PURPOSEFUL ARTIFICIAL INTELLIGENCE FOR THE ENTERPRISE

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It's a high decibel discussion

When the conversation turns to Artificial Intelligence (AI), opinions are typically polarized into one of the two extreme camps: those who believe it'll make our lives better, curing everything from boredom to cancer, and the others who are convinced it'll accelerate human irrelevance. Reality, as always, is somewhat more nuanced. Since humanity's earliest days, technology has been a great disruptor, but also one that has empowered us and improved our lives. AI technologies are taking this to a whole new level today. And, to ensure that some of us are not stranded on the wrong side of this disruption, it is essential that we create the right framework for us all to benefit. This same conversation about AI, when set in the corporate conference room, plays out not very differently.

Leaders, on the one hand, are excited about the potential to leverage AI to transform their business, bring radical cost reductions and efficiencies, and explore new kinds of value-creation opportunities. But nagging fears are never far away. Digital technologies, such as AI, have their risks – privacy protection and cyber security are issues that must be tackled carefully. Then there is always the great responsibility of equalizing the playing field for all – protecting the interests and careers of the workforce.

In the years that Infosys has worked on building AI platforms and solutions, we have encountered (and countered) a fair share of hype and conjecture. Given that most people's exposure to AI has been as consumers, we have also spent much effort showcasing its relevance to the business enterprise. Through 160 pilot implementations over 13 months it has been our endeavor to demystify AI, demonstrate the current capabilities of its technologies and put out a roadmap for enterprises embarking on their AI journey.

This document has been conceptualized in this same spirit.

Excited about AI, but not really prepared for it

An independent study that Infosys commissioned late last year confirmed this viewpoint, which we were also beginning to form from our conversations with several of our clients. 76 percent of the approximately 1,600 respondents – IT and business decision makers from organizations with more than 1,000 employees and annual revenue exceeding US$500 million – say that AI is fundamental to the success of their organization's strategy. Yet about half the respondents say that they did not know where AI could help their enterprise and also that they lack the required skills and proven enterprise solutions.

Over the past two years, we have helped a number of businesses improve their understanding of AI and with the help of use cases, demonstrated how and where they can put it to work in the enterprise. Walking clients through the basic requirements of being AI-ready, we have helped many of them find their bearings and proceed with confidence towards AI adoption.

So then, what would enterprises need to make AI work?

A rich data lake, adequate compute power, robust data science and continuous improving algorithms are the essentials.

Data is the lifeblood of AI. Large volumes of data are a reality for most enterprises today. And AI can help fully leverage this data wealth. However, an enterprise does not necessarily need a vast data repository to tap into before it can start leveraging the potential of AI. Having said that, it's important that the repository is scalable so it can be built up over time, with data pertinent to the several use cases explored along the way. This does not mean that the enterprise with the most data will automatically emerge as the leader. What really counts is the number of connections that can be made from the information. That being said, when there are two enterprises of equal analytical skill, the one with more data has the inherent potential to be able to uncover a larger number of patterns and more accurate insights. This enterprise also has more material to tweak and fine-tune algorithms and models, which should result in better recommendations or outcomes.

Ingesting, storing and analyzing enormous amounts of data in near real-time demands massive compute power. A few years ago that kind of computing power would have been beyond the reach of almost all organizations, but today, low cost commodity hardware along with open source software is making it possible for enormous data volumes to be processed by practically anyone who needs it.

Data science – the mathematical ability required to discover connections and build algorithms. Combined with the right skill and experience, it allows human intuition to be used in a practical way to solve tough problems. This is what enterprises draw upon to mine data, apply statistical techniques and implement machine/deep learning solutions. Infosys provides this expertise. In addition, we also bring software capabilities to automate a great part of this data science.

Continuously improving algorithms adds incalculable value to the quality of results AI can deliver. Organizations need to commit to learning from data and to be fully invested in this data-centric approach to growing their AI-led operations. This also means refining their understanding of computing requirements and iteratively advancing the mathematics and data science behind AI-based systems and applications. Because algorithms need time to learn and improve. With several algorithms-related innovations coming from open source, the journey to quality results has become relatively simpler for everybody.

Where to get started on the AI journey?

Our research also found that 49 percent of the organizations are unclear about how exactly AI can help in their specific situation. It is quite likely that they are confounded by the technology jargon, and even the competitive clamor of solution providers. At Infosys, we are guided by Marvin Minsky's definition of AI which describes it as the science of making machines do things that would require intelligence if done by humans. And we take a straightforward view of AI's purpose in the enterprise, which is quite simply, to solve a given problem that would otherwise need human intervention. Our process often includes a logical breaking down of business processes to first identify opportunities for automation of repetitive tasks through robotic process automation or cognitive automation.

For succinct framing and articulation of the problem we rely on the Design Thinking approach to problem-finding and creative problem-solving. The problem could relate to the enterprise's existing situation, and therefore call for renewal, improvement or automation of the work it is already doing on the IT or business front. Alternatively, it could be a search for new value and experiences that can only be fulfilled by an unprecedented solution.

AI: To renew the old and explore the new

Enterprises can bring AI into two dimensions. One is to help automate repetitive tasks and improve the productivity of work that businesses are already doing – both on the IT side as well as on the core business front. For example, AI can automate much of the maintenance and management of the enterprise IT landscapes and solve some fundamental problems around continuously lowering the costs of managing and evolving these IT landscape. It can support the deterministic, intelligent and cognitive automation of a broad set of IT services management activities and business processes. It can capture, combine and institutionalize the knowledge of complex, mission-critical legacy systems spread across paper documents, electronic databases and the workforce. Even improve the experiences of people working with these systems. On the business side of the enterprise, these improvements can take on other interesting flavors. Today, across industries, enterprises rely on AI to transform their landscapes and enable their systems to predict and automate tasks traditionally executed by humans. CPG companies are using AI for faster revenue reconciliation; pharmaceuticals for better forecasting; healthcare and insurance companies for managing their claims processes; banks for dynamic fraud analysis; and several others for applications from smart HR process management to just-in-time business reporting. They are increasingly realizing that intelligent systems can enable people to overcome the limitations of their senses and attention spans, and enhance and amplify their capabilities to drive higher value tasks.

The second dimension is to bring AI to serve the enterprise in creating new value, new experiences. When trying to accomplish this, the enterprise must articulate the problem beforehand so that it can be mechanically defined. Now it is a matter of building novel AI applications to solve the problem. Examples include game-changer applications that foresee and prevent issues, understand and predict the behavior of partners, suppliers and customers, predict the nature of products that are most likely to be marketed profitably, and so forth.

So, on the one hand, AI can automate the work people do, codify knowledge and bring to life solutions for both the IT side of the enterprise and the routine problems of typical business. But, AI can be much more than something that automates the work that enterprises are already doing. It can be a great amplifier of the work that businesses of the future will do.

But, technology – even AI – alone is not enough to power this journey purposefully. What's crucial is our ability to continuously teach ourselves new skills and nurture a mind-set that focuses not just on problem-solving but also on problem-finding, and innovation. Because, in our lifetime, we won't rub shoulders with problem-finding AI. So, while problem solving with AI will become extremely efficient, problem finding will remain in the human domain for the foreseeable future.

The AI approach to problem-solving

In every case, AI solves the problem at hand with a four-pronged approach of discovering, learning, sensing and acting.

Discovering and Learning

AI uses machine learning and knowledge management to discover and capture knowledge from sources of truth lying inside and outside an organization. Machine learning extracts patterns from a dataset and even uncovers previously unknown connections. Knowledge management then goes further by connecting a set of disparate, unrelated parameters, capturing the relationship between them, to give organizations much greater visibility into the previously unseen and richer context.

Sensing and Acting

When the AI system processes knowledge from events, transactions, tickets and errors, deep insights are created that are then leveraged for anomaly detection and probabilistic modeling (predictive) which then can be used to determine if the condition/outcome/problem is likely to occur in the future (prognosis). By using simple deterministic rules-based automation or more complex AI-based self-learning predictive automation, processes and tasks can then be automated so that undesirable situations are averted and repetitive tasks are automated.

Machine learning vs. Knowledge management

Machine learning merely extracts patterns from data, without putting it into context. Knowledge management, on the other hand, connects potentially disparate information to uncover much deeper insights, such as the root cause.

To appreciate the difference, consider a piece of source code that needs its bugs fixed. A machine learning application will point to the propensity for bugs to occur but it will take knowledge management to correlate error analysis to the root cause of the incident.

A software system can ingest system logs and records and use machine learning to identify that order validation is a step in the order-to-cash business process. But a knowledge management system will not only identify it as a step in the order-to-cash process, but also infer that order validation occurs after order entry and has a dependency on customer credit validation.

Hence, a complex process, drug discovery for example, which needs an understanding of body processes, such as creation of genetic material and protein synthesis, and the right drug for each problem, will require knowledge management capability.

Infosys NIA: Delivering on AI's promise to solve problems

Infosys Nia is a next-gen AI platform which collects and aggregates organizational data from people, processes and legacy systems into a self-learning knowledge base and then automates repetitive business and IT processes, freeing up human effort to solve higher-value problems that require creativity, passion, and imagination. It supports the deterministic, intelligent and cognitive automation of a broad set of IT services management activities and business processes. Beyond IT simplification and optimization, Infosys Nia also allows enterprises to leverage AI to drive transformation in their core business. Our clients have used Nia to leverage their organizational knowledge, generate deep insights and discover opportunities to optimize, simplify, automate and even reimagine their complex business processes.

NIA has three principal components: Data, Knowledge, and Automation

The Nia data platform has advanced analytics, machine learning, natural language processing (NLP), and optical character recognition (OCR) capabilities. It ingests raw data from a broad set of external data sources, including documents, email, event logs, databases and a lot more, which it stores in a large scalable repository of heterogeneous data. Nia currently offers users more than 50 readymade adapters to pull in data from diverse sources, but can easily build new ones to suit a specific requirement.

The ingested data is used to build the knowledge or reasoning systems. A combination of NLP and machine learning discovers relationships between various data elements to both enrich the data and provide context.

A knowledge model is constructed with the data, normalizing and enriching it with all its potential relationships and patterns (ontology). Included in this are also representations of process models which can be used for further analysis and future modifications. These are updated dynamically as new information is ingested so it serves as the single source of truth.

The insights and cognitive automation platform takes over next. It creates insights from the data in the knowledge platform by conducting analysis, detecting anomalies and doing predictive modeling that could be used to form a prognosis. It also automates processes and tasks based on simple deterministic rules or more complex AI-based self-learning predictive automation, depending on the requirement. Both of these ensure that the action taken is best suited to bring about the desired outcome.

Enterprises have the choice to leverage Infosys NIA in three ways:

- Standalone license: Implement Nia on-premise or consume it off the cloud to build bespoke applications
- Managed service: We manage Nia and its applications for you either on-premise or off the cloud
- Prebuilt solution: We integrate a prebuilt Infosys Nia solution into your current IT landscape.

Infosys NIA can give your enterprise its AI launch pad

Quickly implement our inbuilt solutions or use Infosys Nia's platform capabilities to develop bespoke AI applications. These samples of Nia's current implementations and use cases offer you a glimpse into the world of possibilities for AI to create the future you imagine for your enterprise.

Automate extraction, classification, and resolution of IT incidents

Engineers use Infosys Nia to automate tasks, beyond basic L1/L2, that are an integral part of their last line IT operations support. Nia automates root-cause and impact analysis and generates test plans for them. By providing deeper organizational context to incident tickets, it helps lower time-to-resolution and creates opportunities for the specialists to find and solve other interesting problems.

Deeply understand your customers

You can leverage our customer genome solution to get a beyond 360-degree view of your customer. Infosys Nia enables that by connecting to different systems, such as your ERP, CRM and even sources of unstructured data like surveys and email, to gather prebuilt models and attributes and create a comprehensive customer view that can then be used by sales, marketing, finance and other business functions to predict churn, uncover relationships at risk, and to proactively plan for desired customer outcomes.

Managing master data made easy

Multinational organizations regularly consolidate financial data across different regions. When done manually, the process can take several weeks often because of the mismatches in accounting standards and differences in local reporting requirements. Using Infosys Nia, we built a largely packaged system for master data consolidation.

Improve days sales outstanding (DSO)

Tardy collections can be a headache for any business. To improve Days Sales Outstanding (DSO), our finance team collaborated with the AI team to devise a solution to automate data consolidation and thereby predict DSO, forecast cash position, and identify high risk (of default) customers to follow up with. Clients have the option of taking this inbuilt solution along with our BPO services, which will manage DSO on their behalf.

Smells like success

The chief R&D officer of a global fragrance and cosmetics company wanted to identify the mix of formulations, which would appeal to customers and enjoy strong sales. We applied machine learning to three years' data, such as sales figures and online consumer reviews of various formulations and built an algorithm to predict the formulations that would top the charts in the market.

Ace the test

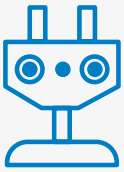
The same cosmetic giant wanted to optimize its product testing effort. Because most of its products used the same core ingredients, it was possible to predict how a new cream or fragrance would perform on various tests based on past data. As an extension of that, the company was able to use machine learning to identify the tests a product was most likely to fail. Armed with this insight, it managed to both prioritize the tests with a higher probability of failure as well as to minimize the total number of tests.

Power to see the unseen

Predicting and preventing outages was one of the priorities for a power generation company supplying to the world's biggest data centers. We analyzed the power signals emitted by their products over the past few years to detect telltale patterns – spikes, fluctuations and the like – and predict (and prevent) imminent outages.

A case for predictive maintenance

Organizations with large physical assets – mining companies, oil rigs, automobile companies, machinery manufacturers, etc. – will find this case of interest. Now, leveraging sensor data and a knowledge model, they can not only predict equipment failure, but also identify its root cause. (For example, the chiller in the refrigeration plant is consuming too much power because the cooling tower is not working as well as it should.) This is a significant difference between machine learning and knowledge management. Where machine learning can only predict an event, knowledge management can go beyond to even identify its root cause.



Comply with AI

The supervisors at a railroad company that used a large unionized contract workforce were finding it challenging to keep track of contractual obligations when taking day-to-day decisions. Using machine learning and NLP to collate and ingest all the contract documents, we created a knowledge model with a chatbot on top. Now, the supervisors only had to query the chatbot in English ("Can X be asked to work weekends?" "What is the company's leave of absence policy?""How do I transfer a worker?") and it would not only provide the right answer, but also point out to the specific rule that applied.

We are also implementing a chatbot to "read" various documents, contracts, manuals, etc. at a global bank as part of a pilot in KYC/AML compliance. The aim is to help the bank staff follow stipulated policies and procedures when notified of any suspicious activity.

While on the subject of compliance, it is worthwhile mentioning the work we did for a CPG company where we built a knowledge model capturing the raw materials used in various products, list of suppliers, and applicable laws to ensure supply chain compliance. So, if the company is supplying detergent to South Korea, where the local laws require indigenous raw materials to be used, the AI system will alert it in advance.

From design to production faster

When the design team of one of the world's top sportswear manufacturers receives a request from marketing, their AI engine does a thorough assessment of several factors, including raw material cost, supplier availability, seasonality, projected demand and the like, to determine where, how and at what cost and lead time the proposed design can be produced, and also whether it has a market at the proposed price. This exercise used to take several weeks and much manual effort because of the unavailability of every element of the relevant information – often simply trapped in a variety of disparate sources or with different staffers. But with Infosys Nia, the sportswear company performs the assessment in near real time, and with much more accuracy.

Discover how Infosys NIA can transform your business and deliver value to your enterprise

Get started by sending your request to **infosysnia@infosys.com**.

For more information, contact askus@infosys.com

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