Incorporating Data from the Application Programming Interface (API) Ecosystem to Inform Business and Marketing Decisions

Fall, 2020

1 Required and Recommended Materials

- R or Python
- Insomnia
- Course Notes (To Be Handed Out)

2 Course Description

Majors sources of data and databases have started to move from more traditional online information systems towards data access via Application Programming Interfaces. Despite the easy accessibility of large datasets, mostly free of cost, the level of background knowledge that is needed to access these endpoints where data is freely available remains extensive. In this course, we will cover the fundamentals of data gathering techniques from APIs. Students will learn how a basic API works on a conceptual level, how to find and read the documentation for any API endpoint usage, how to write and test queries to APIs, understand the basic Request/Response framework, understand the differences between traditional API endpoint structures and Graph structures, cover common applied business APIs such as Yelp, Twitter, and others, as well as how to leverage popular statistical software such as R and Python to automate the data gathering process from APIs.

3 Learning Outcomes

- Understand how a basic API works on a conceptual level
- Acquire a fundamental understanding of the Request/Response model

- How to learn how to use any data-provider's API
- Understand the common types of APIs that many organizations currently use for business applications.
- Know how to integrate the usage of API access into applied business analytics applications.

4 Prerequisites

Background in R or Python would be helpful.

5 Course Format

This course will meet twice in person and once online. Our in person sessions will last for 4 hours, while our online session will be conducted synchronously at a pre-scheduled time via Zoom.

6 Evaluation

Lab 1	20%
Lab 2	20%
Lab 3	20%
Final Project	40%

7 Labs

Each day will comprise of a Lab, which will be step-by-step instructions going through lines of R/Python code. You will be expected to follow the code as we go line by line together. Parts of each lab, after demonstrating some of the basic functionalities in R/Python pertaining to API access, will comprise of solving problems using the code demonstrated throughout the first part of each lab. Each student is expected to work on their labs individually and in class. The same hold for our virtual session as well. Each lab will comprise of 5 - 10 problems that need to be solved using the topic material and previously demonstrated code in that day. Labs are to be submitted virtually, with a "mini-report" and well-documented code.

8 Final Project

The final project will entail selecting an API not demonstrated in class and writing code to pull down very specific data. Not only will you leverage the code you learn in this class to write your own, but you will also be required to write up a report detailing different facets of your project. Your report must explain the following:

- The name of the API and the hyperlink.

- The method of authentication.
- A description of the most important and relevant endpoints.
- For each endpoint, a write-up of the input parameters, and what each one does.
- The data format that the API returns via responses.
- The use of a minimum of 3 endpoints.
- The exact query strings which were used to request the data.
- An Excel spreadsheet which contains the data. The spreadsheet MUST be auto-generated from R/Python.
- A description of how the data can be used to help guide decision making within marketing applications.

9 Course Schedule

- Day 1: Basics of Application Programming Interfaces
  - Review of R/Python
  - The Basic Application Programming Interface Model
  - Common Data Formats
  - Your First API Query!
- Day 2: How to Learn a New API
  - Authentication and Authorization
  - Writing API Request Queries
  - Basics of API Documentation
  - Graphs: A New Paradigm for APIs
- Day 3: Gathering Data from Popular APIs
  - Working with Social Media APIs
  - Other Popular APIs, and How to Use Them