Tutorial:

Title:

<u>Intelligent Feature Extraction from Knowledge for forecasting and decision making:</u>

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Time required: 4 Hours

Abstract:

Topics:
1. In most of the cases what you want to know can be derived from what you know.
2. Knowledge in proper form in the most important asset.
3. You can forecast future based on knowledge of past.
4. Quantitative forecasting, Qualitative forecasting and many other forecasting methods can be used for decision making.
5. Methods to extract features from knowledge with reference to different domains:
a. Health care
b. Business
c. Revenue management
d. Education
6. Decision system/ decision support systems based on patterns, forecasting and statistical methods.
7. Trend analysis, seasonal behavior.
8. Critical decision and risk management.
9. Industrial Applications

Forecasting is art of telling about the future. When forecasting is based on historical data it is science rather than art. Decisions are based on facts and projections. Facts lead to forecasting and ultimately projections. In this tutorial we will cover following details:
1. Decision systems
2. Forecasting Methodologies
3. Decision making engine
4. Patterns, trends and seasons
5. Case studies.

Decision support systems/ Decision systems:

In many complex situations we need to take decisions. Decisions are based on past experience, intuition or expert advises. Neural networks, statistical methods and qualitative methods are some of the methods those used for this purpose. As quantitative methods are based on actual history are most commonly used methods.

Passed information or data is used for extracting features. Here features are the properties specific to domain or application. If the features are unique for a particular situation we can analyze and make decision more accurately. Trend analysis, seasonality can also play major role in this process. In this tutorial we will discuss about various decision methods and feature extraction methodologies. Decision based on features. Time dependant decisions and time independent decision. Various modeling methodologies for decision systems including MDP and SMDP will be covered as a part of decision process and model development. Incremental learning based on AI tools and statistical methodologies is necessary for dynamically changing situations. We will also cover methods suitable for static situations and dynamic situations and time dependant modeling.

Forecasting Methodologies:
Forecasting is closely associated with decision making. Correct forecast can lead to better decision making. In this tutorial we will also cover various forecasting methods and their association with decision making.

Decision Making Engines:
In this part we will cover forecasting based decision making engine. Parameters consider for development of the same. This will be explained with practical examples.

Patterns, trends and seasons:
Information analysis and extracting feature is the core part of this process. Various types of properties can be determined from data and those can be very useful in this process.

Case Studies:
These methodologies can be used in various domains but most of the time models are developed specific to application or domains. There are many such domains including health care, revenue management, risk management, educations. We would like to present a model and decision engine development exercise specific to practical applications like health care, revenue management and education.

Applications of these methodologies are not limited to these areas and those can be used in various other research domains. In concluding section we would like to give brief overview of research and various domains of applications where it can be used.
Also a brief introduction on advanced applications those can make difference in decision making.

Industrial Applications:
Decision systems have numerous industrial applications. Risk measurement related applications cab be used while deciding and undertaking projects. Revenue management and resource management applications can be used in all industries for managing critical resources and generating more revenue. In this concluding session we will take overview of all such applications from which industries can gain a lot.

Also we will discuss these benefits with examples and a few existing tools those can fetch these benefits for industries.

"Decisions can change your world…. You need to change decision making process..."

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Profile: Ph.D. from IIT Kharagpur, Working in IT industry for more than 12 years. Areas of interest: Decision systems, forecasting, distributed computing, AI, expert systems.

Motivation and Objectives:

Decision system is key are in business and knowledge industry. Better feature extraction and organized methodologies can lead to better decision making. Many times user feels that domains of application for it are limited and those are not useful for their business solution. Here we want to clarify it can be used very effectively in all domains. It can help for decision making, better management. There are many different methodologies those can be developed using basic methodologies and used in numerous applications. Purpose of this tutorial is to give an overview of application domains, introduce open areas of research in this field and present effectiveness of decision systems with case studies. This tutorial ill be useful for students and professionals working in the area of decision systems or are active in optimization of one of the domains related to it.

Primary/secondary Audience:
1. Students, professionals working in area of decision systems, expert systems, knowledge management or AI
2. Decision makers, managers from industries