COGNITIVE COMPUTING PRIMER

Cognitive Industrial Revolution: Digital Transformation and the Reinvention of Business Economics

We have entered into the *fourth industrial revolution*. What machines did to textile industry in the 18th century, robotic process automation (RPA) powered by cognitive systems will do for businesses today.

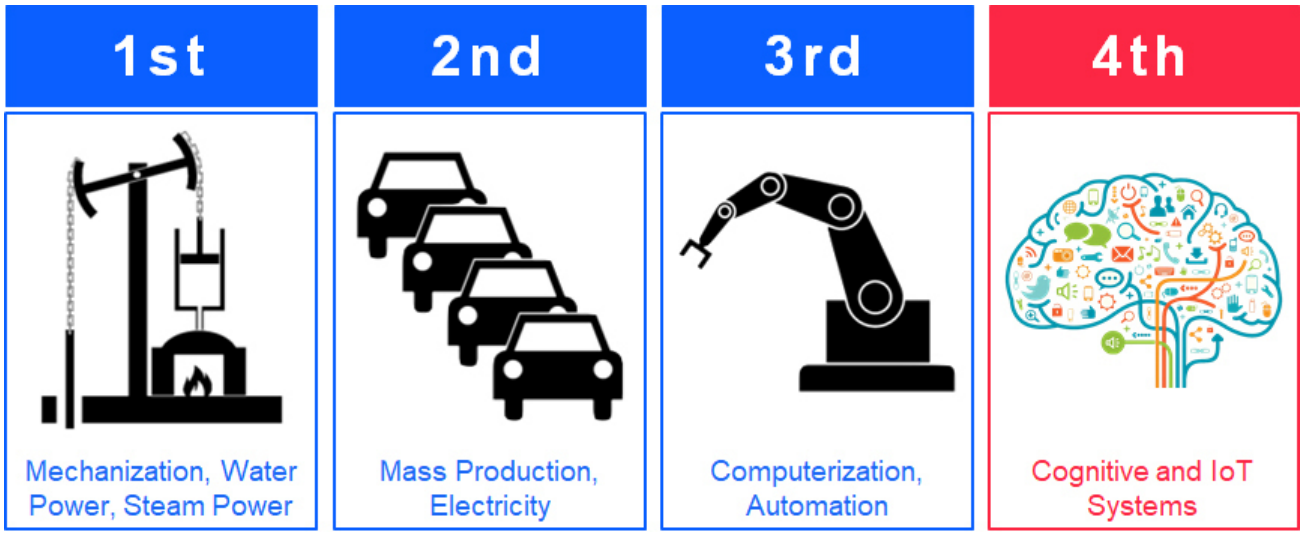
Our increasing use of technology has disrupted the way we fit within traditional business economics. The creation of new specific industries and services has forced business and thought leaders to redefine their business practices, tools, resources and relationships with customers, competitors, and partners.

Dark Data Unlocks Exponential Growth

There is a massive leadership shift underway: Decision makers in every industry are feeling the pull to transition their traditional businesses into thinking businesses. By applying exponential technologies, like cognitive systems and IoT, companies can unlock prodigious amounts of acumen that can be utilized and incorporated to enhance their business processes and offerings, to increase their competitive advantage, and to strengthen their customer utility and engagement.

By 2020, Business Insider estimates that there will be 34 billion devices connected to the internet. Technological innovation and accessibility has us creating a monumental amount of data, faster than ever before. Currently, only 10% of this digital data we are creating is usable or actionable by computers--meaning that 90% of digital information assets that organizations possess, often referred to as *dark data*, are untapped treasure troves of insights. Dark data is unstructured and difficult to analyze, which leads us to the modern data problem: now that we've got it, how do we *use* it?

About 15 years ago, businesses started utilizing analytics to unlock and understand as much of their data as possible; they used many processes and adapted as newer and better methods became available. The process that started it all was *descriptive analytics*. This process mines an organization's structured historical and past performance data to discover what happened, report on whether it was successful or not, and analyze why it happened. For example, automotive and manufacturing companies have repair tickets and receipts that are generated over the life of a product, and they want to understand which products may have large scale problems or deficiencies and use insights from those tickets to improve future processes.



As time wore on companies could no longer satiate their data hunger with descriptive analytics; organizations turned to predictive analytics. Living up to its name, *predictive analytics* uses past structured data and combines it with rules and algorithms to determine the likelihood of a situation occurring or probable outcomes of a future event. Building upon its predictions, predictive analytics suggest actions to benefit from decisions and outlines the implications of each decision option. An example of this could be your car or smart phone app navigation system. Have you ever been driving, and you get a traffic warning or a suggestion of an alternate route that will get you to your destination sooner? Predictive analytics powers these suggestions.

Both descriptive and predictive analytics are successful in producing business value and insights for enterprises, but they are limited, as both methods are only able to utilize structured data (10% of data resources). This raises the question: what about the rest of the data?

Descriptive analytics focuses on the past, predictive analytics focuses on the future of decisions and the implications of those decisions, but *cognitive computing* is the past, future, and the present all in one. The next step in the technological revolution, cognitive computing combines analytics with human-capability reasoning to turn any business into a *thinking business*.

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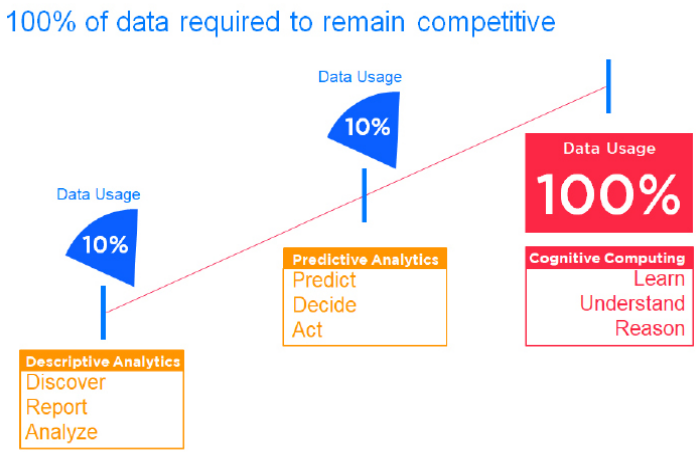

The Rise of Cognitive Computing

There is not yet a universally agreed upon industry or scientific definition for cognitive computing systems. It is agreed, however, that cognitive systems are a combination of hardware and/or software that mimics the functioning of the human brain.

At Loop AI Labs, our platform Loop Q is a culmination of scientific and technical advancements, blended into a system that has human-like abilities to learn and reason at scale from all data, structured and unstructured alike. Built upon principles of the human brain and neural networks, artificial intelligence, deep learning, natural language processing and linguistics, psychology, pattern recognition, hypothesis generation, and machine learning, cognitive computing achieves human-capacity learning and understanding. What separates cognitive computing from other similar technologies, such as Machine Learning (ML), Deep Learning (DL), or Artificial Intelligence (AI) is its end goal. While artificial intelligence is capable of taking a data and making decisions on it, cognitive computing's goal is to learn and understand by observing the successful cases of humans and striving to emulate their process to produce similar results.

Business Impacts of the Digitally Transformed Cogni-Capable Enterprise

Cognitive Computing Systems can be utilized in any data-producing business. By 2018, IDC predicts that over 50% of enterprises will have embedded cognitive systems into their processes. Companies worldwide have been embracing the thinking power of their data and seeing a strong revenue margin in their balance sheets, companies like Google, Facebook, Walmart, and Baidu.

What Can You Expect to Gain by Integrating Cognitive Systems into Your Strategic Roadmap?

1. **Competitive Advantage:** Be the first in your market to integrate cognitive systems and reap the transformative benefits! Perform better, operate smarter and more efficiently, and make more informed business decisions and forecasts. With your new decision optimization power, create new services and break into new markets.

2. **Increased Revenue and Savings:** A well-planned project can result in massive growth and operational savings. Create new value and use your company resources more economically; redefine your supply chain, research and development processes with the confidence of data. Use Cognitive Robotic Process Automation (Cognitive RPA) to grow the output of your organization with a scaled step, to increase the precision and accuracy of your operations, and to offer the most substantial benefits for your employees, customers, partners, and stakeholders.

3. **Increased Productivity:** Cognitive systems are an asset current full-time employees (FTE) by replacing the knowledge based, time consuming aspects of their positions with super-fast cognitive support. Organizations can make the expertise of their top performers (by using their data) accessible to the whole team, and aid in “in the moment” decision making, advising, training, and automation of repetitive tasks—freeing up employees for more creative and innovative projects.

4. **Increased Customer Intimacy:** Your customers are your customers because they have a need for the product or service that it is your business to provide. Some argue that there has been a shift in customer focus, shifting from product dominated focus to an experience dominated focus. A customer’s experience with your company can be a major deciding factor of whether they stay with you or switch to a competitor. By embracing unified, single-view customer models and leveraging past user data (experiences, preferences, and sentiment/emotions) to improve individual service and quality for each customer. Harnessing the power of cognitive RPA helps create a 100% personalized customer experience. All of your customers are unique and special, and their experiences should be too.

5. **Job Diversification and New Team Developments:** Positions that have intellectual requirements can be augmented by cognitive RPA, enabling employees to be liberated to work more efficiently and collaborate with other teams and projects within the company.

6. **Fast Adoption, Deployment,Transformation and Reinvention:** Have your first application ready in no time! Typical implementation times vary based on provider, ranging from 1-18 months. Loop AI Labs, for instance, takes 1-3 months depending on the data quantity. System deployment is available in on-premise appliance, Software as a Service (SaaS).

What Should You be Mindful of When Planning to Adopt Cognitive Systems?

1. **Data Consistency:** Make sure data is sourced and collected in a secure and sustainable way. Data laws and use regulations vary by country, like GDPR requirements in Europe. Consider the security and privacy constraints for the producers and collectors of your data. Be sure you have enough dark data for the cognitive system to provide the most impactful insights and the ability to continue learning over time; it is advised to have at least 1GB of uncompressed data to get started.

2. **Project and Use Case Creation:** Carefully craft your use cases. Be clear in what you are trying to accomplish and have a plan for your insights once you have them. Build a strategic panoramic Cognitive Roadmap, listing the business problems of your organization that can be solved with cognitive solutions. For optimal success, start with a smaller project that will provide a return on investment, as well as allow time for organizational transparency, change management, and employee adaptation. In embracing cognitive computing as a new tool of analytics, be open and flexible to the possibility of discovering benefits you did not expect, such as new market opportunities, new ways of looking at the customer experience, and innovating business processes.

3. **New Industries Have Limitations:** While the benefits of cognitive integration are already apparent, we are still exploring the boundaries of cognitive computing. A good place to start, is to look at low-risk areas where the organization can try the technology and learn. A good example is, the customer front-desk area of your organization. In this area, lots of documents in various shapes, formats, and often other languages arrive to the employees who make repetitive decisions based on the content within the documents. Cognitive systems can help these employees but consolidating and learning from the unstructured data, creating concept maps that make the data accessible to and actionable by employees. Once the organization has tried and assessed the technology, it can move gradually into more complex core business applications. As each use case is specific to each client, systems can be customized to include features that serve the organization's wishes and unique business practices. For example, every time a human or automation (Q Robot) is about to take an action that has certain ramifications, the system can be built to stop it for a human employee to give final approval on the machines recommendation. The cognitive system automatically assesses the impact of that action and double-checks with humans, if it anticipates sizable results. This human-in-the-loop interaction with employee and machine reinforces the machines' understanding in real-time. In a short time, the machines' confidence on common requests will be high enough that full automation of those similar requests will become possible.