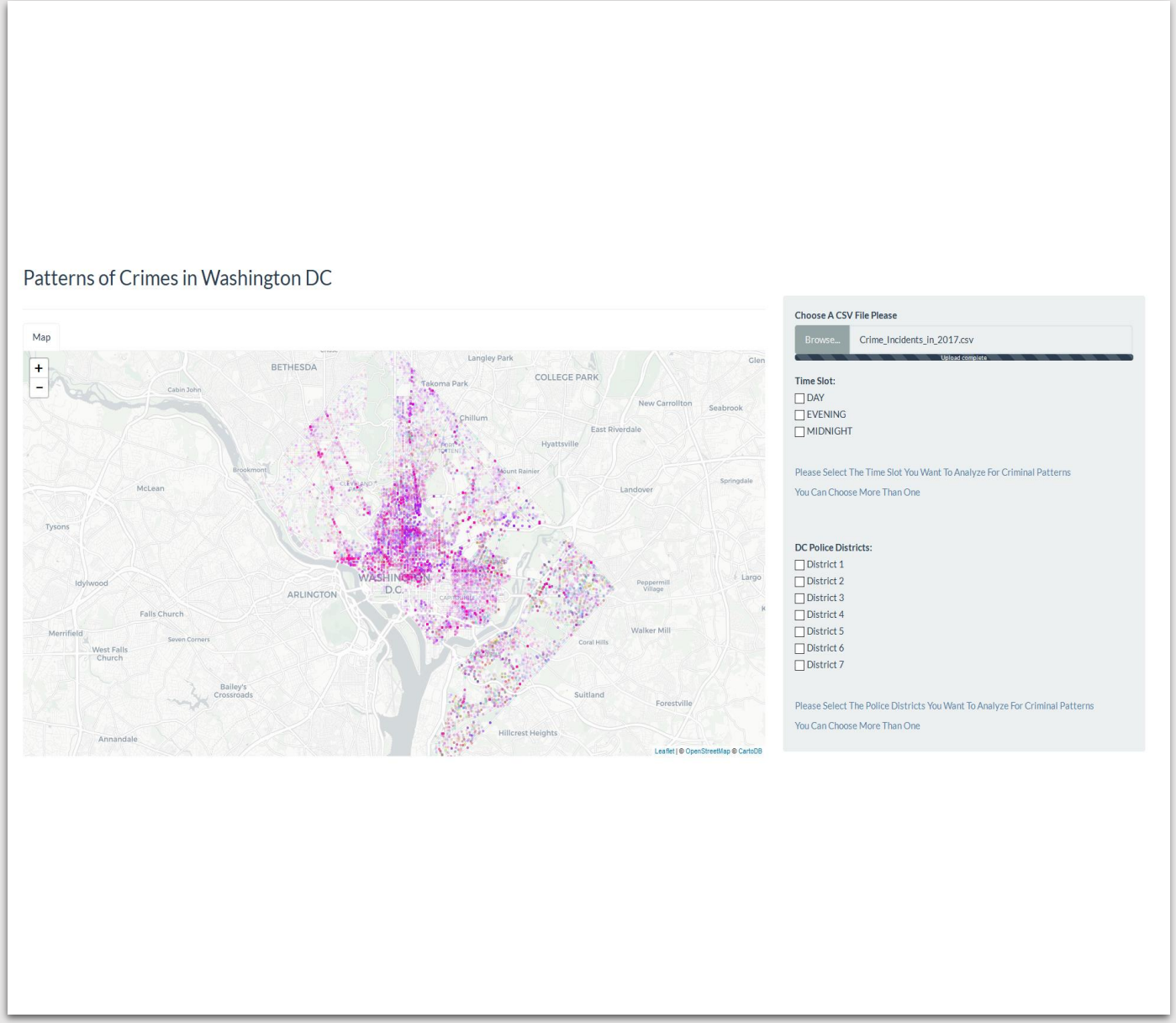


server.R (v2)

- Create a map output variable
- **Connect to the sidebar of file input**
- **Read input file**
- **Create colors with a categorical color function**
- Create the leaflet function
- Set the default view
- Provide tiles
- **Add markers**

ui.R (v3)

- Application title
- Sidebars
  - Read file
  - **a multiple checkbox for time slots**
  - **a multiple checkbox for police districts**
- Main panel
  - Tab Panel
  - DC Map with markers

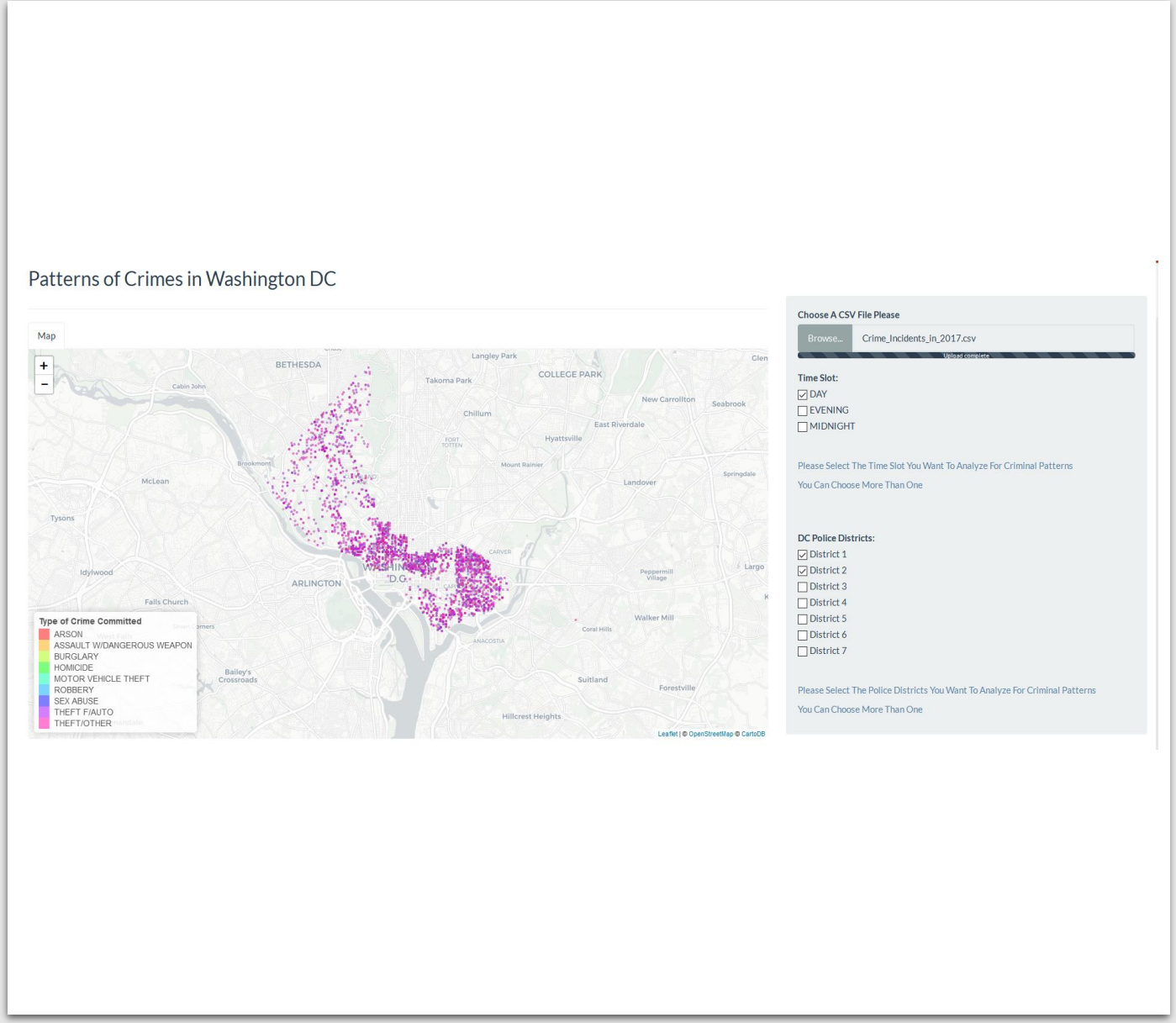


server.R (v3)

- Create a map output variable
- Connect to the sidebar of file input
- Read input file
- Create colors with a categorical color function
- Create the leaflet function
- Set the default view
- Provide tiles
- Add markers

ui.R (v4)

- Application title
- Sidebars
  - Read file
  - a multiple checkbox for time slots
  - a multiple checkbox for police districts
- Main panel
  - Tab Panel
  - **DC Map with markers for different time slots and police districts**

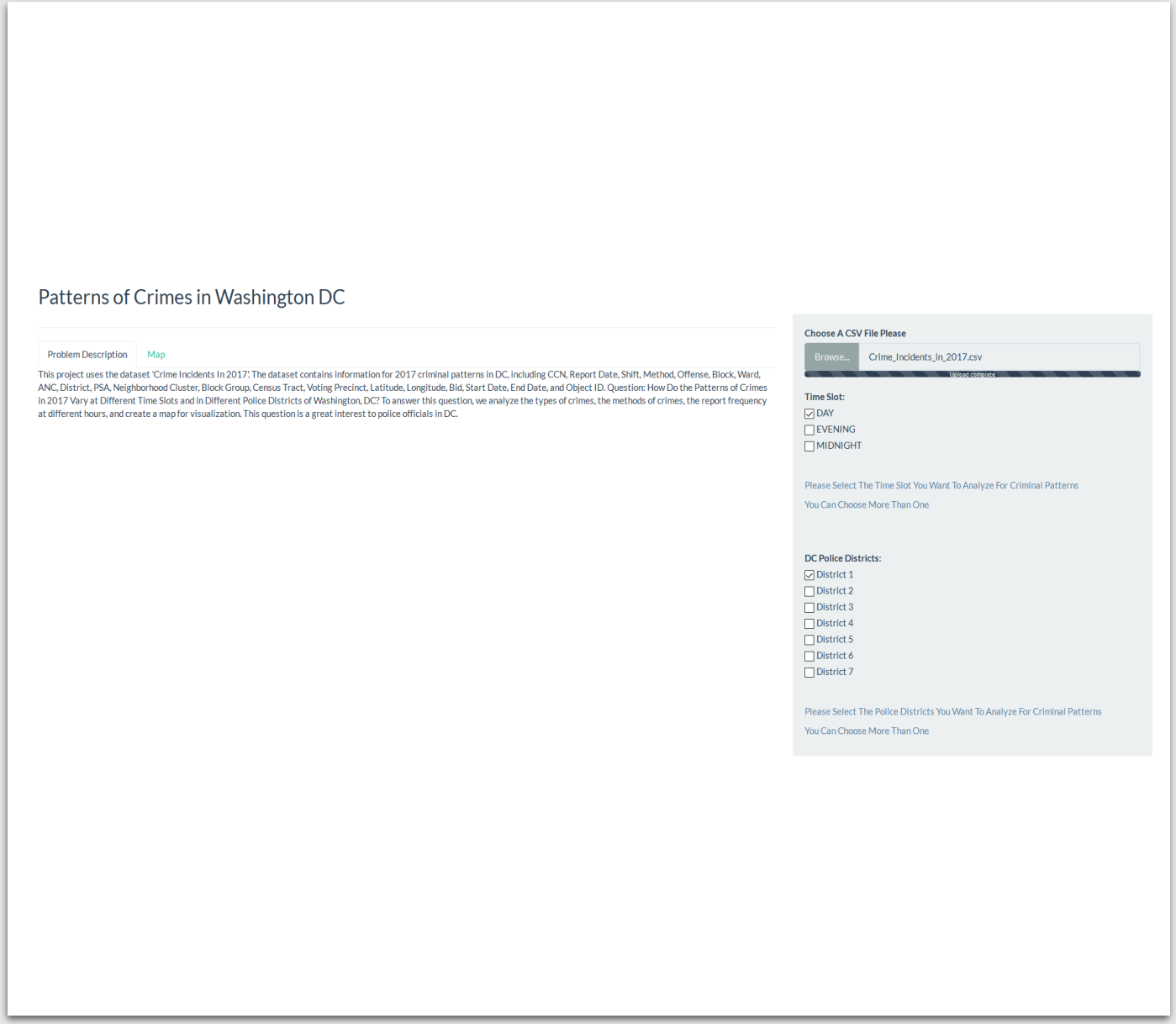


server.R (v4)

- Create a map output variable
- Connect to the sidebar of file input
- Read input file
- **Filter the data for different time slots and different districts**
- Create colors with a categorical color function
- Create the leaflet function for data
- Set the default view
- Provide tiles
- Add markers
- **Add legends for different types of crime**

ui.R (v5)

- Application title
- Sidebars
  - Read file
  - a multiple checkbox for time slots
  - a multiple checkbox for police districts
- Main panel
  - **Problem description**
  - DC Map with markers for different time slots and police districts

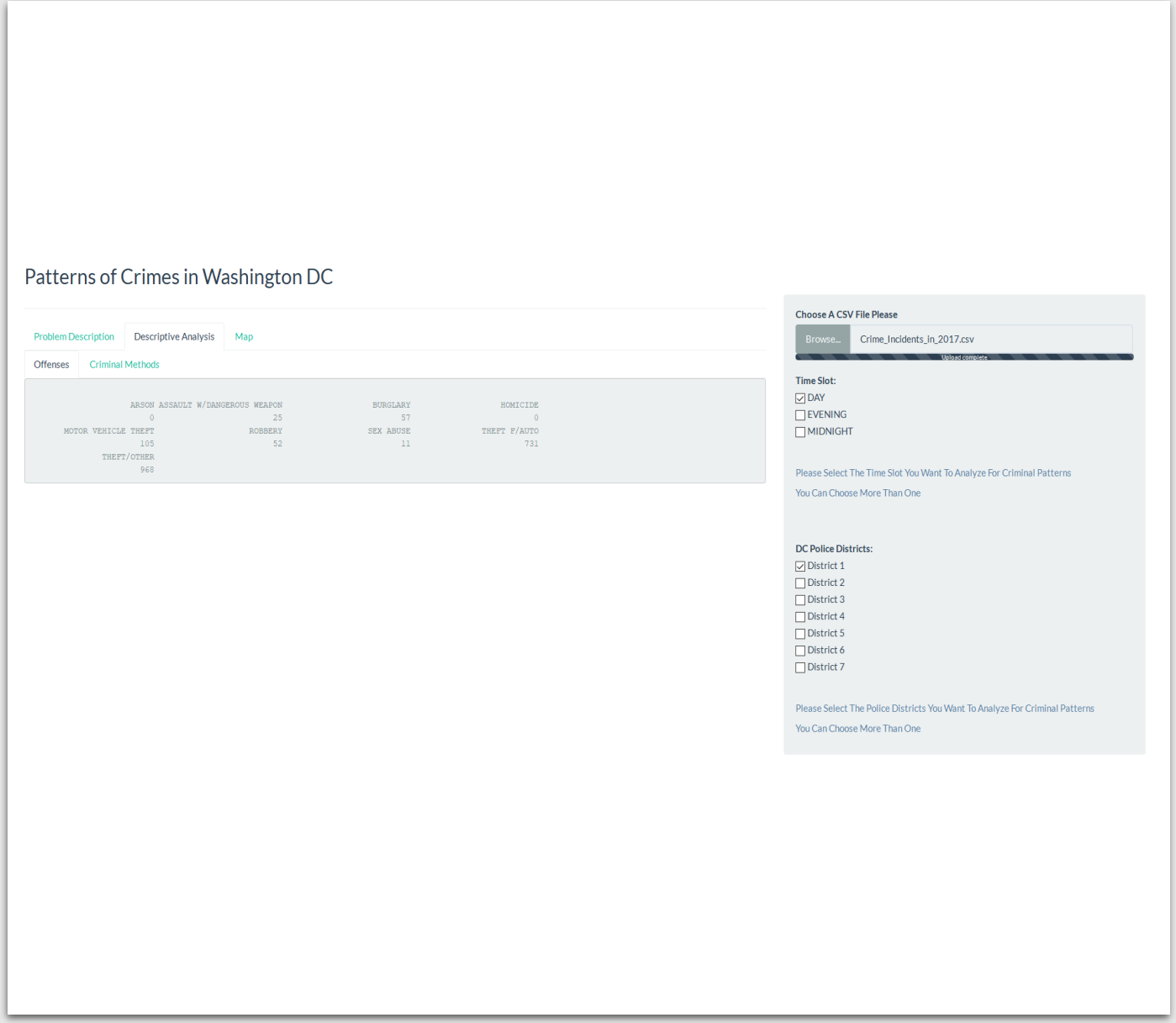


server.R (v5)

- **Create an output variable for problem description**
- Create a map output variable
- Connect to the sidebar of file input
- Read input file
- Filter the data for different time slots and different districts
- Create colors with a categorical color function
- Create the leaflet function for data
- Set the default view
- Provide tiles
- Add markers
- Add legends for different types of crime

ui.R (v6)

- Application title
- Sidebars
  - Read file
  - a multiple checkbox for time slots
  - a multiple checkbox for police districts
- Main panel
  - Problem description
  - **Descriptive Analysis (Offenses & Criminal Methods)**
  - DC Map with markers for different time slots and police districts



server.R (v6)

- Create an output variable for problem description
- **Create a descriptive table for different offenses**
- **Create a descriptive table for different criminal methods**
- Create a map output variable
- Connect to the sidebar of file input
- Read input file
- Filter the data for different time slots and different districts
- Create colors with a categorical color function
- Create the leaflet function for data
- Set the default view
- Provide tiles
- Add markers
- Add legends for different types of crime

Resources for Leaflet

- https://rstudio.github.io/leaflet/
- https://www.rstudio.com/resources/videos/mapping-in-r-with-leaflet/
- https://www.rdocumentation.org/packages/leaflet/versions/1.1.0
- https://allthisblog.wordpress.com/2016/10/12/r-311-with-leaflet-tutorial/
- https://shiny.rstudio.com/gallery/superzip-example.html