

Time Series Analysis

1. Background:

The time series analysis method can be used for research in computer science for analysing data in respect to time. In the area of artificial intelligence and datamining time series analysis has major influence for deriving knowledge from data. Time series analysis comprises methods for analysing time series data in order to extract meaningful statistics and other characteristics of the data.

This method can be both deductive and inductive based on the requirement and goal of the project. In my thesis work we used both of these approach in different stages of the project. In my research I mostly work with quantitative method that has most interaction with positivist/postpositivist paradigm. It usually involves collecting and converting data into numerical form so that statistical calculations can be made and conclusions drawn.

The method can be filtered in mathematical approach of Järvinen's taxonomy [1] which basically tries to prove whether one theorem or lemma is true or false in certain scenario. One similar article "Design and analysis of research using time series" [2] has been found where time series analysis is used for designing some research method. The theoretical developments in time series analysis started early with stochastic processes. The first actual application of autoregressive models to data can be brought back to the work of G. U Yule and J. Walker in the 1920s and 1930s.

2. Data collection:

There are different forms of data and data collection method which are basically rules and practices based on different scenarios. In my research data is collected from different organizations and our clients on demand basis. It is more or less best fit on "Achieves and Collections" data collection method. We regularly update this collections from different sources.

All data is represented in some numerical form. Integration between different system, knowledge about different data collection techniques and application are needed for data collection. There are different integration solution provided by different companies like Microsoft BizTalk, Oracle Enterprise Bus (OSB) and others which can be very useful for handshaking between systems and collect data very efficiently.

3. Method implementation:

For implementing the method first we need to select our scope of the data and define the variables to interpret the scenario. The expected outcome of the project needs to be determined before. The participant data is selected and identified the factor needs to be monitored on time basis. The selection of the participant depends on the business need and objective of the project and for that we need to first find the relevance of the variables with the scope.

Based on the training data, model can be tested and select the important variables that has notable influence towards the result. The method generate some rules and logics by which result variables can be calculated for getting the final results. The reliability of method can be measured based on the validation method defined later.

The primary difference between time series models and other types of models is that lag values of the target variable are used as predictor variables, whereas traditional models use other variables as predictors, and the concept of a lag value doesn't apply because the observations don't represent a chronological sequence. Specific ethical issues are explicitly or not nested in larger theories of how we decide that the action is right, correct or appropriate. Deyhle, Hess and LeCompte suggests five general theories teleological, utilitarian, deontological, relational and ecological.

References:

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1. P.H. Järvinen , “Research Questions Guiding Selection of an Appropriate Research Method” available online: <http://www.sis.uta.fi/cs/reports/dsarja/D-2004-5.pdf>
2. JOHN M. GOTTMAN, RICHARD M. McFALL AND JEAN T. BARNETT, “DESIGN AND ANALYSIS OF RESEARCH USING TIME SERIES” available online: <http://www.johngottman.net/wp-content/uploads/2011/05/Design-and-analysis-of-research-using-time-series.pdf>
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