Manipulating Time Series Data in R

2022-05-16

*This course will introduce learners to working with time series data in R. Learners will explore how to store and format data in date and time objects as well as how to manipulate time series datasets through subsetting, indexing, and extraction. Examples of time series data across a variety of fields in business and science should be discussed. The course will cover summarization, frequency, missing data, resampling, and comparison techniques as well as window functions for both rolling and expanding windows.*

**Course Outline:**

# 1 Chapter 1: Introduction to Time Series Data

* Lesson 1.1: *What is Time Series Data*
  + LO: Learner will be able to understand the foundations of time series data: rather than just analyzing a variable over time, study *how* that variable changes with time.
* Lesson 1.2: *Interpreting a Time Series*
  + LO: Learner will be able to interpret a time series graph, understanding the x- and y-axes, trend, repeated periods, etc.
  + LO: While seasonality is outside the scope of this course, it is important for learners to at least recognize the difference between periodic and non-periodic data.
* Lesson 1.3: *Temporal data classes in R*
  + LO: Introduction to different formats for temporal data in R, such as the Date, numeric, and character formats:
    - e.g.: 2022-01-30, 19022, and “2022-01-30” share the same information, but in different formats
  + LO: Learners will be able to check classes of data stored as vectors or as columns in a dataframe or tibble.
    - class()
* Lesson 1.4: *Converting between data classes*
  + LO: Learners will be able to convert between classes in R, such as converting a character vector to a Date vector
    - as.Date(), as.numeric(), as.character()

# 2 Chapter 2: Time Series objects in R

* Lesson 2.1: *How does R store Time Series Data?*
  + LO: Learners will be introduced to ts objects in R, and how they store data differently than objects like vectors or data frames
  + LO: Check whether an R object is a