Time Series Forecasting in Machine Learning

Unlocking the future: Dive into the fascinating world of time series forecasting with machine learning.

by The XYZ Company

Introduction to Time Series Data

Data with a Time Stamp

Time series data is a sequence of data points collected over time, ordered chronologically.

Examples

Stock prices, weather patterns, sales figures, website traffic, and sensor readings are all examples of time series data.

Stationarity and Trend Analysis

1 **Stationarity**

A time series where statistical properties (mean, variance) don't change over time.

2 **Trend Analysis**

Identifying the underlying pattern in the time series, such as an upward or downward trend.

Autoregressive Models (AR, ARMA, ARIMA)

AR

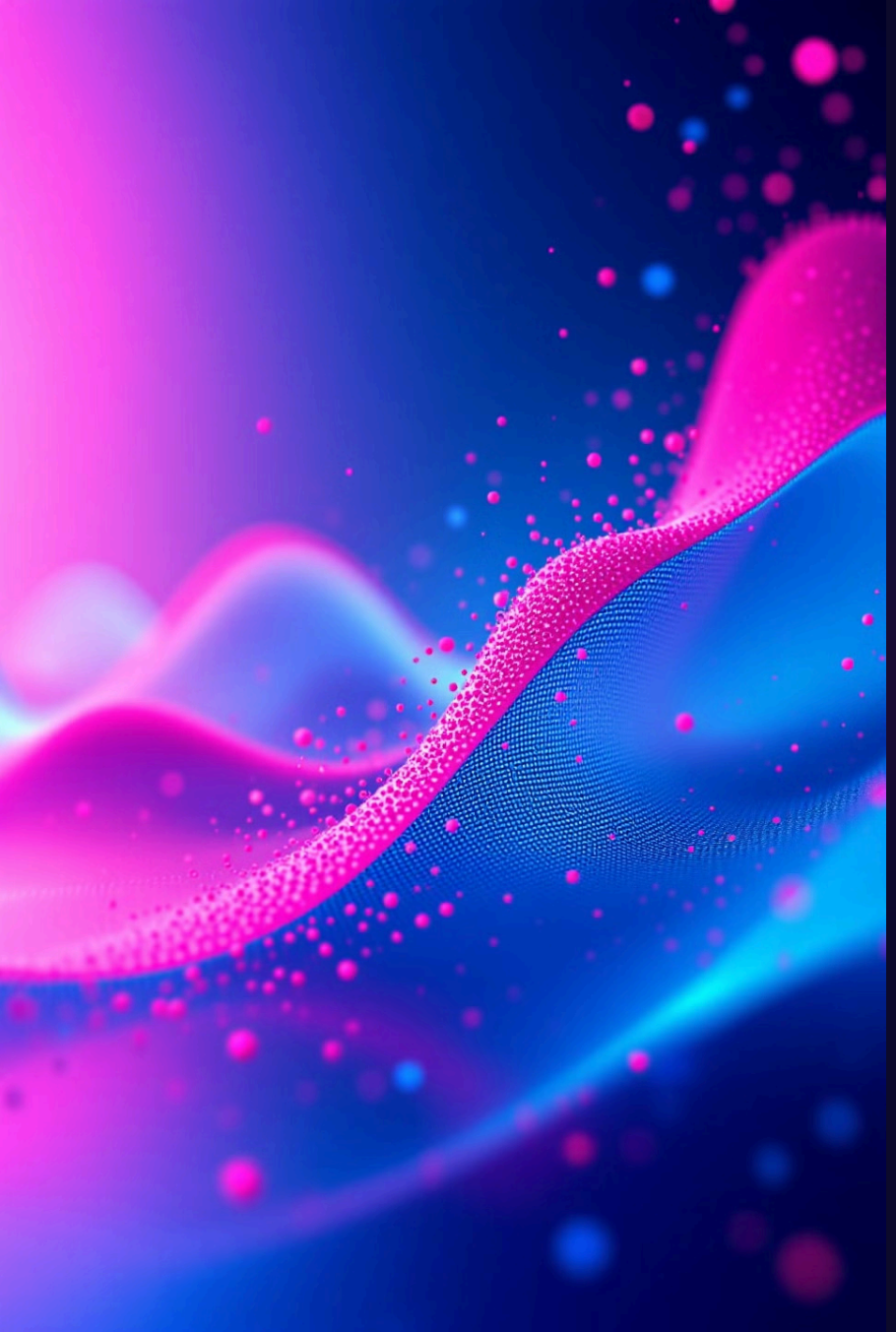
Predicting future values based on past values.

ARMA

Extending AR by incorporating moving average terms.

ARIMA

Handling non-stationary time series by incorporating differencing to make them stationary.



Exponential Smoothing Techniques

Simple

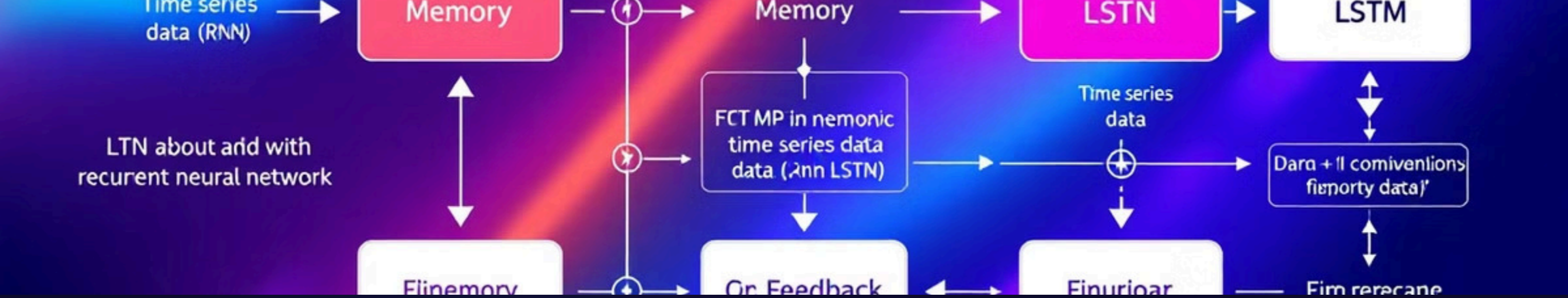
Weighted average of past observations.

Holt's

Accounts for both level and trend.

Holt-Winters

Captures seasonality in addition to level and trend.



Recurrent Neural Networks for Time Series

RNNs excel at handling sequential data like time series.

Deep learning approaches offer powerful capabilities for time series forecasting.

1

2

3

LSTM cells provide long-term memory, capturing complex patterns.

Evaluation Metrics for Time Series Forecasting

1

RMSE

Root mean squared error.

2

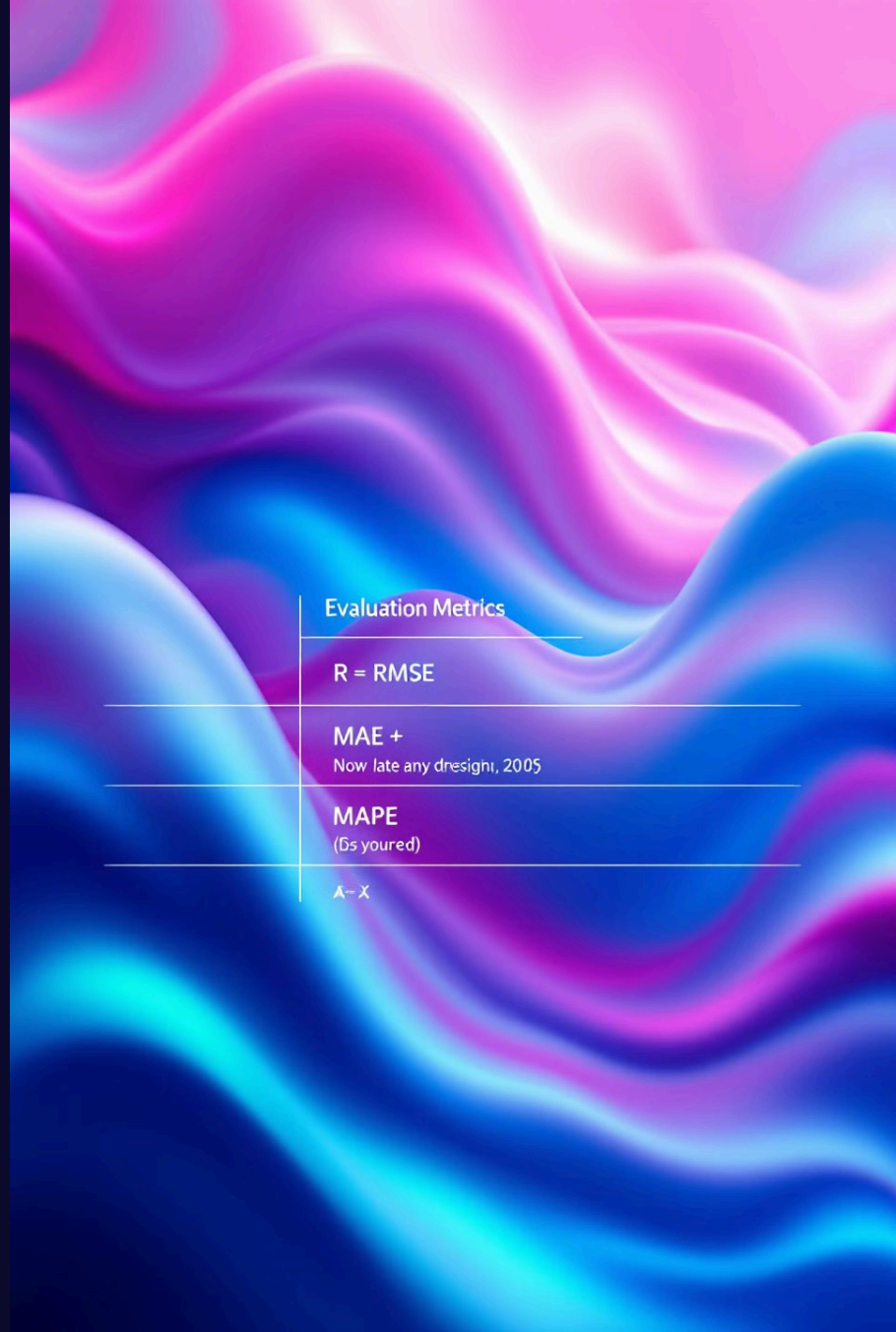
MAE

Mean absolute error.

3

MAPE

Mean absolute percentage error.



Applications and Case Studies