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# THE FUTURE OF QUALITY ENGINEERING IS WITH AI-ASSISTED EVERYTHING

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## Abstract

There is growing concern that AI tools such as ChatGPT are taking over our lives. However, much like any other disruptive technological advancement, there is clear evidence that AI tools too will serve as our assistants and help us achieve our greater goals faster and with better quality. This viewpoint discusses how we can leverage large language models (LLMs) in quality engineering processes to automate repetitive tasks and free up humans for critical thinking roles.

## Introduction

It is easy to forget that as revolutionary as ChatGPT is, it is also another evolutionary step for technology built on the foundation provided by existing AI and other technologies. Just like other revolutionary technologies, such as the original iPod that changed the way we listen to and consume music, AI will transform how we interact with the world around us.

To understand this, think of AI as the lynchpin that has the potential to accelerate the software lifecycle. Thanks to advancements in the arithmetical processing power of graphics cards, cloud computing, and the ability to run distributed workloads at unprecedented scale, AI has taken significant leaps in capability, enabling advancements at all stages of the

software development lifecycle.

In order to reap its benefits, it is important to not view this advancement as humans versus AI. Think of it as humans utilizing AI to amplify our strengths and achieve our goals, similar to how we utilize a stick, a car, or a spreadsheet.

However, we must be careful that LLMs like ChatGPT occasionally make claims that seem to be true. But that does not imply that you are right. AI tools do not hesitate or use words such as 'maybe' or 'perhaps,' and rarely will ChatGPT admit that it is not trained to perform a requested task. Hence, no matter how confident an LLM may seem, we cannot blindly trust what it tells us.
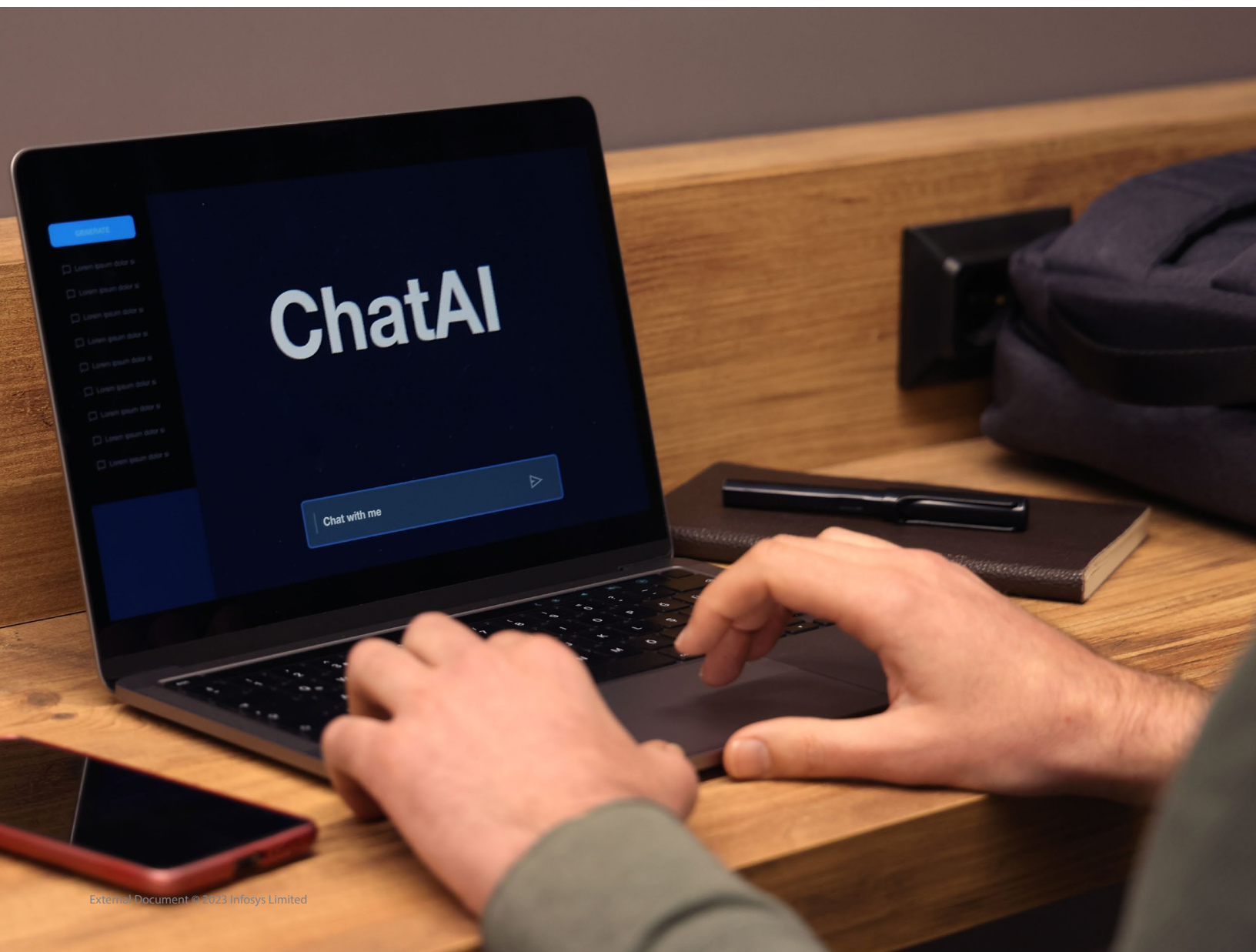
## Quality Engineering

There are two dimensions to consider from Quality Engineering perspective when we differentiate software 1.0 and software 2.0. In Software 1.0, the SDLC tasks like requirement gathering, design and development were largely manual and had certain patterns to the failures. The quality engineering activities were geared to prevent and capture these failures at different stages. However, in Software 2.0 - SDLC tasks will be AI assisted and will likely have an altogether different set of failure patterns that are yet to be understood completely and correctly. We can expect new failure patterns in areas of explainability, security, privacy, etc. that have not existed, or haven not been critical. We will witness a breakthrough in the field of quality engineering, new requirements and techniques will emerge in the coming days.

The pace of software development is accelerating fast with the time to market shrinking rapidly, putting more pressure on every role of the engineering team. The ability to deliver software quickly and with minimum errors requires tools that eliminate distractions and make each team member more productive. Several of the quality engineering tasks can be accelerated and automated leveraging generative AI. The minor/cosmetic errors/failures in machine produced code will likely be fewer allowing the focus to be on business-critical failure patterns that will require human in the loop.

In quality engineering, teams require confidence. We must be able to make go/no-go decisions about releases, and we need evidence that testing has been thorough, especially in regulated industries.

## The Phrase of the Day is "AI-assisted"

Not AI-driven or AI-powered, the phrase that best reflects where we are today is AI-assisted.

Why assisted? Although there have been significant advancements in the AI space, humans are still necessary at every stage. Humans determine requirements, acceptability, and correctness. Insight, innovation, and understanding will always require a human mind.

Consider the realm of passenger aviation. Most of the navigational duties are performed by automated systems and artificial intelligence, yet we have pilots and co-pilots. Why? This is because as a society, we cherish and uphold the sanctity of human life, and we are unwilling to face the potential risk of catastrophic consequences arising from an erroneous automated decision. As a result, the confluence of human expertise assisted by advanced automation technology and AI in modern aviation has made it the most secure and reliable form of global travel.

On the ground, driverless autonomous trains that transport people between stations have existed for over 70 years. This may be because the number of potential issues on a train (compared to those in the air) is dramatically reduced and controlled. The fewer the variables, the less complexity, and the more likely we are to trust autonomous modes of transportation. When it comes to ChatGPT and other LLMs, the same rule applies. AI alone might suffice for simple tasks, but if the goal is more sophisticated, human minds are required.

To identify flaws in quality, a human mind needs to think critically and unconventionally, analyze all possible flows and risks, and evaluate the system's output deterministically. Through critical thinking, sensemaking, and experimentation, quality engineers evaluate the system's status. To help quality engineers achieve goals faster and more efficiently, they have access to a wide selection of powerful tools and techniques. With the breakthroughs in LLMs, new AI capabilities are being created and added to augment existing tools.
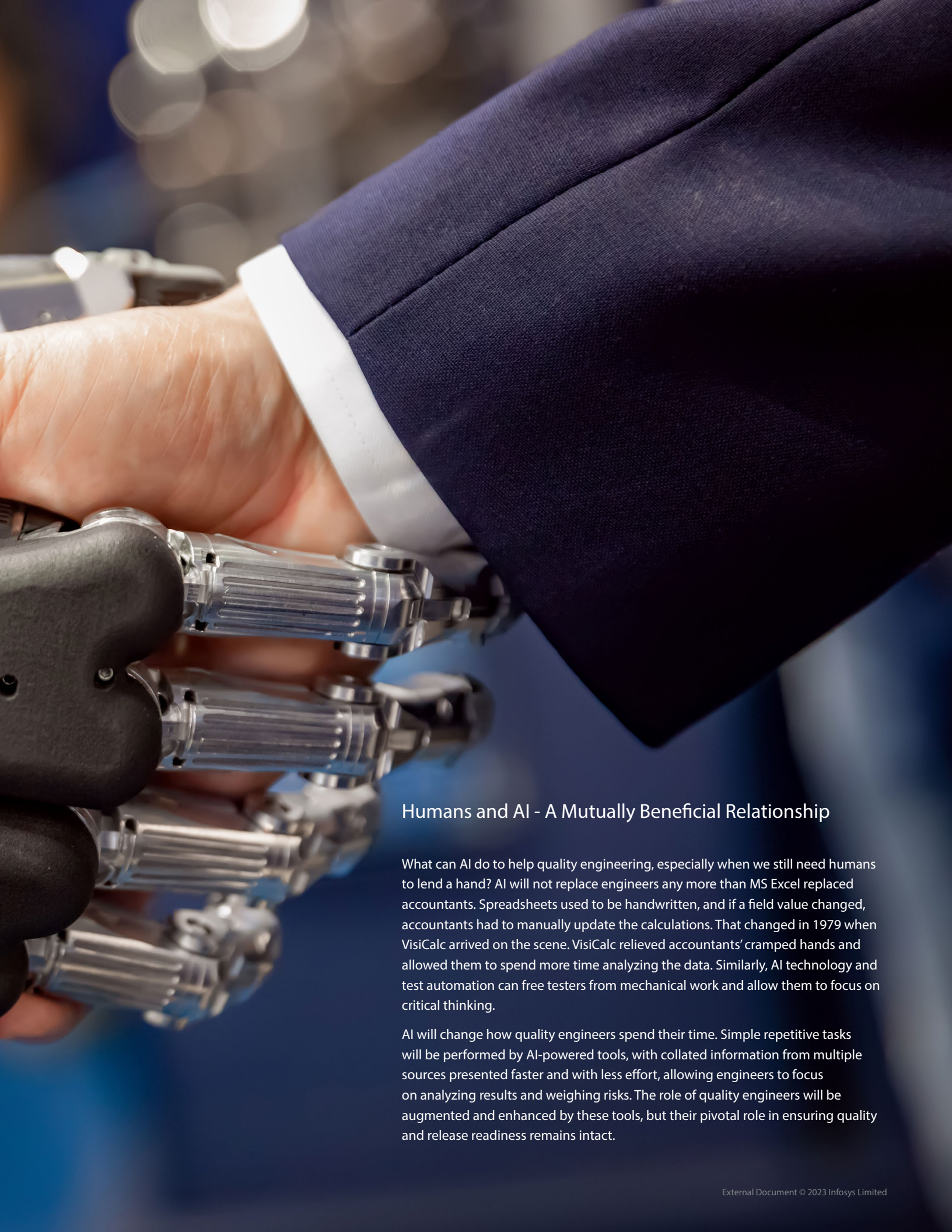
## Humans and AI - A Mutually Beneficial Relationship

What can AI do to help quality engineering, especially when we still need humans to lend a hand? AI will not replace engineers any more than MS Excel replaced accountants. Spreadsheets used to be handwritten, and if a field value changed, accountants had to manually update the calculations. That changed in 1979 when VisiCalc arrived on the scene. VisiCalc relieved accountants' cramped hands and allowed them to spend more time analyzing the data. Similarly, AI technology and test automation can free testers from mechanical work and allow them to focus on critical thinking.

AI will change how quality engineers spend their time. Simple repetitive tasks will be performed by AI-powered tools, with collated information from multiple sources presented faster and with less effort, allowing engineers to focus on analyzing results and weighing risks. The role of quality engineers will be augmented and enhanced by these tools, but their pivotal role in ensuring quality and release readiness remains intact.

# Conclusion

As the software release cycle continues to accelerate, and our tools and processes strive to adapt to this new velocity, the importance of quality engineering cannot be overstated. If we allow quality to slip, the inevitable result is increased production downtime and compromised user experience. We must prioritize higher software quality by adopting the advancements in AI-assisted technology.

With the integration of AI tools and techniques, we can elevate quality to unprecedented levels, ensuring that our software meets the needs of modern enterprises and exceeds the expectations of users. By harnessing the power of AI as a collaborative and augmentative force, quality engineering will play a pivotal role in driving innovation, minimizing errors, and delivering exceptional software that truly empowers and delights users in this fast-paced technological landscape.

## About the Authors

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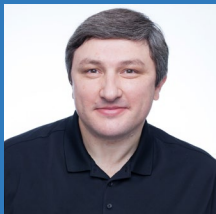
Dr. Grigori Melnik is Chief Strategy Officer, responsible for defining and articulating strategies for Tricentis, working closely across all functions to synchronize strategies with corporate execution. He also leads a research team that focuses on future Tricentis initiatives, expanding his work externally as an evangelist for Tricentis and assisting with major partnerships and acquisitions. A seasoned product executive, Grigori previously served at Tricentis as Chief Product Officer. He has over 25 years of experience in technology innovation, product/portfolio strategy and management, software engineering and research at raw startups, scaleups, top technology enterprises, academia, and governments. He is a hands-on leader with a passion for product innovation, software craftsmanship, building highly effective teams, and learning. Grigori holds a Ph.D. in computer science from the University of Calgary, Canada.

### Venkatesh Iyengar

Venkatesh Iyengar (Venky) has been with Infosys for over 22 years playing different global roles. He currently lives in Silicon Valley and is responsible for growing the cloud and validation solutions business across industries worldwide. Venky has developed a patented Testing Organization Maturity Assessment methodology while leading the validation consulting group and has managed multiple organizational transformations for clients across industry verticals. He holds a bachelor's degree in mechanical engineering and an MBA in sales and marketing. Outside of his professional life, Venky enjoys long hikes, long distance runs, and tennis.

Infosys Topaz is an AI-first set of services, solutions and platforms using generative AI technologies. It amplifies the potential of humans, enterprises and communities to create value. With 12,000+ AI use cases, 150+ pre-trained AI models, 10+ AI platforms steered by AI-first specialists and data strategists, and a 'responsible by design' approach, Infosys Topaz helps enterprises accelerate growth, unlock efficiencies at scale and build connected ecosystems.

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