

COGNITIVE  
COGNITIVE  
COMPUTING

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# EXECUTIVE SUMMARY

In recent years, with rapidly increasing volumes of Big Data, we have the ability to track a lot of information about users and their purchases. In short, a greater ability to understand user information, and to learn, to reason and take actions. But we cannot make important decision with that, we need smarter machines to organize data faster, make better sense of it, discover insights, learn, adapt, and improve over time without direct programming. Cognitive computing is helping out on this, by using big data stores as a source to feed algorithm behind and get correlation between this data. In a nutshell, the goal of cognitive computing is to create automated IT systems that are capable of solving problems without requiring human assistance.

# COGNITIVE COMPUTING COGNITIVE COMPUTING CORE CHARACTERISTICS

We at Globant believe that cognitive computing systems are fundamentally different from the current state of computing. Nowadays the computers are just a very fast calculator, we write code with fixed instructions and run super-fast on multicore, but cognitive computing allows you to move forward... But before we move to how, we must pin down precisely what differentiates cognitive computing and allows us to do what we are unable to accomplish with today's tools.

As a first take, we propose four distinguishing features that all cognitive computing systems must have:

## Adaptive

It should learn when the data changes.

## Interactive

They can interact with the user in a friendly way and with other devices. It should be user as well as device friendly.

## Iterative & Stateful

It must aid in defining a problem by asking the right questions or finding additional sources for input.

## Contextual

It must understand, identify, and extract contextual elements such as meaning, syntax, time, location, appropriate domain, regulations, user's profile, process, task and goal. They may draw on multiple sources of information, including both structured and unstructured digital information, it should be able to draw the information from multiple sources that is both structured and unstructured as well as sensory inputs along with sensory inputs (visual, gestural, auditory, or sensor-provided)

## COGNITIVE COMPUTING COGNITIVE COMPUTING

# WHY SHOULD IT MATTER!?

With invent of internet and technology advancements, consumer digital interaction has increased. As a result, across industries, organizations today collect overwhelming amounts of data from multiple source – that is both structured and unstructured such as video, images, symbols and natural language. No doubt this creates a data-rich environment for learning about customer needs and proactively addressing them. But with so much of data organizations are unable to make time-critical decisions. We need a new computing model in order for businesses to process and make sense of the data - mostly unsupervised and that is offered by cognitive computing.

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## WHAT

## WHY

## HOW

Is a new practice to discover, understand and model any kind of decisions made by the stakeholders of a company at any level, and allow to digitalize inside a platform.

These include the event which fire the decision process, the necessary information to evaluate the situation and the reasoning tree or the cognitive process to make the decision.

Transform the decision management system from analog to digital.

## WHAT

In the last years companies had invested a lot of resources to digitalize their data and processes, but not the decisions made by final users, chiefs, managers and boards. Now is time for them, to create a digital brain to automate, optimize, and govern repeatable business decisions.

## WHY

### Principles of Decision Management Systems

- Decisions First
- Explicitly Design Decisions
- Use Decision Management Technologies
- Deploy as Decision Management Systems

## HOW

A Decision Management System Has:

- **DESIGN TRANSPARENCY**  
to see exactly how the decision will be made in the future.
- **EXECUTION TRANSPARENCY**  
to reconstruct how a specific instance of a decision was made in the past.
- **IMPACT ANALYSIS**  
to assess the business impact of a change before it is made.
- **A CLOSED LOOP**  
for continuous improvement, and to test and learn, experiment and adapt.

## WHAT

## WHY

## HOW

Holistic Approach



**RULES ENGINE**  
(N° L)



**MACHINE LEARNING**  
(MY L)



**ARTIFICIAL INTELLIGENCE**  
(OTHERS L)

Maturity Landing

01

**SIMULATION**  
(UNATTENDED EXECUTION)

02

**HYBRID**  
(DUAL EXECUTION)


03

**FULL**  
(ATTENDED EXECUTION)

# COGNITIVE COMPUTING COGNITIVE COMPUTING HOW DOES IT MATTER!?

According to a new report by Allied Market Research titled, "Global Cognitive Computing Market Size, Industry Analysis, Trends, Opportunities, Growth and Forecast, 2014 - 2020" the cognitive computing market is expected to generate revenue of \$13.7 billion by 2020, registering a CAGR of 33.1% during the forecast period of 2015 - 2020.

 33.1%  
CAGR 2015 - 2020

 \$13.7 billion  
Revenue by 2020

## Key highlights of the study

THE GROWTH OF THE GLOBAL COGNITIVE COMPUTING MARKET **WOULD BE SUPPLEMENTED BY THE INCREASING VOLUME OF LARGE UNSTRUCTURED DATA** ACROSS VARIOUS VERTICALS SUCH AS HEALTHCARE, BANKING AND FINANCIAL, SECURITY AND IT & TELECOM.

ASIA-PACIFIC AND LAMEA ARE EXPECTED TO BE **THE MOST LUCRATIVE MARKETS IN TERMS OF GROWTH**, OWING TO THE DEVELOPMENTS IN THE HEALTHCARE AND THE INSURANCE SECTOR ALONG WITH THE GROWING ADOPTION OF ADVANCED TECHNOLOGIES.

**NATURAL LANGUAGE PROCESSING** IS THE HIGHEST REVENUE GENERATING TECHNOLOGY OF COGNITIVE COMPUTING.

INCREASED ADOPTION WOULD BE WITNESSED ACROSS KEY SECTORS SUCH AS **HEALTHCARE, RETAIL, BANKING AND FINANCE**, OVER THE FORECAST PERIOD (2015 - 2020)

**NORTH AMERICA** ACCOUNTED FOR THE MAXIMUM ADOPTION OF COGNITIVE COMPUTING APPLICATIONS WITH

**41.6%**

MARKET SHARE IN THE OVERALL GLOBAL REVENUE IN 2014



# COGNITIVE SYSTEMS KEY PLAYERS

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### IBM Watson

Watson is the state of the art of IBM research, it became famous because the jopardy program en US, the machine using watson answer all the question and win the jopardy price. Now IBM expose all this webservices and made some products. From Globant we are focus on use this technologies to apply directly to eCommerce solution.



### Amazon AWS Machine learning service

Amazon's latest offering falls into the first category. It only deals with prediction problems. The exact underlying learning algorithm is not known, but the features it provides are very similar to vowpal wabbit, a fast machine learning algorithm developed by Jon Langford based on the stochastic gradient descent algorithm. This algorithm, which works by sequentially streaming the data past the model and adapting it based on the observed prediction error, is inherently hard to parallelized but very efficient and has bounded memory usage, and is therefore the workhorse behind many large scale applications (used, for example, for ad click prediction at Google).

# COGNITIVE SYSTEMS KEY PLAYERS



## Microsoft Azure

Machine Learning offers a streamlined experience for all data scientist skill levels, from setting up with only a web browser to using drag-and-drop gestures and simple data-flow graphs to set up experiments. Azure Machine Learning Studio features a library of time-saving sample experiments, R and Python packages and best-in-class algorithms from Microsoft businesses like Xbox and Bing. Machine Learning supports R and Python custom code, which can be dropped directly into your workspace. Easily share your experiments, so that others can pick up where you left off.



## Google Prediction API

On the other hand, was released all the way back in 2011, and offers a very stable and simple way to train Machine Learning models via a RESTful interface, although it might seem less friendly if you generally prefer browser interfaces. We can define Google's approach as a "black box", since you get no control over what happens under the hood: your model configuration is restricted to specifying "Classification" vs. "Regression," or providing a preprocessing PMML (Predictive Model Markup Language) file and a set of weighting parameters in the case of categorical models

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# OUR VISION

New innovative technology has created an immense opportunity for digital marketers but the trick lies in identifying and reacting to the right information at the right time. At Globant, we recently created Cognitive Computing Studio to move to the next level of engagement with the clients, the efficiency of the operations and governance of the companies.

Our approach is to discover & understand the actual business decisions at any level, to shift from analog model to digital one. At this scenario, the organizations are able to increase business agility and the ability to constantly improve the quality of business decisions in response to rapid changes in the business and regulatory environments.



**SMART  
DISCOVERY**



**DIGITAL  
DECISIONS**



**DEEP  
ENGAGEMENT**

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**OUR VISION**

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**SMART  
DISCOVERY**

This practice is focused on discovering insights from big data, using structured and unstructured data.



**DIGITAL  
DECISIONS**

Cognitive Computing has the ability to infer meaning of colloquial information giving another dimension to data correlations and analysis. These new dimensions bring us a better understanding about contexts and moods.



**DEEP  
ENGAGEMENT**



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**OUR VISION**

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**SMART  
DISCOVERY**

Usually the business decisions are made by users at any level in companies, but today, the state of art of different technologies let us to start shifting decisions from analog to digital.



**DIGITAL  
DECISIONS**

This transformation allows to rethink them, we could use more information to understand the context and more complex reasoning trees to make decisions.



**DEEP  
ENGAGEMENT**

A good start to use cognitive computing systems could be to perform as advisors by suggesting a set of options to human users, who ultimately make the final decisions. Actionable Data.

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**OUR VISION**

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**SMART  
DISCOVERY**

These systems fundamentally change the way humans and systems interact and significantly extend the capabilities of humans by taking advantage of people's ability to provide expert assistance and to understand.



**DIGITAL  
DECISIONS**

These systems provide expert assistance by developing deep domain insights and presenting the information in a timely, natural and usable way.



**DEEP  
ENGAGEMENT**



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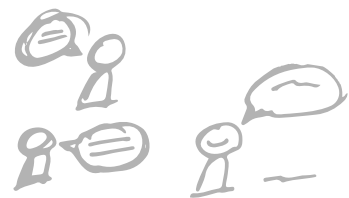
## OUR VISION

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One of the key to success, is to understand what's the perfect match between each decision and the technology to use to model it. The way to implement this transformation is with a smooth controlled transition, becoming like a human decision support platform to a more autonomous one.

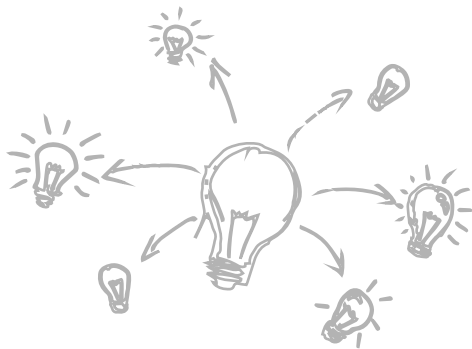
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**OUR VISION**

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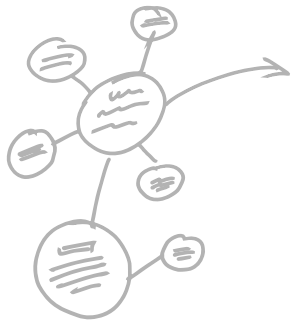
### Emotional

Emotional connection is the only way to create long term engagement. Understanding personality insights of each consumer and emotional levels of each touching are the keys to permanent connection.



### Adaptive

Shift from static to dynamic UX, is the only way to follow consumers needs and behaviours. An adaptive UX follows more accurate the consumer's journey.



### Evolving

A Machine Learning approach allows the UX to understand, learn and evolve by itself.



# CONCLUSION

Cognitive computing has arrived and it has the potential to radically redefine everyday life, changing how individuals perform their jobs, engage and interact with others, learn and make decisions. The newly introduced Globant's Cognitive Computing Studio was formed based on the rise of cognitive computing systems as the ultimate solution to improve companies' capacities.

The Studio is focused on developing intelligent products and services leveraging both the power and complexity of Big Data and Globant's expertise in fields like artificial intelligence, natural language processing, machine learning and Big Data. These solutions will enable companies to extend and magnify their expertise, and improve how they relate to their audiences with customer and context-aware smart applications.

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