Impact of Environmental Factors

on Acute Myocardial Infarction

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June, 2024

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Dataset & Data Preparation

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- **Response variable:** Age Standardised Incidence Rate (ASIR)

- A total of **5** predictors - Humidity, Temperature, Ozone levels, Particulate Matter, Public holidays

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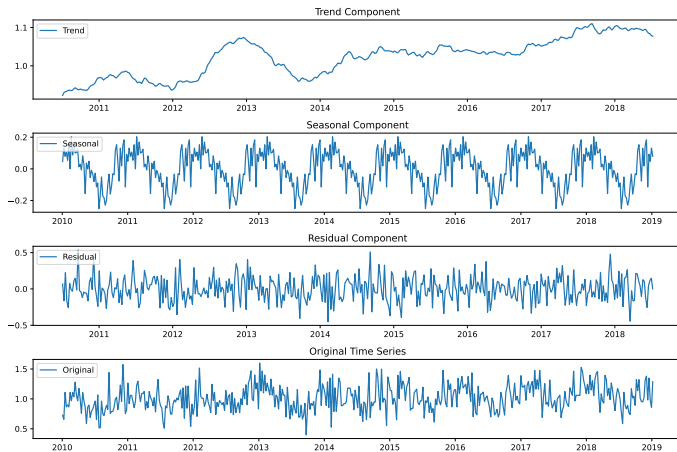
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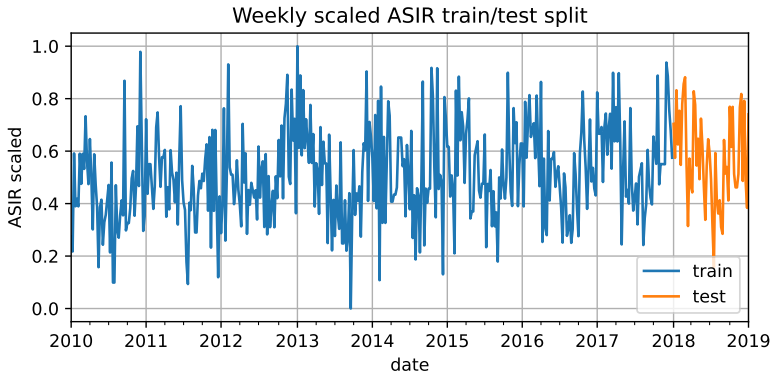- Allows comparisons between regions or over time periods.
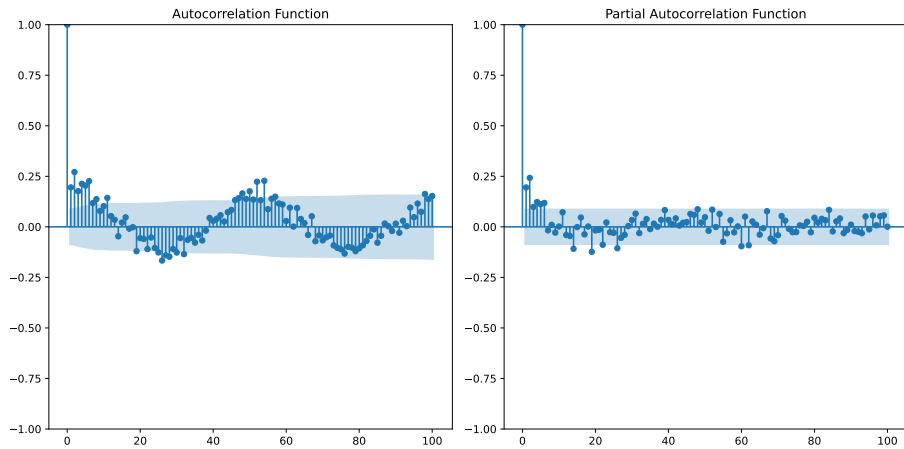
Target Variable - ASIR

Daily Age Standardised Incidence Rate for AT01
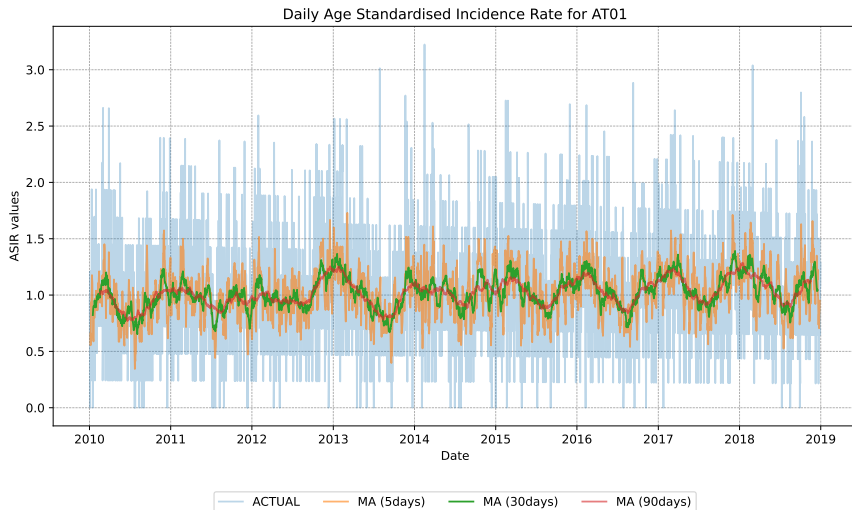
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Weekly scaled ASIR train/test split

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SARIMAX

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- **AR**: Autoregressive part that models the dependency between an observation and a number of lagged observations.

- **I**: Integrated part representing the differencing of raw observations to make the time series stationary.

- **MA**: Moving Average component that models the dependency between an observation and a residual error from a moving average model applied to lagged observations.

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By incorporating exogenous variables, SARIMAX can model the influence of external factors on ASIR.

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- can capture complex patterns and relationships to forecast future ASIR.
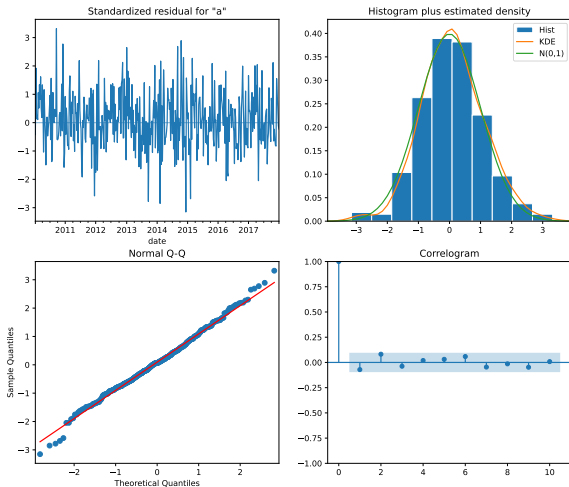
Results – SARIMAX
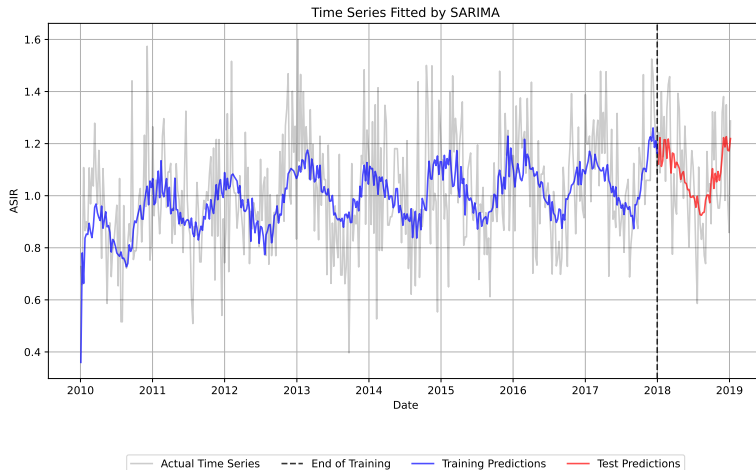
Time Series Fitted by SARIMA

Results - **SARIMAX**

- Maximum temperature (`max_temp`): A decrease of 1°C in maximum temperature is associated with a decrease of approximately 0.345 units in the Age-Standardized Incidence Rate (ASIR) of AMI.

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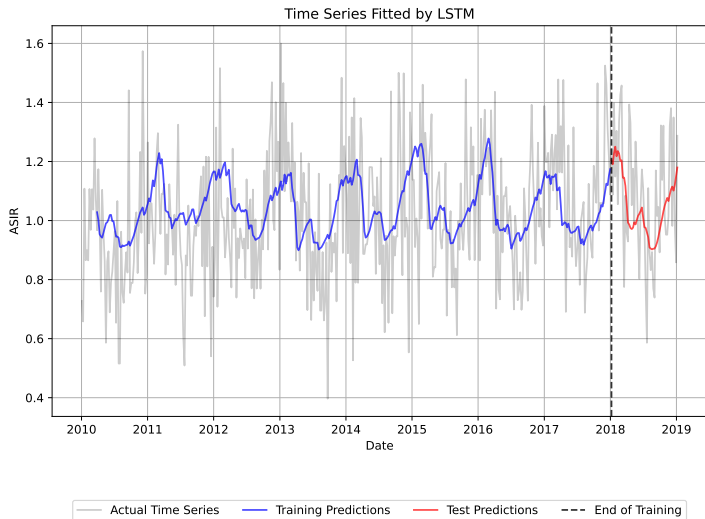
- Mean PM10 concentration (`mean_PM10`): An increase of 1 $\mu g/m^3$ in mean PM10 concentration is associated with an increase of approximately 0.146 units in ASIR of AMI.

Diagnostics – SARIMAX

Results – LSTM

Comparison

Table 1: Results

	SARIMAX	LSTM
MAE	**0.12**	0.15
MSE	**0.02**	0.03
RMSE	**0.15**	0.19
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- SARIMAX outperforms LSTM in terms of both MAE and MSE, making it a more suitable choice for this forecasting task.

- However, the LSTM model exhibits substantially lower AIC and BIC values compared to SARIMAX, indicating a potentially better fit to the data and superior long-term forecasting capabilities

Thank you for your attention