

# BizSmartAnalytics Series on “How Managers Should Prepare for Deep Learning”



Exploring the unique challenges for managing analytic systems enabled by Deep Learning [photo by [Charlie Wild](#) on [Unsplash](#)]

[Richard Hackathorn](#), Jun 27, 2018

<https://medium.com/@Hackathorn/series-on-how-managers-should-prepare-for-deep-learning-f5b795b36148>

This article series focuses upon the **managerial perspectives on Deep Learning (DL)**, a critical topic receiving little attention. These articles are targeted at managers who are responsible for or involved with analytical systems using neural network technology within large IT infrastructures. These managers are savvy about the organization’s priorities and IT resources, often interacting across IT and data science groups. They are also aware of the remarkable accomplishments of Deep Learning, courtesy of Google and others. They recognize that deploying analytical systems using DL presents unique challenges, as compared to conventional machine learning. They are often faced with a conceptual disconnect between IT professionals and DL practitioners—a gap that they must bridge!

Some might say that these articles overly simplifying the difficult concepts of Deep Learning. However, the proper characterization is that they distill the evolving practice of Deep Learning to be relevant and useful to the persons who fund DL-enabled analytical systems, who organize required resources, who define use cases, who evaluate performance, and who are held accountable for their impacts.

## New Paradigms—Guiding thinking about unique nature of DL

To bridge the IT-DL disconnect, this first article highlights the paradigm shifts from IT to DL, which are often complementary but confusing. In some instances, these paradigm shifts progress from conventional machine learning, while others are new and unique. The intent is that, by understanding and discussing these new DL paradigms, a healthy collaboration would be established. *Status:* [published in Towards Data Science](#).

- **Generalizing Beyond Known Data:** smartly guessing the dynamics of complex systems.
- **Cultivating a Farm:** Not building a house! Continual effort is required to mature DL models.
- **Coping with the Blackbox:** Magic happens but focus on the outputs and then inputs. Manage to the blackbox.
- **Teaching by Example:** Not learning! Be accountable for teaching with good examples.
- **Curating your Data:** Act as an art curator who preserves information and enhances context.

- **Treating Data as Reality Photos:** Stop thinking tabular data! Think ‘photos’ of business reality.
- **Exceeding Human-Level Performance:** New standards for maturing DL models. Use responsibly.
- **Data Drives Performance:** Little data implies poor DL. Whoever owns the data wins (with DL)!
- **Trained Models as Packaged Apps:** Trained DL models trained with large datasets become new packaged apps.
- **Augment, Not Automate:** Eliminate humans NOT. Carefully design Human-in-The-Loop points.
- **Own the Responsibility:** Monitoring and balancing benefits/costs for the organization and society.

## New Values—Changing criteria for valuating analytical systems

This article reviews approaches to determine the business value of analytics, from maturity stages to value chains. The end-to-end perspective focuses on improved business behavior from changes in processes. For instance, how does analytics improve the customer experience? Highlighted is the analytic last-mile that deploys DL applications into the IT ecosystem, along with the complementary analytic first-mile. *Status: published in [Towards Data Science](#).*

- **Intelligent Effectiveness:** Customizing tasks to the needs of specific situations.
- **Generalize Beyond Known Data:** Understanding the system dynamics.
- **Million-Unique-Things (MUT):** Where human intuition loses its mojo...
- **Volume-Velocity-Variety as Information Content:** All about the bits!
- **Examples with Features plus Labels—EFL Data:** Future corporate IP.
- **Analytic Maturity Stages:** Asking probing questions of reality.
- **Analytic Value Chain:** As the analytic data-to-action pipeline.
- **Analytic Last-Mile:** Hardest dirtiest segment to making a difference.
- **Learning as the Value Sustainer:** Static logic to learned logic to learning constantly.

## New Ethics—Dealing with ethical dilemmas having implications

Discussing the relevant ethical issues that may emerge from DL. Asking whether we **should** create new DL applications, which are now technically possible to create. Practical steps are suggested for having ‘the *ethics* conversation’ within the corporate setting. *Status: in draft.*

## New Horizons—Recognizing the many surprising ways of using DL

This article explores the surprising and unusual ways that DL research is exploiting the power of neural networks. Not your grandmother’s supervised learning any more! This emerging area is referred to as *meta-learning*—becoming aware of and controlling the learning (model training) processes. This includes a ‘zoo’ of approaches, such as transfer learning, reinforcement learning, autoencoders, generative adversarial networks, and attention management. And, it is supercharging the pipeline for the analytic value chain, for better or for worse! *Status: big pile of research pieces.*

## New Practices—Innovative practices for becoming DL-ready

This article suggests several best practices with low cost and risk to ‘test the waters’ as to whether the organization is a viable candidate for DL applications and is ready to develop and deploy such systems. *Status: bunch of good thoughts.*

## Additional Article Ideas

- **New Metrics**—Understanding the methods and issues for validating performance (accuracy) of DL models.
  - **New Terminology**—Using key terms with precision and forethought, in ways unique to your organization.
  - **New Applications**—Exploring new and innovative user cases for DL across industries. Why are they ‘good’?
  - **New Skills**—What skills related to DL are required by managers of DL-enabled systems? How much technical skills are required?
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If you benefit from these articles, please support [my Patreon](#) to create and mentor small peer groups of managers to explore key management issues of analytical systems enabled by Deep Learning. If this program might be of interest to colleagues, please share a link or tweet. Thanks, Richard

Updated 2018-08-21: Added details on New Values now that is published. Revised the outline for New Horizon covering meta-learning. 2019-01-25: Added more on New Ethics, raising its priority.