In the stock market, technical indicators developed over a century are regarded as the analysis tools to help determine the market trend of an asset using the information of historical price and volume.

Even though technical indicators were designed for low-frequency data, e.g., daily frequency, numerous efforts have been made to explore their ability to predict high-frequency intraday financial data. Recently, technical indicators contributed to the prediction of intraday stock momentum whenever the sampling frequency is hours, minutes, or even ticks.

Yamawaki explored the effectiveness of several frequently used technical indicators relevant to intra-day motions based on three categories: trend, momentum, and volatility for several ticks ahead trend predictions of NYSE stock prices. Song selected eight common types of technical indicators, such as moving average, relative strength, and price oscillator, to predict the trend direction of the KOSPI200 index 5 minutes ahead. In general, the profitability of technical indicators has shifted from low-frequency to intraday due to the adaption of the increasing speed of stock transactions. Related research about technical indicators is not limited to stock markets. \cite{Takahashi2018} and \cite{Ozturk2016} demonstrated that the profitability of using technical indicators for intraday price prediction applies to bitcoin, foreign exchange, and markets of index futures.

Technical indicators, a type of time series data, were produced by applying mathematical formulas to time-series data. Technical indicators can be classified into three groups: trend, momentum, and volatility-based indicators \cite{Ozturk2016}. In section 5, all the technical indicators listed on the “TTR” package were calculated on daily standardized time series. The package of “TTR” is a collection of 55 technical indicators for creating the technical trading rule. The technical indicators in this package covered three groups (trend, momentum, and volatility) very well. There are two reasons we calculated all the technical indicators listed: 1) One of our benchmark models in section \ref{enhancing} - random forest model is not sensitive to the input features, which may have multicollinearity with each other; 2) we may find the essential technical indicators among listed 55 for the target we prepared.