

# MACHINE LEARNING, DEEP LEARNING AND AI

THE ADVANTAGE OF ADVANCES ANALYTICS



MARC ELLIS  
TRAINING ACADEMY

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## About Marc Ellis Training Academy

Marc Ellis have been specialists in recruiting for the digital and Technology industries for over a decade. We believe and strongly endorse the digital initiatives that all the GCC are undergoing and support businesses & government entities in supplying some of the best skilled workforce in the region.

We have over the years combined expertise and specialist talent pool to allow us to support clients (who come in all sizes) and candidates to ensure we find the perfect match.

Since we know what the market requires, we launched Marc Ellis Training Academy to allow all people within the market in the GCC to be skilled up with the best certifications in the Technology & Digital skillsets.

We collaborate with some of the most talented and gifted trainers to offer fun, interactive and most importantly informative courses to allow people taking part to benefit from it.

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# Overview of leveraging Machine learning, Deep learning and AI

**The Emerging Need for Better Analytics:** Management performance is closely tied to the results of the decisions made by managers. Decisions depend on the effective and efficient use of the data and information that support decisions.

Recent advances in analytics provide better insight into the information that managers and analysts rely on when making better decisions. The use of machine learning analytics by managers is best enabled when managers have access to methods, techniques, and tools easy to use, apply to a problem or issue, and make sense for the tasks at hand.

## **Machine Learning Analytics are Available to Improve Decision Making?**

Improvements in artificial intelligence, neural nets, and machine learning now provide managers and analysts with this insight. Once the realm of data scientists, analytic tools are now available that enable tapping their potential. Additionally, new techniques are emerging that better provide insight to future direction.

**Extending Analytics to Business Analysts:** This course is for managers and professionals seeking to gain skills in accelerated and improved analytics for decision making. Easy to use analytics provide the organization with efficient and effective means of correcting and governing the flow of work that delivers the goods and services to customers.

## **Machine learning and Decision Making**

There are a variety of analytics and analytic approaches available today, so what type of analytics do people really need? Managers and analysts at all levels require a good working knowledge of the core machine learning analytics available to them today. The convenience of value added analytics in tools provides a day to day capability for increased organization performance. Business intelligence can provide managers with dashboards and a running tally of performance data for known indicators. However, when an incident occurs or tracking indicators require further understanding needing a bit more insight to identify the issue and execute a corrective action. Machine learning supports that analysis.

# Curriculum and Learning Objectives

## DAY ONE

### THE MACHINE LEARNING (ML) APPROACH

There is explosive growth in the discipline of machine learning. Along with the methods there have emerged tools for machine learning. What is missing is the clear linkage between opportunities and problems in the organization and machine learning solutions that resolve the problems and capture the benefit of an opportunity.

Machine learning should be easy to use and apply, no programming needed if you can use off the shelf tools. Also, the results should help with the everyday decisions managers and analysts make. The focus today is applying Machine Learning (ML) analytical techniques to situations that provide operational as well as strategic insight value.

### Section 1: Machine Learning Today – ML is about Data and Algorithms

- What do we mean by ML □
- Characteristics of ML □
- Supervised, unsupervised and others □
- Categories of ML, Traditional and Emerging □
- Dominant ML types today □
- The ML value proposition □
- The most common predictive ML analytic □
- Video – Understanding Machine Learning □
- Working Session: What ML projects do you have or need today?

### • Section 2: The Machine Learning Project?

- Business needs and technology relationship □
- What ML Technology is available? □
- Defining ML Projects □
- Mapping needs to technology □
- The ML methodology today □
- Prioritizing needs – the ML project portfolio □
- The machine learning road map □
- Video and Discussion: Machine Learning Today

# Curriculum and Learning Objectives

## Day Two

### Statistical ML Analytics for Managers

There is explosive growth in the discipline of machine learning. Along with the methods there have emerged tools for machine learning. What is missing is the clear linkage between opportunities and problems in the organization and machine learning solutions that resolve the problems and capture the benefit of an opportunity.

Machine learning should be easy to use and apply, no programming needed if you can use off the shelf tools. Also, the results should help with the everyday decisions managers and analysts make. The focus today is applying Machine Learning (ML) analytical techniques to situations that provide operational as well as strategic insight value.

### Section 3: Supervised and Unsupervised Learning

- Why over 100 ML statistical algorithms? □
- What do we mean by supervision? □
- How does this work? □
- Issues in these types of algorithms □
- Unsupervised learning – the cluster analysis □
- Exercise and Demo – Building and Interpreting a Correlation Matrix □
- Working Session: How do you decide what technologies for ML to use today?

### Section 4: The Most Common ML for Prediction: Statistical

- What are some core predictive techniques? □
  - Trends, Correlation, regression, and correlation matrices □
- Uses of correlation □
- Regression and trending □
- Correlation matrices and ranking opportunities □
- The problem with trends: Linearity □
- Exercise – Correlation, Regression, and trends

# Curriculum and Learning Objectives

## Day Three

### The Data Side of Machine Learning

A key part of machine learning is knowing what kind of data is used, where it comes from and how much data to use. It makes a difference what the algorithm is and the application.

How much semantic data do you need for a semantic algorithm such as large language models? Are you doing large scale analysis with millions of rows or small analysis with a few hundred or thousand rows? Are you doing facial, license plate or object recognition? Some analysis in machine learning is done with less than 100 rows and still has value for decision making. A key part of the data side is understanding the sourcing of data.

### Section 5: Current Data Sources

- Transaction data and history □
  - Historical and operational data □
  - Big data and small data □
  - Reporting and presentation organisation □
  - Data Lakes, and other organisation
- Aggregate data – Business Intelligences □
  - The data warehouse □
  - Analytic workflows □
  - Dashboards
- Video and Discussion: Data Analysis and Machine Learning □
- Working Session: What operational measures are Important?

## Section 6: Emerging Data Sources

- Streaming Data □
  - Defining streaming □
  - Streaming technology □
  - Usage of streaming data □
- Meta Data □
  - The idea of meta data □
  - Sourcing meta data – e.g., Social Data □
  - Using meta data in marketing □
- Topic Discussion – Uses of Meta Data

# Curriculum and Learning Objectives

## Day Four

### Machine Learning Algorithms

Machine learning uses data sets ranging from small data sets (hundreds or thousands of rows) to what is called big data (millions or billions of rows). Various algorithms are applied to increase the accuracy and speed of predictions or trends by increasing the density of information. However, caution must be used when applying analytics. For example, a high correlation of two variables does not mean you have a trend, only that one variable may predict another. You need a smooth linear regression line for a trend.

Also, machine learning may involve small to medium data set sizes, usually up to a few thousand rows of the most recent data. The analysis might involve millions or billions of rows of data when analyzing buying habits such as consumer package goods analysis. Machine learning is most useful when the data is changing over time and the organization needs to understand the direction of change by rerunning the algorithms.

## **Section 7: Statistical Machine Learning**

- A key use of machine learning is prediction □
- Predicting trend is sequence dependent □
- Predicting membership is classification dependent □
- The regression idea – What you choose to look at □
- How is this different from correlation? □
- Preparing data for regression analysis □
- Exercise: Correlation and Regression with Excel □
- Working Session: Consider a possible ML need in your organization. How many rows of data do think you need to analyze?

## **Section 8: A Marketing use of ML – The Recommendation Engine**

- Recommendation engines □
- Three types of recommendation approaches □
- Correlation matrix, Affinity analysis, Clustering Membership □
- Suggesting what customers, users, citizens should do or buy □
- People who bought this product also bought that product □
- Example: Book Buying Habits □
- Demo and Discussion: Analyzing Process Performance using Correlation Matrices



# Curriculum and Learning Objectives

## Day Five

### More Machine Learning Analytics

The new and emerging types of analytics most useful to organizations are those related to machine learning neural net algorithms. Neural nets use data sets ranging from small data sets (hundreds or thousands of rows) to big data (millions of rows). Algorithms are applied to increase the accuracy of pattern recognition. Many problems that relate to decisions deal with small to medium data set sizes, usually up to a few thousand rows of the most recent data.

Predictive analytics using history only need a few hundred or thousand rows of data to support a decision. The more features you have as input the more rows you need to predict something.

### Section 6: Neural Net Algorithms

- The manager's viewpoint – it depends on what your organization does. □
- Applying predictive techniques to operations □
- Identifying the drivers of performance □
- Small data sets and genetic algorithms □
- NN Video – What is a neural net? □
- NN Demo: Analyzing Process Performance □
- Working Session: List at least 3 potential applications of neural net in your organization. Do you have enough rows of data for the analysis?

### Section 6: Emerging Machine Learning Approaches

- Semantic machine learning and Large Language Models (LLM) □
- What are LLMs all about? □
  - The foundation model □
  - The knowledge (semantic data base) base □
- The nine types of LLM today □
- The hype about Chat GPT and other LLM applications □
- The emerging use of Chaos theory in machine learning □
- Video and Discussion

# FRANK KOWALKOWSKI

## Trainer Profile



Frank Kowalkowski is President of Knowledge Consultants, Inc., a firm focusing on business performance, business analytics, data science, business architecture, big data, business intelligence, predictive analytics and statistical techniques. He has over 30 years of line management and consulting experience in a wide variety of industries

He has been involved with many projects both as a user and purveyor of business analytics. He has worked projects in state and federal government (including national defense department, Coast Guard) dealing with back office operations, legislative compliance and regulatory compliance. His background includes a number of industries including manufacturing, distribution, supply chain, banking, insurance, financial institutions, health care, pharmaceuticals, oil and gas and chemicals.

Frank is often a keynote speaker, panel moderator and member at international conferences as well as a conference chair, he has written numerous papers and spoken at conferences on a variety of business subjects. He conducts frequent seminars and workshops nationally and internationally on a variety of business management, analytics and information technology topics. He also develops algorithms for analytics tools particularly semantic algorithms as well as data analysis techniques. He is the author of a 1996 book on Enterprise Analysis. His most recent publications are a featured chapter in the business book "Digital Transformation: Using BPM You Already Own." for publication in 2017. His chapter is titled "Improve, Automate, Digitize", he also has a chapter in the business architecture book titled 'Business and Dynamic Change' June, 2015 and a chapter on semantic process analytics in the book Passports to Success in BPM published in 2014 all are available on Amazon.



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