TimeGPT: Leveraging Generative AI for Time Series Forecasting in R

Key words: time series, forecasting, foundation models.

Abstract

Time series data - which means data with a timestamp - is almost everywhere: from finance, to retail, to healthcare and many more. Time-series forecasting aims to leverage this data to predict future events, such as sales, financial markets, inventory levels, or energy consumption. Until now, forecasting has traditionally been hard, confusing and expensive.

In this talk, we'll explain how R users can leverage generative AI for time series forecasting. We'll introduce TimeGPT, the first foundation model for time series forecasting developed by Nixtla, and nixtlar, an R package now available on CRAN that brings TimeGPT's capabilities to the R community.

TimeGPT can produce accurate forecasts for new time series without training, using only historical values as inputs. The model 'reads' time series data similarly to how humans read a sentence—sequentially from left to right. It looks at windows of past data, which we can think of as "tokens", and predicts what comes next. This prediction is based on patterns the model identifies in past data and extrapolates into the future. The nixtlar package provides an interface to TimeGPT, allowing users to leverage its forecasting capabilities to predict future events. It can also be used for other time series-related tasks, such as what-if scenarios, anomaly detection, and more. TimeGPT was originally developed in Python, and with nixtlar, all these functionalities are now accessible to R users.

We will demonstrate how anyone can use TimeGPT via nixtlar and will showcase its capabilities through a live demo. This presentation will highlight how generative AI is revolutionizing time series forecasting within the R ecosystem.