

Artificial Intelligence's Journey from a "Value Optimizer" to a "Value Creator"

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The abundance of data, improved computing power at lower cost & the revival of interest in the AI field among the technology community has brought the spotlight back on AI in the last few years. Having worked in this field, one aspect that appears common is that most use cases are value optimizers and are not value creators. By value creators we are referring to those use cases that generates additional revenue to an enterprise via new customers or a new market segment all together. On the other hand, by value optimizers we are referring to those uses cases that optimize already existing processes by augmenting the capabilities of resources, thereby reducing complexity, time & FTE. It doesn't create any new market/revenue but rather aims to optimize already existing processes to reduce cost and increase savings.

The figure below (Figure 1) highlights our perspective of this point, where most of today's common use cases (in the AI space) represented by bubbles are falling on the left half of the value created parameter, leaving a huge void on the right side.

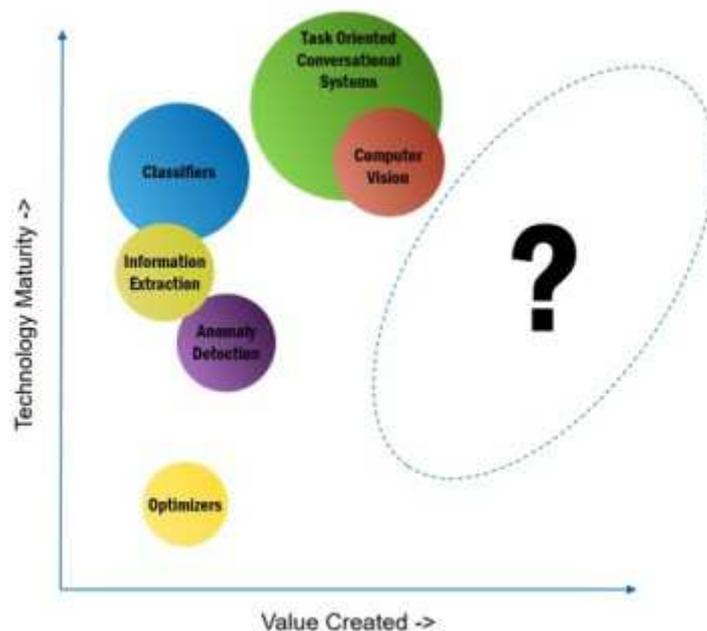


Figure 1: Perspective of Value Creation Use Cases

Why is AI consolidating as a Value Optimizer?

There may be many reasons why AI still predominantly remains a value optimizer in enterprises. In this article, we bring the spotlight to some of these reasons.

Hype v/s reality: Artificial intelligence is a buzz word today. AI today is often seen as a mysterious wand that can weave its magic to solve problems that other technologies have failed in. The truth, however, is that AI is not a magic wand and has its limitations. We are far away from a general AI solution that can think, learn & feel like a human being and mimic all cognitive behavior.

Natural language-based solutions often leverage AI concepts like ontology, NLP, NLG, summarization and semantic search. Just to highlight the gaps in these areas, we have provided some perspective through a few figures below that show our estimates of where the AI maturity stands today in these areas and where it will in a few years. Please note, we believe that as we move toward higher levels of maturity, the complexity increase exponentially, rather than linearly as depicted below.

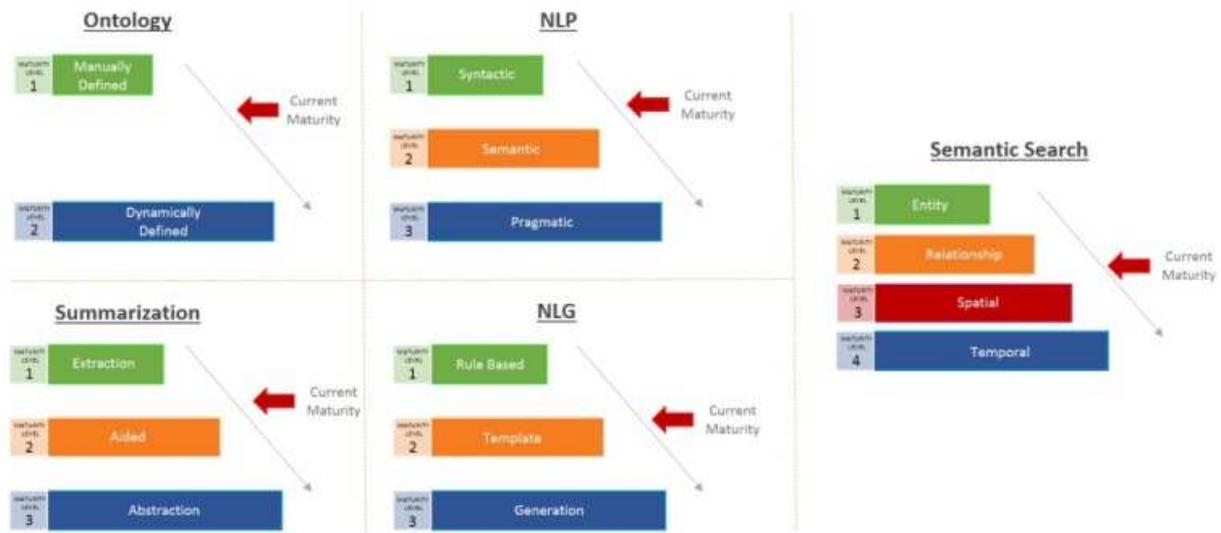


Figure 2: AI maturity for key AI concepts

The AI community needs to understand and manage customer expectations during this critical phase of time. Failure in over exuberant projects could send the wrong message to the business community thereby slowing down investments in AI and raising skepticism in the AI potential.

Need for standardization: The interest in AI has sparked off a race amongst the major global technology power houses in order to gain market share. This has resulted in multiple platforms and frameworks being available to the AI community to adopt and use. While having a plethora of options is not a bad thing, the lack of standardization and incompatibility of different framework certainly is. There arises a need to have a standards global body to ensure that we consolidate & bring global standards that would enable AI community to choose the strengths of all frameworks and have the ability to switch from one framework to another with minimum effort. The need for standardization holds good from both software and hardware perspectives.

Enough of white papers, time to execute: The pace at which an idea originates in a campus or a university and becomes an industrial use case is at its fastest ever. White papers often provide theoretical evidence that something can be achieved with a given technology. However, not all whitepapers findings are easily reproducible in the real environment.

Scarce AI resources: AI resources are one of the most sought-after resources in the IT industry. As such, building a team and more importantly retaining a team is a challenge that IT companies face today. True transformational, value creating AI projects often requires a strategic shift and needs individuals that share that vision to work on it. Unfortunately, there is a scarcity of such talent today

Availability of data remains a challenge: One of the first requirements for proving AI technology in the real world is getting access to real data. However, this remains a big challenge even today especially in the initial phases of the project where stakeholder commitment is relatively low. Localization of data in major countries has further created a challenge for global enterprises. Moreover, with more and more restrictions being put into place, on the handling and use of enterprise data, this challenge is expected to get even tougher.

Slower adoption from PoC to Implementation: The amount of time it takes to move from completion of a proof of concept to actual implementation is often large when it comes to AI related projects. The reasons are many. Firstly, very often machine learning / deep learning solutions are expected to take decisions that were otherwise done by human beings. For most processes in enterprises, there needs to be a reason attached to decisions taken, especially for compliance and audit purposes. However, in most AI solutions, especially, those linked to deep learning, such reasoning might not be possible. Secondly, there seems to be a growing concern of privacy and users are circumspect to share their information. Similarly, tighter data protection laws like GDPR increases the barrier for implementation of AI's complete potential. Finally, AI is often seen as an alternative to human work force, rather than a solution to augment human capabilities, leading to resistance from existing workforce.

Transformational Shifts To Power Artificial Intelligence's Next Move

Despite these challenges, Artificial intelligence needs to move from the role of a value optimizer to that of a value creator. The AI journey from value optimizers to value creators might be a challenging one but what awaits at the end of the

journey, will certainly be rewarding. AI is far from reaching its potential by any measures. The models of knowledge processing automation have matured and is nearing stability. Now we need to look forward to a world where AI creates value for enterprises and society as a whole. However, there are certain cultural & technological barriers that AI community faces in its journey. This is a critical phase in the journey and transformational shift is needed to overcome these challenges. By transformational shifts, we are referring to changes that disrupt the underlying assumptions and principles of today's processes and status quo.

AI Transformation Matrix

Today AI has achieved narrow intelligence based on the traditional outlook and technology concepts. For AI to attain its full potential, it is imperative for AI to undertake transformational shifts in both cultural outlook and technology. As depicted in the AI Transformational matrix, attaining transformational shifts in either one alone would not power AI to its true potential. Technology transformation without cultural evolution will lead to AI rejection similar to the AI winters already witnessed. Cultural transformation without the accompanying technology advancement would present us with a data overload which would at best be a handicapped version of true AGI.



Figure 3: AI Transformation Matrix

In this article we highlight 4 transformational shifts needed culturally & technologically for AI to achieve its ideal AGI state. Given below (Figure 4) highlights the challenges that AI needs to overcome, its current state and transformed state. We believe that if the AI community is restricting itself to today's assumptions and fundamentals, AI will find it difficult to reach its true potential. As such, beyond a point, a transformational shift is needed to trigger the next sequence of advancements.

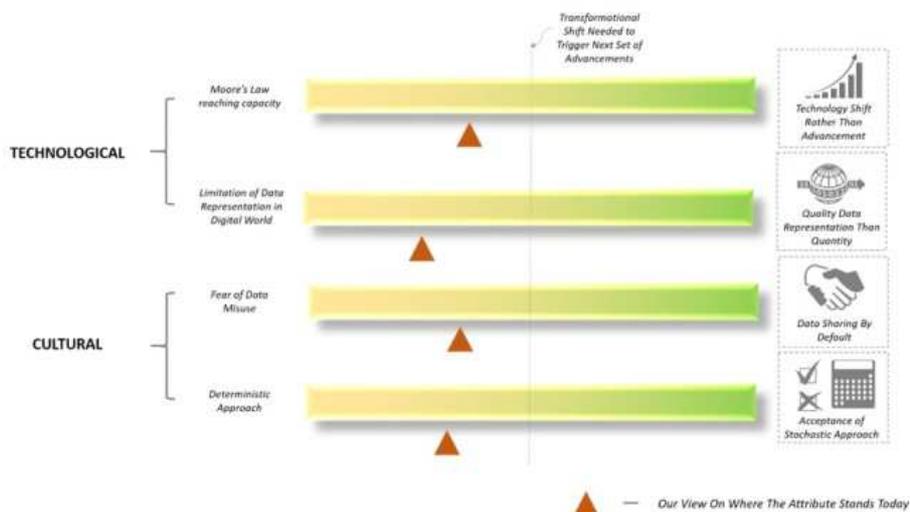


Figure 4: Transformational shift to trigger next phase of advancements

Technological Transformation:

Technology shift rather than advancement: There is no denying the fact that technology has advanced at a rapid pace over the last couple of decades. The increasing computing power at lower costs and architectural evolutions has enabled us to increase our processing capacity multifold. However, newer technologies like neuromorphic computing & quantum computing would provide a technology shift that would further augment the capabilities of current technologies. A breakthrough in these technologies would essentially get rid of most, if not all, of our computing worries. We might be a few years away from making a commercially viable break-through in either, however, it has the potential of changing the way we look at problems and how we build solutions.

Quality over quantity: Deep Learning and other advanced AI technologies/algorithms of today, requires a huge amount of data and lots of compute power to identify inherent patterns. Lack of labelled data, segregation of noise from data and time correlations are challenges that algorithms of today need to overcome. The current methods of data representation in the digital world is not how we humans store information. As such, if AI needs to mimic humans, it needs data representation closer to the real-life scenario. This is where we look forward to future advancements in task agnostic algorithms and better data representation in digital world, that would shift the focus away from solving problems via brute force (compute power) to smarter techniques that's relies more on quality rather than quantity.

Cultural Transformation:

Data Sharing by Default: Today, people are very circumspect of the intentions of enterprises when they collect data from their customers. Currently, the questions that people ask is, "How is my data used" or "Can it be misused" or "Is my life made easier by sharing my data?". The lack of transparency amongst enterprises have made it more difficult for people to trust them. However, a future is not far where this transparency will be provided and sharing data would be the norm. With tighter data protection laws (like GDPR), which governs both the ethical and privacy issues of end customers, people will begin to see value for sharing the data. The coming generations would provide data without a blink of an eye, because they would have been born into a data-driven world, which is based on trust and where reaping benefits of data analysis is the norm.

From deterministic to stochastic way of thinking: People tend to favor decisions that they understand and can derive. One of the major limitations of AI techniques that solve complex problems is that the derivation is not often part of the solution and it leaves human to trust the decision made by machines. Humans inherently are skeptical of blindly believing and trusting. However, a time is not far when this "lack of trust" barrier will be broken. People will begin to accept and trust heuristic approaches based on probability & statistics. The advancement of AI in life sciences like the use of AI powered machines for surgical operation and the excitement around autonomous car is a clear indication in this direction, as people are beginning to consider non-perfect solutions in even critical applications.

Conclusion:

Many believe AI is only a hype and will need many decades to reach it potential. This prediction is mostly based on the pivotal assumption that the status quo is maintained, that is, technology, algorithms, culture and the business environment will continue to grow linearly in future. However, we believe that transformational shifts are inevitable. A transformational shift has the potential to change the underlying assumptions and the rules of the game. The impact of such a shift can make existing AI methods obsolete and fasten AI's maturity. The utopian AI future may be a few years away but transformational changes can enable AGI to become a reality much earlier than expected.

About the authors



Mr. Sojan George has over 11 years' experience in the IT industry and has been predominantly associated with the Artificial Intelligence domain. He currently works as a Business Development Manager at Tata Consultancy Services for the Artificial Intelligence Practice. Over the last 5+ years, he has interacted with multiple customers, across domains, in solving their pain points leveraging AI techniques (like Deep Learning, Shallow Learning, Natural Language Processing) and has helped shape their AI journey. He has completed his BTech from Mar Athanasius College of Engineering, Kothamangalam, Kerala and his MBA from Leeds University Business School, United Kingdom.



Mr. Rajeev M Azhuvath is a hands-on technologist with 19 years of experience. Presently he is part of the Artificial Intelligence (AI) Program in TCS. Primary responsibilities include delivery of architecture focused on AI and building capabilities around shallow learning, deep learning, & natural language understanding. The right mix of consulting experience, delivery experience, servicing experience, research experience, & futurism gives him the unbiased perspective of technology and its impact. Additional areas of interest include advances in Nano Technology, Bio Technology, Information Technology, & Cognitive Science (NBIC). Special interest in Convergence of Technologies & Technological Singularity and its impact to humanity.