

Time Series Analysis & Forecasting Using R

An aerial photograph of a city skyline during sunset. The sky is a mix of orange, yellow, and light blue. In the foreground, there's a green field and some trees. The middle ground is filled with various buildings, including several tall skyscrapers. The background shows more distant city structures and hills under a hazy sky.

Introduction

Bahman Rostami-Tabar

Instructor: Bahman Rostami-Tabar

- Associate Professor of Business Analytics & Management Science, Cardiff University
- Founder & Chair, Forecasting for Social Good, International Institute of Forecasters
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International Institute of Forecasters

- a nonprofit organization founded in 1982, is dedicated to developing and furthering the generation, distribution, and use of knowledge on forecasting
- Forecasting for Social Good

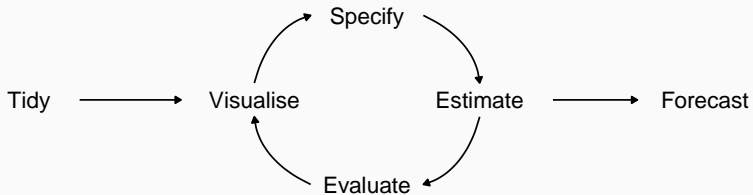
Assumptions

- This is not an introduction to R. We assume you are broadly comfortable with R code, the RStudio environment and the tidyverse.
- This is not a statistics course. We assume you are familiar with concepts such as the mean, standard deviation, quantiles, regression, normal distribution, likelihood, etc.
- This is not a theory course. We are not going to derive anything. We will teach you time series and forecasting tools, when to use them, and how to use them most effectively.

Approximate outline of the workshop

Session	Topic
1	Introduction
2	Prepare data (tidy)
3	Time series patterns and graphics
4	Time series features
5	Introduction to forecasting
6	Forecaster's toolbox-part 1
7	Forecaster's toolbox- part 2
8	Exponential smoothing models
9	ARIMA models
10	Time series regression
11	Dynamic regression

Tidy workflow



Key reference

Hyndman, R. J. & Athanasopoulos, G.
(2022) *Forecasting: principles and
practice*, 3rd ed.

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[OTexts.org/fpp3/](https://otexts.org/fpp3/)

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■ Recommended

- ▶ Profit From Your Forecasting Software
- ▶ Principles of Business Forecasting
- ▶ Managerial Demand forecasting

Install required packages

Please bring your own laptop and install the latest version of R and Rstudio

Install packages

```
library(tidyverse)
library(fpp3)
library(GGally)
library(sugrrants)
library(astsa)
library(dygraphs)
library(xts)
library(ggthemes)
```

Schedule for each day

Time	Activity
09:00 - 10:30	Session 1
10:30 - 11:00	<i>Coffee break</i>
11:00 - 12:30	Session 2
12:30 - 13:30	<i>Lunch break</i>
13:30 - 15:00	Session 3
15:00 - 15:30	<i>Coffee break</i>
15:30 - 17:00	Session 4

Poll: How experienced are you in forecasting and R

Please complete the pools:

Pool