For this workshop you will need:

http://bit.ly/AS2019Slides - The code, slides and file you will need to load in the App (link below)

http://bit.ly/AS2019App - App (remember this requires the data in the zip file above)

Agile Analytics:

Using R Shiny to develop data analytics tools

Analytics Summit 2019

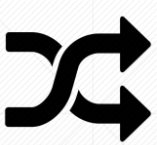
Eduardo Contreras Cortes

Motivation

SELECTED ITEMS FROM THE AGILE MANIFESTIO

(http://agilemanifesto.org/principles.html):

Our highest priority is to **satisfy the customer** through early and **continuous delivery** of valuable software

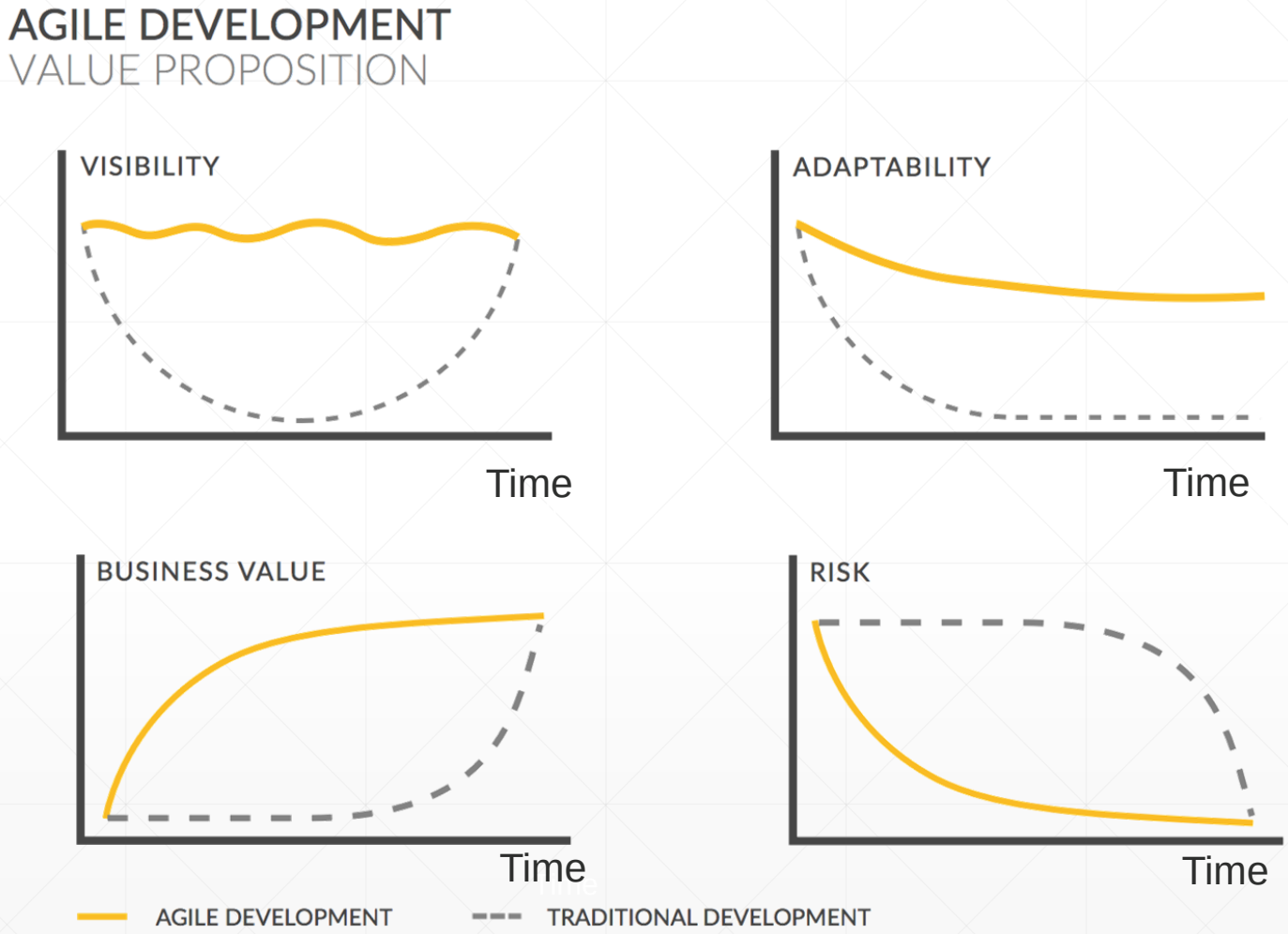


Welcome **changing requirements**, even late in development. Agile processes harness change for the customer's **competitive advantage**

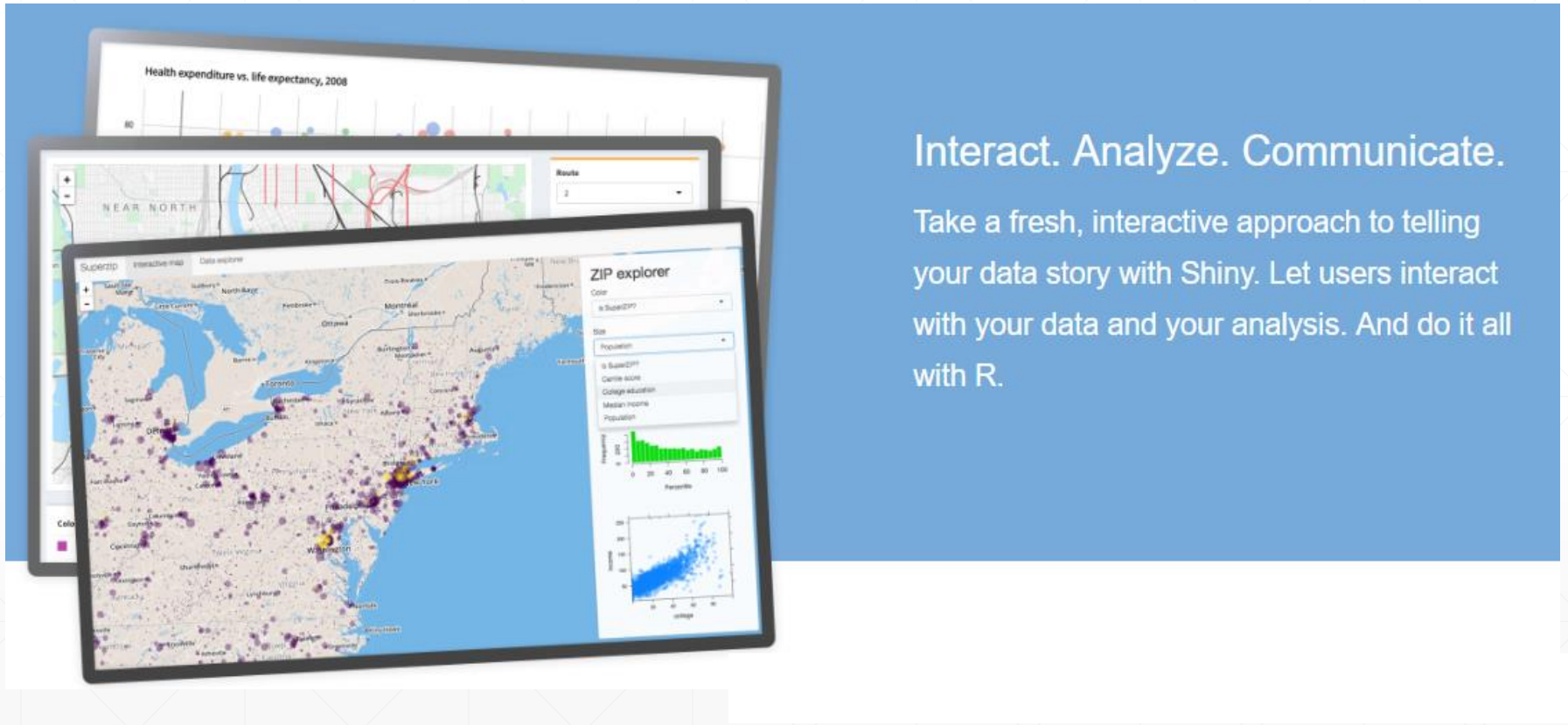
Working software is the primary measure of progress

Simplicity--the art of maximizing the amount of work not done--is essential

Motivation


AGILE DEVELOPMENT
VALUE PROPOSITION
VISIBILITY
Time
ADAPTABILITY
Time
BUSINESS VALUE
Time
RISK
Time
AGILE DEVELOPMENT
TRADITIONAL DEVELOPMENT

What is R Shiny?



R Shiny vs Other Tools

Data Visualisation Tools

Excel with VBA

Data Preparation Tools

Software Development

- It is Open Source
- Many libraries to save hours of coding
- Many tutorials to learn it
- Lots of support from community

R vs Python

Analysis Tool	Similar Superhero	Super Powers in Common
R 	Batman 	• Detective Work • Intelligence • Cunning • Usage of Tools • More Brain than Muscles
Python 	Superman 	• Muscle Power • Super Strength • Elegance • Wide Range • More Muscles than Brain

What will be covered?

- Load data from Excel
- Output data in a Table
- Plot data and filter source
- Calculate a logistic regression
- Download the model

What do you need to use R Shiny?

- **R and R Studio**
- **Shiny libraries**
- **Other useful libraries**
  - Plotly: Interactive Graphics
  - DT: Data tables outputs
  - Dplyr and Tidyr: Data Transformations
  - Smbinning: Produce summary statistics

Play time

- Lets give it a try to the app!

  http://bit.ly/AS2019App

- And to download the code and this slides

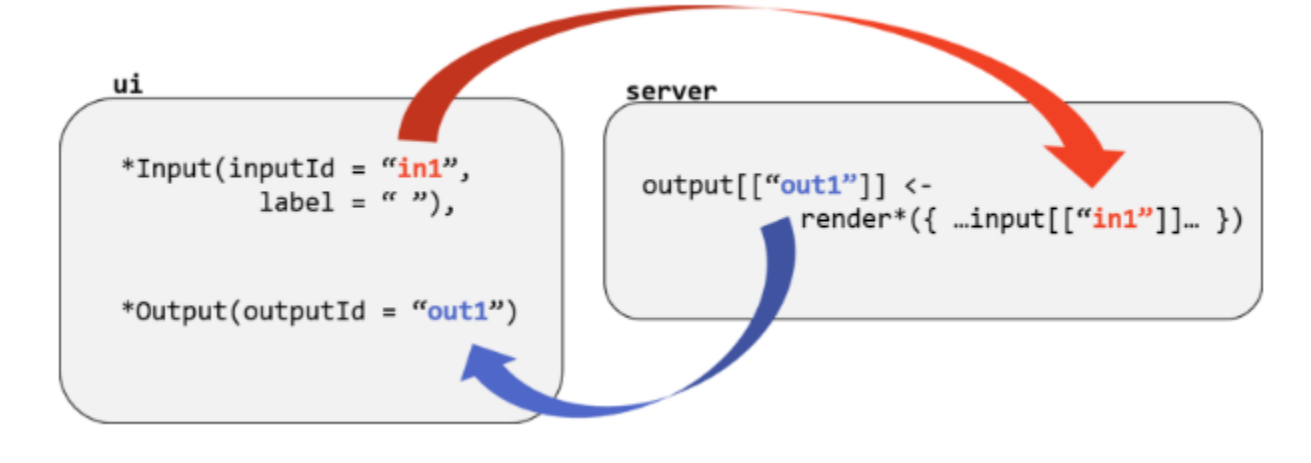
  http://bit.ly/AS2019Slides

Lets explore the App

- Load the Excel File
- Explore the dataset
- Plot only “Married” customers
- Calculate the logistic regression
- Download the Results

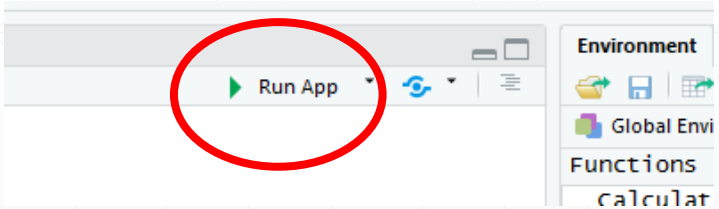
How does it works?

- It has two main components
  - The User Interface (UI)
  - The Server



The basics

- We will use Shinydashboard, makes it easy to use Shiny
- Lets Run the App by opening the UI.R file and click in Run APP

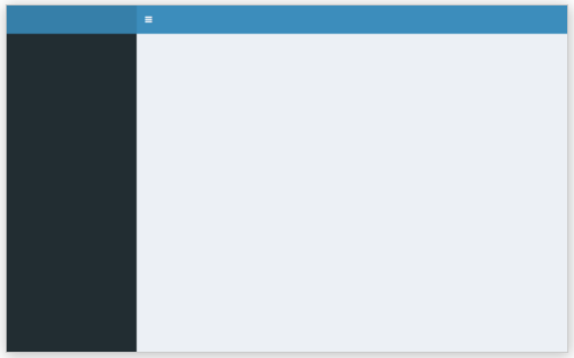


The basics

- **The dashboard has three parts: header, sidebar and body**

```
## ui.R ##
library(shinydashboard)

dashboardPage(
  dashboardHeader(),
  dashboardSidebar(),
  dashboardBody()
)
```



Basic Dashboard
Adding content to the Sidebar

```
sidebar <- dashboardSidebar(
  sidebarMenu( id= "tabs",

               menuItem("1. Load Data", tabName = "LoadData", icon = icon("upload")),
               menuItem("2. Interactive Plot", tabName = "InteractPlot", icon = icon("signal")),
               menuItem("3. Calculate Regression", tabName = "CalculateRegression", icon = icon("cogs")),
               menuItem("4. Download", tabName = "DownloadData", icon = icon("download"))
  )
)
```

Basic Dashboard
Adding content to the Body

```
body <- dashboardBody(
    tabItems(
      #First tab content
       tabItem(tabName = "LoadData",
              h2("Load Data"),
              fileInput("file", "Choose Excel File",multiple = TRUE,accept = c(".xlsx")),
              br(),
              tabsetPanel(
                tabPanel("Preview Data", fluidRow(column(width = 10, offset = 0,
                                                         DT::dataTableOutput("SummaryOfDataInputs")))),
                tabPanel("Brief insight about data",
                         fluidRow(plotlyOutput("plt_basic"))
                          )
              )
            ),
       #Second tab content
       tabItem(tabName = "InteractPlot",
                     h2("Interactive Plot"),
                     br(),
                     fluidRow(box("Select Marital Status",uiOutput("ui"))),
                    br(),
                     fluidRow(column(width = 10, offset = 0,plotlyOutput("filterPlot", height = 200)))
              ),
       #Third tab content
       tabItem(tabName = "CalculateRegression",
              h2("Calculate Regression"),
              br(),
              fluidRow(box("Click to calculate regression",
                           br(),
                           actionButton("ab_CalculateRegression","Calculate Regression")),
                       br()),
                       fluidRow(column(width = 10, offset = 0,DT::dataTableOutput("ModelResults")))
              ),
       #Fourth tab content
```

And the last step…
Adding the Header

```
# Put them together into a dashboardPage
shinyUI(dashboardPage(skin = "black",
                      dashboardHeader(title = "Shiny Dashboard"),
                      sidebar,
                      body
))
```

All events triggered are in the Server File

```
shinyServer(function(input, output, session) {

  #Load Any external File
  source("HelperFunctions.R")

  #Event to load files
  observeEvent(input$file, {
    if (is.null(input$file)) {
      # User has not uploaded a file yet
      return(data.frame())
    }  else{
      CreateRequiredDataFrames <- CreateDataFrames(input$file)

    }
  })

  #Output for Table Loaded
  output$SummaryOfDataInputs <- DT::renderDataTable({
    if (!is.null(input$file))
    {
        DT::datatable(FullData, options = list(pageLength = 10,
                                               searching = FALSE, scrollX = TRUE,
                                               scrollY = TRUE))

    }
  })
```

And you can link to other files as a way to organise your code better

HelperFunctions.R

Source on Save

```r
#Function to create dataframes
CreateDataFrames <- function(ListOfFileDf) {

  withProgress(message = 'Creating data frames', value = 0, {

    #Loading data with read_excel
    incProgress(1/3, detail = " Loading data")
    file <- read_excel(ListOfFileDf[[1, 'datapath']],sheet=1)
    file <- as.data.frame(unclass(file))

    #Do a quick filter with dplyr
    incProgress(2/3, detail = "Transforming Data")
    FullData <- file %>% filter(MAX_BILL<1000000 & !is.na(SEX) & !is.na(EDUCATION))

    incProgress(3/3, detail = "Data Loaded")
    assign('FullData',FullData,envir = .GlobalEnv)

  })
  return(ListOfFileDf)
}

#Funciton to calculate Logistic Regression
CalculateLogistic <-function(){

  # Formula for logistic regression

  logisticreg<-glm(formula=default ~AVG_BILL+AVG_PAY_AMT  , family = binomial, data = FullData)
  logisticregdf<-as.data.frame(summary(logisticreg)$coefficients)
  assign('logisticregdf',logisticregdf,envir = .GlobalEnv)

  Predict <- predict(logisticreg, data = FullData, type = "response")
  FinalDataScored<-cbind(FullData,Predict)
  assign('FinalDataScored',FinalDataScored,envir = .GlobalEnv)
}
```

Where to learn more…

- **R programming**
  https://www.coursera.org/learn/r-programming
- **Free Shiny Interactive Tutorial**
  https://www.datacamp.com/courses/building-web-applications-in-r-with-shiny
- **More tricks of Shinydashboard and actions**
  https://rstudio.github.io/shinydashboard/structure.html
  http://shiny.rstudio.com/gallery/widget-gallery.html
- **Gallery of plots with code**
  https://plot.ly/r/
- **Useful data transformations with Dplyr and Tidyr**
  https://dplyr.tidyverse.org/
  https://blog.rstudio.com/2014/07/22/introducing-tidyr/
- **Deploying your app to the web**
  - https://www.shinyapps.io/

Thanks!

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