



Shiny Real Estate App With the Zillow API

Matt Dancho & David Curry
Business Science Learning Lab





Learning Lab Structure

- **Presentation**
(20 min)
- **Demo's**
(30 min)
- **Pro-Tips**
(15 mins)



Matt Dancho

Founder of Business Science, Matt designs and executes educational courses and workshops that deliver immediate value to organizations. His passion is up-leveling future data scientists coming from untraditional backgrounds.



David Curry

Founder of Sure Optimize, David works with businesses to help improve website performance and SEO using data science. His passion is ethical Machine Learning initiatives.

Shiny API Series

- **Lab 28 - Shiny Real Estate App**

- Zillow API



- **Lab 29 - Shiny Oil & Gas App**

- Quandl API



- **Lab 30 - Shiny Finance App**

- Tidyquant API



- **Lab 31 - Shiny Marketing App**

- Google Analytics API



An advertisement for Learning Labs Pro, showing three people working on laptops. The text reads: 'Learning Labs Pro Community-Driven Data Science Courses' and '\$19/m'. It also features a profile picture of Matt Dancho.

Learning Labs PRO

Every 2-Weeks

1-Hour Course

Recordings + Code + Slack

\$19/month

university.business-science.io

Lab 27 - Marketing Series, Pt 4
Google Trends Automation with Shiny

Lab 26 - Marketing Series, Pt 3
Customer Journey with Machine Learning

Lab 25 - Marketing Series, Pt 2
Attribution with ChannelAttribution

Lab 24 - Marketing Series, Pt 1
A/B Testing with Infer

Lab 23 - SQL Series
SQL with BigQuery & Conversion Funnel

Lab 22 - SQL Series
SQL for Time Series

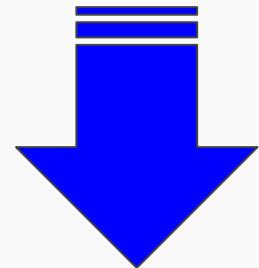
Lab 21 - SQL Series
SQL for Data Science

Lab 20 - Machine Learning
Explainable Machine Learning

Lab 19 - Network Analysis
Using Neo4j to Build Graphs with R



Continuous Learning
Advanced Topics



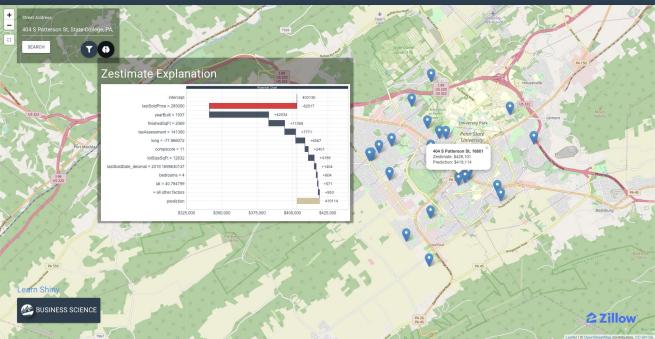
Learning Labs Pro

Community-Driven Data Science Courses

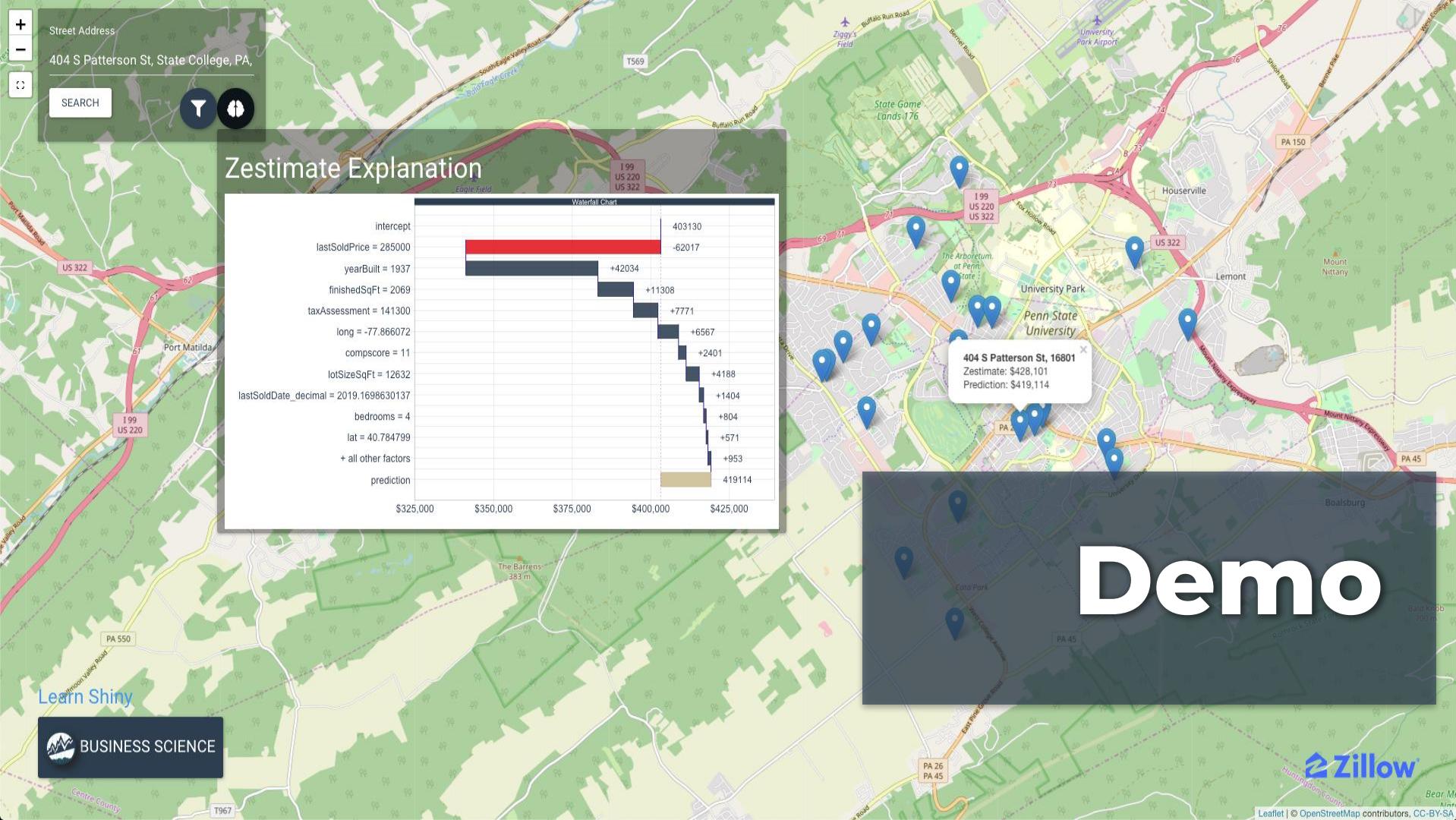
Matt Dancho

\$19/m

Agenda



- **Demo**
 - Shiny App that Emails Reports to Coworkers
 - **30-Min Demo**
 - Zillow API
 - ML Workflow
 - Shiny Crosstalk
 - Real Estate App [LL PRO]
 - **Why a Zillow App?**
 - Helping Realtors,
Mortgage Companies,
& People
 - **Pro-Tips & Learning Guide**
 - **ML Workflow**
 - Zillow
 - Parsnip & DALEX
 - Shiny + Crosstalk



Why make a Zillow App? Real Estate

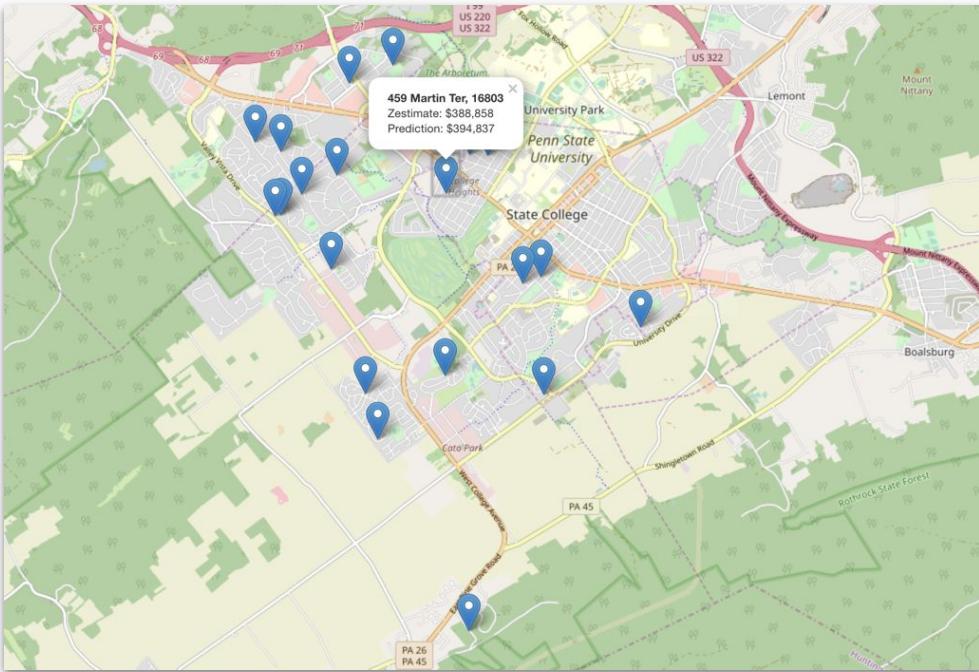


My wife is a realtor

Data is a **huge part** of what she provides her clients.

A step in that process is analyzing **comparable homes**

She provides guidance on how to price the home (**sellers**) and how much to pay for homes (**buyers**)



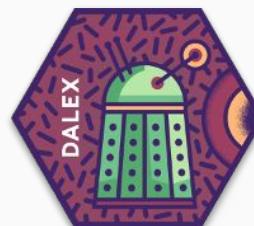


How an app can help

Zillow has a vast amount of data on homes:

- Number of Bedrooms
- Square Footage
- Neighborhood

We can use this data to understand which **features drive price**





Benefits

Buyers and Sellers
understand why the market
accepts the price

A large, gold-colored 3D sign spelling "BANK" in capital letters is mounted on the side of a modern skyscraper with a glass facade. The sign is illuminated from behind, creating a bright, metallic appearance against the dark glass.

Benefits

Mortgage companies can better understand how to appraise the property

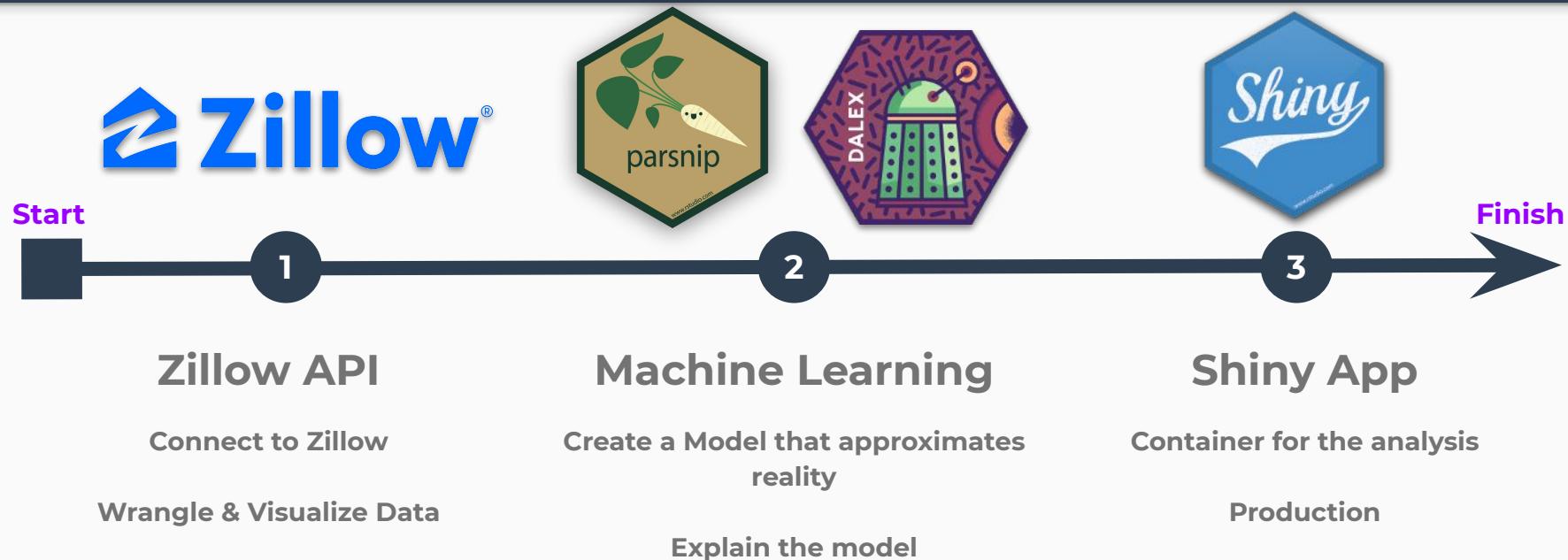
Benefits

People like you and me get the
home of your dreams



Machine Learning Workflow

Workflow Step-By-Step





Crosstalk is an add-on to the `htmlwidgets` package. It extends `htmlwidgets` with a set of classes, functions, and conventions for implementing cross-widget interactions (currently, linked brushing and filtering).

Play with the example below by manipulating the slider, clicking rows in the data table, and playing with the selection button in the map.

Magnitude

	lat	long	depth	mag	stations
308	-22	180.53	583	4.9	20
258	-19.18	169.33	254	4.7	35
552	-20.33	168.71	40	4.8	38
57	-22.7	181	445	4.5	17
467	-15.61	167.5	135	4.4	21
482	-14.85	184.87	294	4.1	10
808	-20.07	181.75	582	4.7	27
368	-18.3	183.2	103	4.5	14
543	-15.86	166.85	85	4.5	22
169	-23.43	180	553	4.7	41

Showing 1 to 10 of 100 entries

Leaflet | © OpenStreetMap contributors, CC-BY-SA

30-Min Demo

Let's do this!

PRO-TIPS

Yeahhhhhh!

Pro-Tip #1: Make your interface simple



No

A screenshot of a complex data visualization interface titled "shinyHome". The interface is divided into several sections:

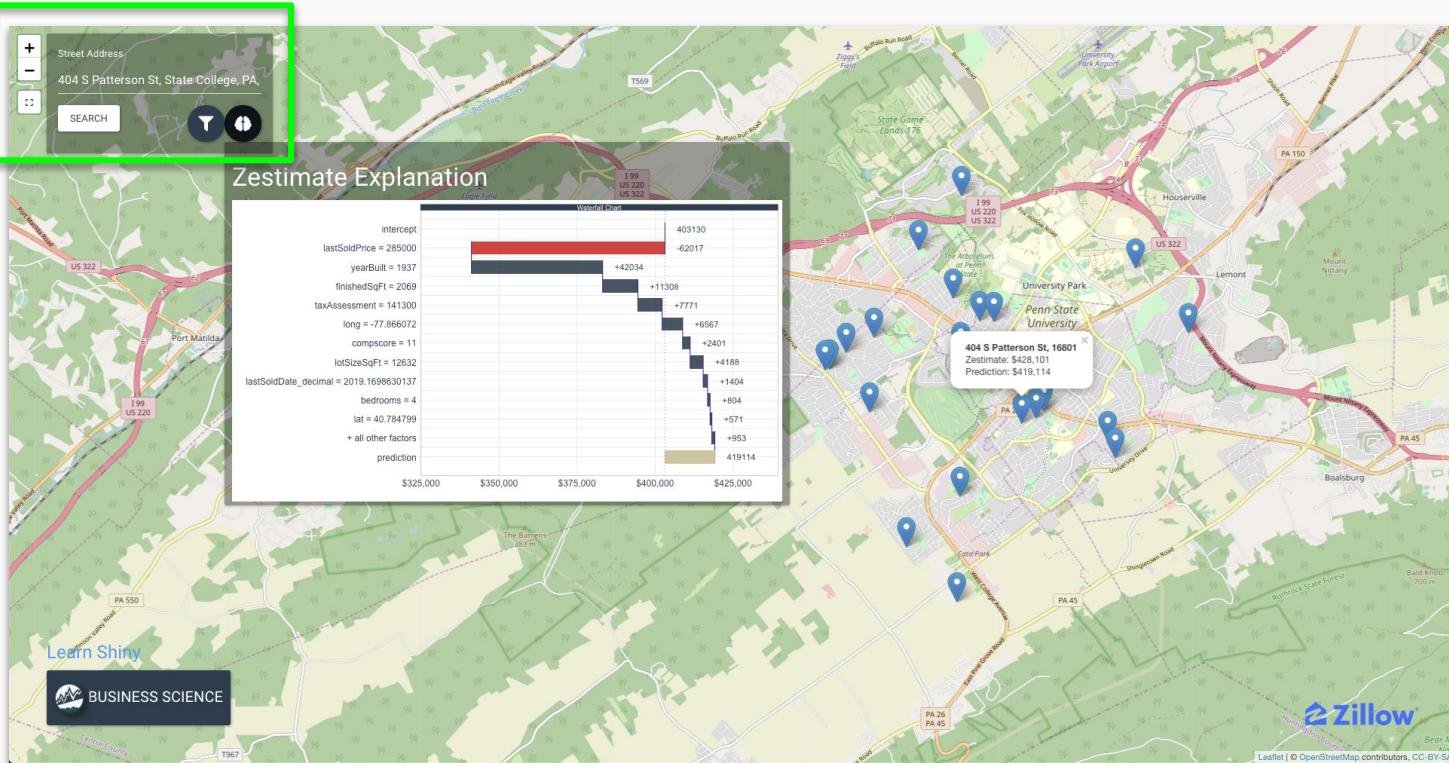
- Left Sidebar:** Labeled "shinyHome". It contains a navigation menu with the following items:
 - Dashboard
 - Market Explorer
 - Value Analyzer
 - Forecast Modeler
 - Train Models
 - Compare Models
 - Market Forecaster
 - Help
- Query Builder:** A panel with a red border containing:
 - Level of Analysis:** Radio buttons for State, County, City, and Zip. "County" is selected.
 - State:** A dropdown menu showing "Georg" (partially visible).
 - Home Value Range (\$000):** A slider from 0 to 1,800. The current range is highlighted in yellow, indicating "1,000".
 - Include all values exceeding \$2m
 - Time Horizon:** A dropdown menu showing "1M".
- Market Data:** The main content area.
 - Value Growth by Value Scatterplot:** A scatterplot showing Percent Value Growth on the Y-axis (0 to 20) versus Median Home Value on the X-axis (100k to 300k). Data points are colored by value, ranging from dark purple (low value) to bright yellow (high value).
 - Distribution of Median Home Values:** A histogram showing the distribution of median home values.
 - Markets Table:** A table showing market data for Georgia, Haralson county. The table includes columns for StateName, County, Value, and Annual.

StateName	County	Value	Annual
Georgia	Haralson	97300	0.1737033

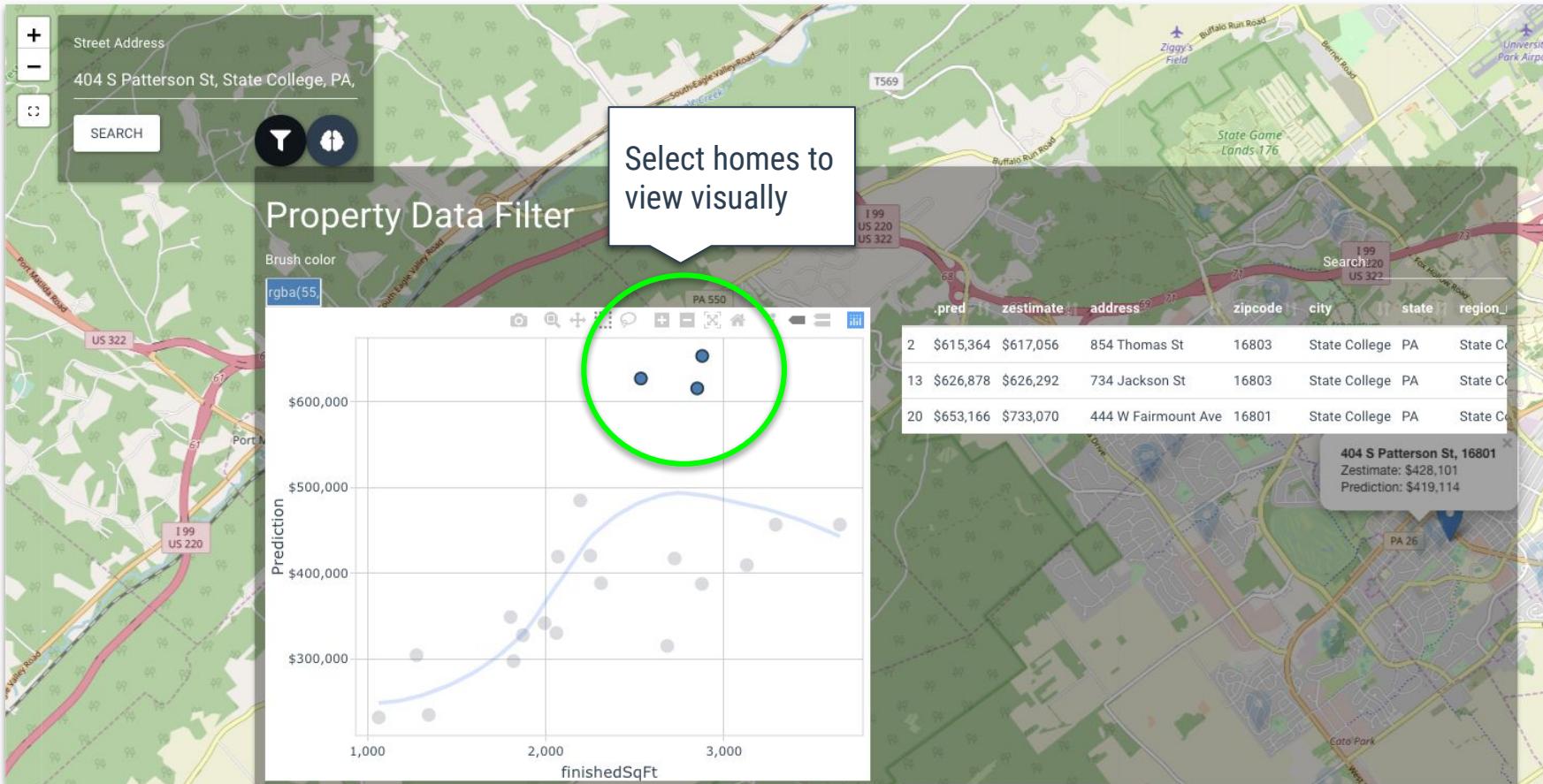


Pro-Tip #1: Make your interface simple

Yes



Pro-Tip #2: Use visual filtering



Pro-Tip #3: Find ways to go beyond reporting



Give Businesses Apps

Businesses **can't** scale reports

Businesses **can** scale shiny

Let your audience interact with the analysis & **make good decisions**

A screenshot of a Shiny web application titled "Employee Attrition Prevention". The main interface features a background image of three diverse business professionals. A yellow callout box with the text "H2O.ai" has arrows pointing from it to the "Attrition Risk" button and the "Prediction" section. On the left, there's an "Employee Card" for "Denise Mooney" showing her department as "Sales" and job role as "Sales Executive", with a dplyr hex icon. In the center, under "Cause & Prevention Recommendations", there's a table of factors like "OverTime = Yes" and "StockOptionLevel = 0", with a ggplot2 hex icon next to a bar chart. To the right, there are two recommendation cards: "Personal Development Recommendation" (Seek Mentorship Role) and "Professional development Recommendation" (Professional development Recommendation).

The dashboard illustrates how machine learning can be used to prevent employee attrition by providing personalized risk assessments and actionable recommendations.

Use Machine Learning & Explainable ML to **help decision making**

4-Course R-Track System



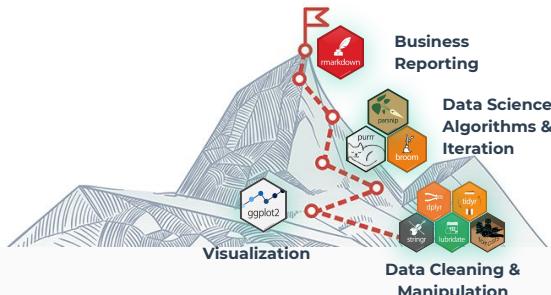
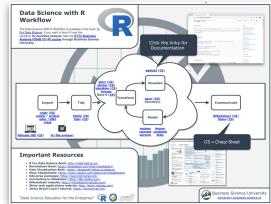
Business Analysis with R (DS4B 101-R)

Data Science For Business with R (DS4B 201-R)

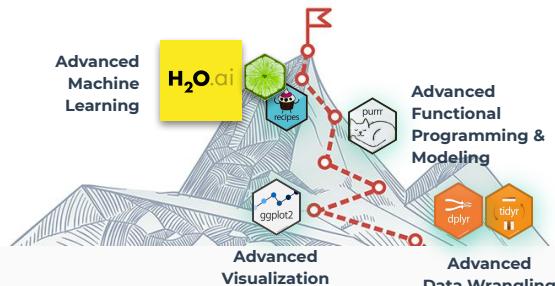
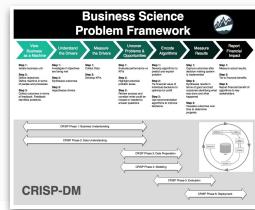
Web Apps & Shiny Developer (DS4B 102-R + DS4B 202A-R)

Project-Based Courses with Business Application

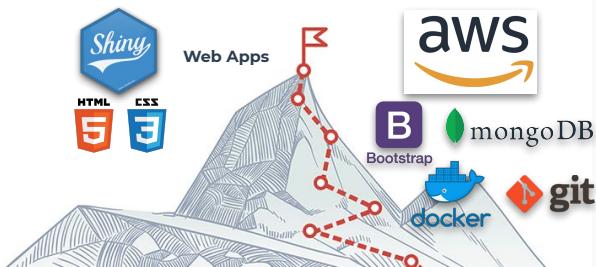
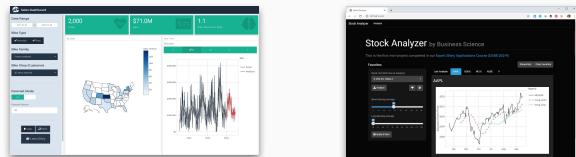
Data Science Foundations
7 Weeks



Machine Learning & Business Consulting
10 Weeks



Web Application Development
12 Weeks

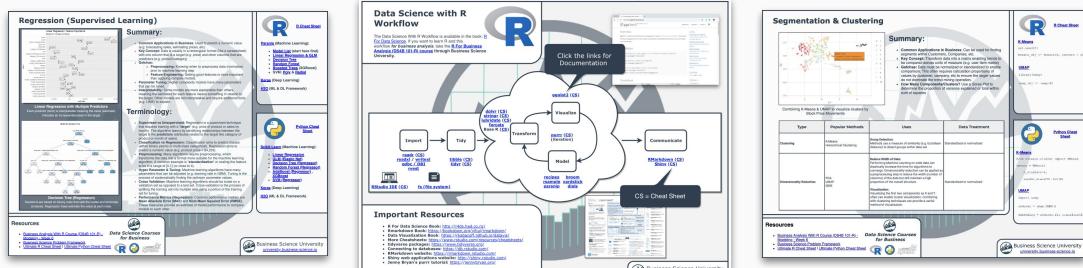


Key Benefits

- Fundamentals - Weeks 1-5 (25 hours of Video Lessons)
 - Data Manipulation (dplyr)
 - Time series (lubridate)
 - Text (stringr)
 - Categorical (forcats)
 - Visualization (ggplot2)
 - Programming & Iteration (purrr)
 - 3 Challenges
- **Machine Learning - Week 6 (8 hours of Video Lessons)**
 - Clustering (3 hours)
 - Regression (5 hours)
 - 2 Challenges
- Learn Business Reporting - Week 7
 - RMarkdown & plotly
 - 2 Project Reports:
 1. Product Pricing Algo
 2. Customer Segmentation

Business Analysis with R (DS4B 101-R)

Data Science Foundations
7 Weeks



Key Benefits

End-to-End Churn Project

Understanding the Problem & Preparing Data - Weeks 1-4

- Project Setup & Framework
- Business Understanding / Sizing Problem
- Tidy Evaluation - rlang
- EDA - Exploring Data -GGally, skimr
- Data Preparation - recipes
- Correlation Analysis
- 3 Challenges

Machine Learning - Weeks 5, 6, 7

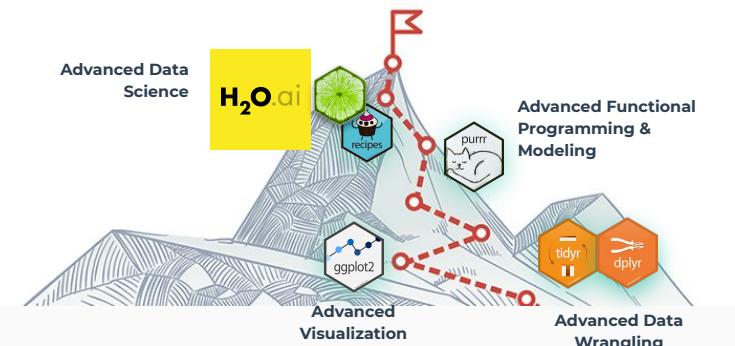
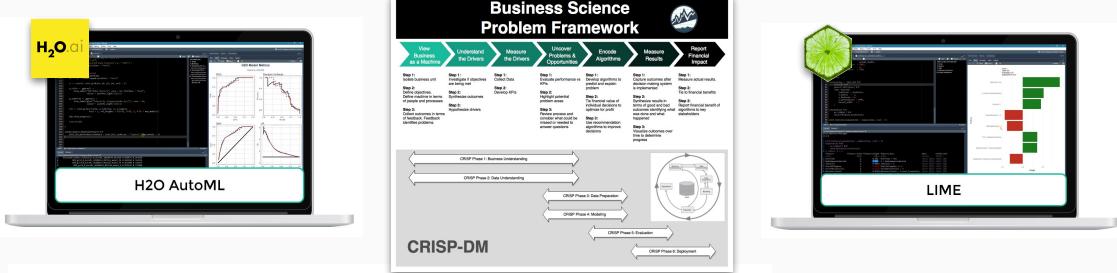
- H2O AutoML - Modeling Churn
- ML Performance
- LIME Feature Explanation

Return-On-Investment - Weeks 7, 8, 9

- Expected Value Framework
- Threshold Optimization
- Sensitivity Analysis
- Recommendation Algorithm

Data Science For Business (DS4B 201-R)

Machine Learning & Business Consulting
10 Weeks



Key Benefits

Learn Shiny & Flexdashboard

- Build Applications
- Learn Reactive Programming
- Integrate Machine Learning

App #1: Predictive Pricing App

- Model Product Portfolio
- XGBoost Pricing Prediction
- Generate new products instantly

App #2: Sales Dashboard with Demand Forecasting

- Model Demand History
- Segment Forecasts by Product & Customer
- XGBoost Time Series Forecast
- Generate new forecasts instantly

Shiny Apps for Business (DS4B 102-R)



Web Application Development
4 Weeks

The collage includes:

- A "Data Science with R" course page featuring a "Predictive Pricing App" dashboard.
- A "Flexdashboard Apps" section showing a dashboard with a map of the US and time series plots.
- A "Shiny Apps" section showing a dashboard with a scatter plot and a histogram.
- A "Themes, Dashboards, & Examples" section showing a dashboard with multiple panels and a sidebar.
- A "Business Analytics" section showing a dashboard with a map and a bar chart.
- A "Machine Learning" section showing a dashboard with a scatter plot and a sidebar.
- A "Data Science with R" course page featuring a "Sales Dashboard with Demand Forecasting" dashboard.



The collage includes:

- A "Shiny" logo and a bar chart.
- A "DATA ANALYTICS" section with a large blue "R" icon.
- A "Machine Learning" section with a green gear icon.
- A "Shiny" logo and a bar chart.
- A "DS4B 102-R: Shiny Web Applications for Business (Level 1)" course page.
- A "Build a predictive web application using Shiny, Flexdashboard, and XGBoost" section.
- A photo of Matt Dancho.

Key Benefits

Frontend + Backend + Production Deployment

Frontend for Shiny

- Bootstrap

Backend for Shiny

- MongoDB
- Dynamic UI
- User Authentication
- Store & Write User Data

Production Deployment

- AWS
- EC2 Server
- VPC Connection
- URL Routing

Shiny Apps for Business (DS4B 202A-R)



Web Application Development
6 Weeks



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R-TRACK BUNDLE

4-Course Bundle - Machine Learning + Expert Web Applications (R-Track)

Go from Beginner to Expert Data Scientist & Shiny Developer in Under 6-Months

4 Course Bundle ~~\$1,500~~

**\$127/mo
Limited Time**

DS4B 101-R: Business Analysis With R

Your Data Science Journey Starts Now! Learn the fundamentals of data science for business with the tidyverse.

Matt Dancho

DS4B 102-R: Shiny Web Applications For Business (Level 1)

Build a predictive web application using Shiny, Flexdashboard, and XGBoost.

Matt Dancho

DS4B 201-R: Data Science For Business With R

Solve a real-world churn problem with H2O AutoML (automated machine learning) & LIME black-box model explanations using R.

Matt Dancho

DS4B 202A-R: Expert Shiny Developer with AWS

Learn how to build Scalable Data Science Applications using R, Shiny, and AWS Cloud Technology.

Matt Dancho

<input type="radio"/>	Paid Course 15% COUPON DISCOUNT	\$1,596 \$2,356.60
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