



# Sensible Machine Learning offering: An Introduction to Intelligent Automated Forecasting



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# Sensible Machine Learning



## ■ Introduction

What is Sensible Machine learning? I suppose we can't really start talking about what SensibleML is and how awesome it is, and believe me it's awesome, without understanding, at least to an extent, the problem it is trying to solve for.

What is the problem? Have you ever wanted to know what the demand for your product will be in 3 months' time? Or maybe even a year? Or perhaps ever wondered whether you need to expand your manufacturing line or prioritise certain services within your business today to maximize profits tomorrow?

The technical term given for such problems is Time Series Forecasting and that is exactly why SensibleML was developed.

Now that we have an idea of what the problem is. Let us get back to the question at hand. The short answer is, Sensible Machine Learning is a powerful tool for analysing and making predictions from time series data. By developing accurate and robust models, SensibleML can help us better understand and predict complex systems that evolve over time.

In this paper, we will explore Sensible Machine learning, its benefits, applications and limitations.

## ■ Background

SensibleML is a type of machine learning that is specifically designed for analysing time series data. Time series data is a sequence of data points that are collected over time, with each data point being associated with a specific time stamp.

Examples of time series data include stock prices, weather data, sensor data, and medical data. SensibleML's goal is to identify and apply the best suited models that can learn from historical time series data and use this knowledge to make predictions about future events in an automated fashion.

These predictions can be used for a variety of applications, such as forecasting stock prices, predicting weather patterns or predicting disease outbreaks.

Traditional machine learning algorithms are not well-suited for time series data, as they do not take into account the temporal dependencies between data points. Time Series Machine Learning algorithms, on the other hand, are designed to capture these temporal dependencies and use them to make accurate predictions.

One of the key challenges in Time Series Machine Learning is dealing with the inherent noise and variability in time series data. This can include missing data, outliers and other anomalies. Another challenge is dealing with non-stationary time series data, where the statistical properties of the data change over time.

SensibleML involves the use of algorithms to make predictions based on time series data. This process involves several steps:

**Data preparation** - This involves collecting and cleaning data. Time series data often has missing values, outliers, and other anomalies that need to be addressed before the data can be used for analysis.

**Feature extraction and Events** - This involves identifying the relevant features in the time series data that can be used for prediction. This may involve statistical techniques such as autocorrelation analysis, spectral analysis, and wavelet analysis. SensibleML includes the use of key events such as Public Holidays, Sports events, Conferences, Store Promotions etc to better understand your data.

**Model selection** - This involves selecting a machine learning algorithm that is suitable for the data and the problem at hand. Popular algorithms include regression models, decision trees, and neural networks.

**Model training** - This involves training the machine learning algorithm on the time series data. This may involve techniques such as cross-validation, regularization and optimization.

**Model evaluation** - This involves evaluating the performance of the machine learning algorithm on a test set of data. This may involve metrics such as mean squared error, mean absolute error, and correlation coefficients.

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## ■ Benefits

Implementing SensibleML in your business can bring significant benefits and help you make better-informed decisions based on historical data. Below are some key reasons why you should consider starting today:

**Improved accuracy** - SensibleML models can provide accurate predictions of future trends, enabling you to make more informed decisions about your business operations. By analysing patterns and trends from historical data, you can identify opportunities and challenges in your business that you may not have been aware of before.

**Enhanced planning** - SensibleML can help you plan for the future, allowing you to make better strategic decisions based on predicted outcomes. With accurate forecasting, you can optimize your inventory levels, production schedules, and resource allocation, which can lead to significant cost savings and increased efficiency.

**Better risk management** - SensibleML can help you identify potential risks and take preventive measures to mitigate them. For example, if you can accurately forecast changes in demand for your products or services, you can adjust your production or marketing strategies accordingly, reducing the risk of inventory overstocking or stockouts.

**Improved customer service** - By forecasting demand and trends accurately, you can better meet customer needs and improve their satisfaction with your products or services. This can lead to increased customer loyalty and retention, as well as positive word-of-mouth recommendations.

## ■ Applications

SensibleML has a wide range of applications in various domains, including finance, healthcare, and transportation.

Some examples include:

**Stock price prediction:** Machine learning algorithms can be used to predict the future stock prices based on historical data. This can help investors make better decisions about when to buy or sell stocks.

**Disease prediction:** Machine learning algorithms can be used to predict the likelihood of a patient developing a disease based on their medical history. This can help healthcare providers identify patients who are at high risk and take preventive measures.

**Traffic prediction:** Machine learning algorithms can be used to predict traffic patterns based on historical data. This can help transportation agencies optimize traffic flow and reduce congestion.

## ■ Limitations

While SensibleML has many applications, there are also some limitations to its use. Some of these limitations include:

**Data quality** - Time series data is often noisy and contains missing values, which can make it difficult to train machine learning algorithms.

**Stationarity** - Time series data may not be stationary, which means that its statistical properties change over time. This can make it difficult to apply traditional machine learning techniques.

**Overfitting** - Machine learning algorithms may overfit the data, which means that they learn the noise in the data rather than the underlying patterns.

## ■ Conclusion

Sensible machine learning is a powerful tool for making predictions and identifying patterns in time-dependant data.

There has never been a better time for organizations to start implementing SensibleML in order to stay ahead of the curve and remain relevant in these rapidly evolving times. It has a wide range of applications in various domains, including finance, manufacturing, healthcare, and mining. However, it is important to be aware of its limitations and to carefully consider the quality of the data before applying machine learning algorithms.

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