STA 3180 Statistical Modelling: Forecasting

Lecture Notes on Forecasting for STA 3180 Statistical Modelling

Forecasting: Forecasting is the process of making predictions about future events based on past data and current trends. It is used to make decisions about investments, production, and other activities. Forecasting can be used to predict the future of a company, industry, or economy.

Key Concepts:

1. Time Series: A time series is a sequence of data points that are measured over time. Time series data can be used to make forecasts about future events.

2. Trend Analysis: Trend analysis is the process of analyzing past data to identify patterns and trends. This can be used to make predictions about future events.

3. Regression Analysis: Regression analysis is a statistical technique used to identify relationships between variables. It can be used to make predictions about future events.

4. Seasonal Variations: Seasonal variations are changes in data that occur at regular intervals. These can be used to make predictions about future events.

5. Forecast Error: Forecast error is the difference between the actual value and the predicted value. It is used to measure the accuracy of a forecast.

Definitions:

1. Forecast: A forecast is a prediction about future events based on past data and current trends.

2. Time Series Data: Time series data is a sequence of data points that are measured over time.

3. Trend Analysis: Trend analysis is the process of analyzing past data to identify patterns and trends.

4. Regression Analysis: Regression analysis is a statistical technique used to identify relationships between variables.

5. Seasonal Variations: Seasonal variations are changes in data that occur at regular intervals.

6. Forecast Error: Forecast error is the difference between the actual value and the predicted value.

Rules:

1. When forecasting, it is important to consider both past data and current trends.

2. When using trend analysis, it is important to look for patterns and trends in the data.

3. When using regression analysis, it is important to identify relationships between variables.

4. When using seasonal variations, it is important to consider the regularity of the data.

5. When measuring forecast error, it is important to compare the actual value and the predicted value.

Examples:

1. A company wants to forecast its sales for the next quarter. They use time series data to analyze past sales and identify trends. They also use regression analysis to identify relationships between sales and other variables. Finally, they consider seasonal variations to account for any regular changes in sales.

2. An economist wants to forecast the GDP of a country for the next year. They use trend analysis to identify patterns in past GDP data. They also use regression analysis to identify relationships between GDP and other economic indicators. Finally, they consider seasonal variations to account for any regular changes in GDP.

3. A stock analyst wants to forecast the price of a stock for the next month. They use time series data to analyze past prices and identify trends. They also use regression analysis to identify relationships between stock prices and other variables. Finally, they consider seasonal variations to account for any regular changes in stock prices.

4. A meteorologist wants to forecast the temperature for the next week. They use trend analysis to identify patterns in past temperature data. They also use regression analysis to identify relationships between temperature and other weather variables. Finally, they consider seasonal variations to account for any regular changes in temperature.