Essential Data Analysis
Enabling Digital Decision Making

Abstract

The Emerging Need for Better Decision Analytics

Decision making is about selecting from a set of alternatives. Management performance is closely tied to the results of the decisions made by managers. Recent advances in analytics provide better insight into the information that managers rely on when making better decisions. The use of analytics by managers is best enabled when managers have access to tools and methods that are easy to use, apply them to a problem or issue, and make sense of the tasks a manager executes.

Completing Digital Transformation

So, you are well on your way to becoming a digital organization. *What can you do with all that digital data you are acquiring?* Completing digital transformation requires using emerging analytical techniques for gaining insight for making effective decisions. It is important to know about the analytics available today, so what type of analytics do managers really need?

What type sof analytics do managers really need? A good working knowledge of core decision analytics available is key. *New tools* provide a day to day capability for increased decision quality and productivity.

Improved performance analysis results in the execution of the best corrective action.

New Analytics are Available to Improve Decision Making

Improvements in decision algorithms using artificial intelligence, neural nets, and machine learning are coupled with new algorithms and statistical techniques for rapid and effective decision making. Statistical and semantic analytics are being used in new ways to provide better insights.

Easy to use analytic workflows are now available that improve decision productivity. Added value comes from extending the use of these analytics to others in the organization, especially the diverse types of analysts. The key to management productivity is providing core decision analytic capability.

This course is for managers and professionals seeking to gain current skills in accelerated and improved analytics for decision making. Awareness about current analytics provide managers and professionals with an advantage in correcting and governing the flow of work delivering goods and services to customers.

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Day One

Day 1 Theme: Key Use of Data Analysis Today

The hot topics today are digital transformation, neural nets, generative AI, and machine learning. All of these are a part of data analysis. Digital transformation requires thinking about analysis and analytics that leverage all the digital data collected. Tools that support and enable analytics help with the everyday decisions all organizations make. The focus today is applying analysis with emerging analytics to key decisions.

Section 1 – What is Data Analysis?

- The many types of data perspectives today
- Data Analysis, Data Science, Data Analytics
- Taking advantage of data today
- Time to focus on algorithms and their value.
- Data Analysis and digital insight?

Video and Discussion: Analytics, Alternatives and Decisions

Section 2 – Data Analysis and Problem Solving

- Problem solving in business
- Analyzing business performance
- Typical indicators and related analytics
- Indicators are about how well you are doing.
- Operational performance indicators
- Example: *Analytics used in Balanced Scorecard Strategy Maps*

Exercise: What Analytic Opportunities do you Have?

Section 3 – Data Analysis and Decision Making

- Problem solving involves decision making
- The driver diagram for explaining indicators.
- Simple decision trees for analysis
- Programmatic implementation of decision trees
- Influence diagrams and decisions

Exercise: Identifying Issues with Budgets

Project Activity Part 1: The Driver Diagram for Decisions

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Day Two

Day 2 Theme: Business Statistics and Machine Learning

Machine learning showed up early on in data analysis with some familiar business statistics. Correlation and related regression methods have been implemented in many tools and are easily done in Excel. Correlation and regression are early machine learning efforts using historical data and statistical methods for diagnosis and prediction. These core business statistics provide considerable insight into the movement of financial and operational performance indicators in an organization.

Section 3 – Forecasting Using Correlation and Regression for Prediction

- Correlation as an analysis method
- Regression is a form of machine learning.
- The regression idea – What a manager chooses to look at
- How is this different from correlation?
- Preparing data for regression analysis
- Example: *Sales trend over time analysis*

Section 4 – Correlation Matrices

- What are they?
- How are they useful?
- Interpreting a correlation matrix.
- Issues and advantages of correlation
- Tracking correlation over time.

Video and Discussion: Understanding Correlation.

Section 5 – Affinity and Sensitivity Analysis

- The concept of sensitivity and decisions
- Methods of sensitivity analysis
- What is a Tornado diagram?
- Affinity analysis – measuring the strength of a relationship
- Using affinity for recommendation.
- Example demo – People who bought this book also bought that book

Project Activity Part 2: For what would you use a recommendation engine?

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Day Three

Day 3 Theme: Neural Nets and Analytic Ensembles

Today the emphasis is changing to extensive use of artificial intelligence neural nets to help diagnose and predict indicators of significance to managers. Artificial intelligence (AI) augments and replaces human intelligence where it makes sense to do so. As such, AI works with both knowledge and data. A manager can use combinations of analytics such as neural nets, machine learning and statistics that provide the best practice in addressing solutions or evaluating an opportunity. Cross checking or enhancing results is one of the goals of applying combinations of analytics.

Section 7 – Linear Neural Nets - Which Criteria has the most Influence?

- Linear neural nets – a key business analysis tool
- Using a neural net to analyze process properties.
- Identifying the property of greatest influence
- Issue of bias in neural nets
- Example: *Neural net influence on process performance*

Demo and Discussion: A Composite AI Project Ranking Example

Section 8 –An Ensemble Analytic for Ranking Portfolios

- The Traditional Ranking Algorithms - items by property
- Improved Ranking Techniques
- A Correlation matrix for ranking
- A neural net ranking approach
- *The 4 – box for assessing results*

Project Activity Part 3: Interpreting a 4 - Box.

Section 9 – When to Use Deep Learning for Data Analysis?

- What is Deep learning?
- Deep Learning vs linear Neural Nets
- The key players today:
- Uses of Deep Learning
- Issues with scaling up the generative apps
    - *Costs, size, complexity, scope, impact, skills, risk*

Video and Discussion: Applying Deep Learning to Decisions

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Day Four

Day 4 Theme: Generative AI and Data Analysis

Every day operational processes handle large volumes of unstructured data. Data that is not quantitative and nicely organized into matrices or time series that you can use well known analysis and analytic techniques to support decisions. Handling the unstructured data has been a big problem until recently. The advent of generative AI has provided a useful tool in extracting significant parts of unstructured data for process support.

Section 10 – The Generative AI Concept

- Unstructured data types for inputs to processes
  - *Text, Forms, Pictures, Video, Audio, Objects and more*
- Generative AI components
  - Foundation Models
  - Large Language Models
  - Generative Neural Nets
- Good Uses of Generative AI today
  - Summarization, Text generation, Research, Process augmentation, Marketing

Video and Discussion: – Can you trust Generative AI?

Section 11– Information Needs And Organization Execution

- Sources of Material for the LLM
  - Documents as process input drivers
- Databases as a source
- External Sources
- Creating an LLM

Video and Discussion: Generative AI and text summarization

Section 12 – Linguistics and Large Language Models

- LLM Architectures
- General LLM Models
- Corporate LLM
- Domain and Focused LLMs
  - *Expertise, Functional, Markets, Organization Landscape*
- Industry focused LLM
  - *Financial, Retail, Healthcare, Manufacturing, Government*

Project Activity Part 4: – Identify Uses of Generative AI

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Day Five

Day 5 Theme: Emerging Data and Analytics Needs

Achieving a high-performance organization requires advanced analytic techniques for better decision making. The starting point is creating a better digital enterprise that accumulates a wide range and volume of electronic data. New analytic techniques are needed to take advantage of that rich source of data. Semantic analysis along with the advent of Generative AI has moved analytics into a new stage leveraging text and other unstructured data. However this also brings along issues. Here are some considerations.

Section 13 – Emerging Semantic Analytics for Decisions

- Sentiment Analysis - What do your employees think?
- What is the image of the organization?
- What do customers think? The enterprise context
- Keyword analysis – what is the emphasis of a document.
- Comparative semantic analysis – Consolidating processes

Demo and Discussion –Sentiment Analysis of Documents

Section 14 – New Sources and Uses for Data

- Key Uses:
  - *Analytics for Management productivity*
  - *Automating complex decisions*
- Sources:
  - *The data supply chain*
  - *Streaming data*
  - *Meta data*

Section 15 – New Data Issues with Data Analysis

- Too much, Not enough, and Incomplete data
- Inadequate quality (noisy)
- Incorrect or unusable format
- Bias in the data

Course Questions and Wrap

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Learning Objectives

Professionals who attend this course can expect to learn how to apply the most recent developments in data analytics and their uses, specifically:

- Describe the key decision analytics managers use today.
- Explain the difference between data analysis, data science and data analytics
- Choosing among alternatives for the best decision result
- Explain how 'easy to use' analytics can help a manager.
- Applying analytics to identify performance issues.
- Identify when to use specific analytics for organization performance.
- Know when to apply the analytics at process decision points.
- Verify that the analytic is providing management insight.
- Comparing the results of multiple analytics as applied to a decision.
- Using analytics to predict what might happen next.

This professional training session provides a hands-on, skill-oriented working knowledge of the analytic techniques that managers and analysts should consider and use. The learning approach uses discussions, interactive exercises, a case study, and group exercises that focus on outcomes that lead to transformation success. Participants can apply this learning as soon as they get back to their office.

What techniques will you learn?
Some of the analytics topics covered in this course are Deep Learning, Machine Learning, Neural Nets, Portfolio Ranking, Affinity Recommendation Technique, Correlation, Regression, Ranking with Correlation Matrices, Sentiment and Keyword Analytics, Semantic Comparisons, Semantic Inference, Alignment Analytics, Deep Learning, Machine Learning, and Neural Net and Impact Analysis.

Where can you use these techniques?
These analytics typically support multiple needs of the manager such as: Decision making, Process improvement, Process consolidation, Organizational change, Hiring needs, Performance analysis, Financial analysis, Predictive and Diagnostic analysis, Traditional data analysis, Organization alignment, and more.

Who should attend?
Managers, Process Analysts, Business Analysts, Managers, Professionals, IT Specialists, IT and Business Architects.

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