A Predictor Based Method for Signal Detection in Time Series Data, Case Study: Financial Markets of Iran in Corona Virus Pandemi.

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Abstract

In this paper, we study the detection of signals in time series data, particularly within the context of the financial markets. By analyzing historical data from auxiliary markets, such as foreign exchange rates, stock indices, and cryptocurrency prices, we aim to identify significant signals affecting the cash price of refined gold in the Iranian market. Our approach leverages various time series models, including ARIMA, SARIMA, and neural networks, as well as regression-based time series methods to predict fluctuations in gold prices. We focus on a period of 45 working days before and after the onset of the COVID-19 outbreak in Iran on February 23, 2020.

To achieve this, we propose a predictor-based algorithm for signal detection that utilizes both traditional time series and regression models. This algorithm identifies auxiliary markets that correlate with the target market, fits appropriate models to predict future values, and then determines cloud confidence intervals around these predictions. Observations that deviate significantly from these intervals are flagged as potential signals, suggesting unexpected changes or trends in the target market.

Our method not only enhances the ability to detect significant signals in financial markets but also provides a valuable tool for investors and analysts to anticipate and respond to market fluctuations, particularly during periods of economic instability, ultimately contributing to more informed decision-making and risk mitigation strategies.

Keywords: Cloud Interval, Signal Detection, Time Series Data.

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