



HOW AUGMENTED REALITY BRIDGES THE GAP BETWEEN HUMANS AND MACHINES

Abstract

Augmented reality (AR) connects the digital and real worlds by overlaying data and images onto the physical environment. AR is highly effective as it eases the application of information and minimises cognitive distance. AR can support multiple aspects of product development, like design, manufacturing, quality checks, and other support functions. AR can reveal the internal elements of a product in 3-D representation in the end-use environment, provide real-time, hands-on, and on-site instruction, and allow virtual control panel product interaction. The quality inspection of the final product for deviations from design is made much more efficient by using AR to superimpose the model on the finished product. AR is the optimal tool for training, operational instruction, and maintenance. Augmented reality can bring in end-to-end transformation in organisations in manufacturing and across sectors.



Use cases for Gen AI

Augmented reality (AR) bridges the chasm between the digital and real worlds by overlaying data and images onto the physical environment. IoT and digitalisation have generated a vast volume of data, but this data needs to be linked to the related physical context to enhance access and assimilation. Among the five sensory inputs, contextual visual input imparts information most effectively. The cognitive load on the brain increases when information must be read from a screen, held in working memory, applied to the working environment, and then translated into action. AR's ability to superimpose context-based images and data onto the physical environment facilitates parsing and applying the knowledge to the task. Bypassing the gathering of data from screens, easing the application of information, and minimising cognitive distance is what makes AR highly effective. Smart and IoT-enabled products that allow real-time remote monitoring, operation, and optimisation are increasingly common in our homes, workplaces, and plants. AR takes these features to the next level through highly improved visualisation and interaction capabilities. AR can reveal the internal aspects of a product in 3-D

representation, provide real-time, hands-on, and on-site instruction, and allow virtual control panel product interaction. AR can become an integral extension of the product and can also enhance productivity across all other functions.

AR can support multiple aspects of product development, like design collaboration, production, operations, sales, and user experience. With AR-driven product design review, the design can be superimposed in its true size onto the actual physical environment where it will be manufactured or used. Trying out the design within the final use environment prevents problems faced by conventional prototype development, which works in lab settings but faces unforeseen issues in the environment of use. For instance, when the AR tool overlays the CAD model of an outdoor use automobile product on the terrain, it allows virtual movement and visibility of internal product function from all angles. The all-around and in-depth inspection helps evaluate ergonomics, sight lines, and the product's response to unexpected changes in the terrain.

AR also prevents the problem of the design on the screen not getting translated to the actual 3D product. AR-assisted

prototype development involves hands-free devices that provide workers with plans, assembly instructions, and other relevant contextual details. The availability of all requisite information within an optimal visibility space minimises errors. The quality inspection of the final product for deviations from design is made much more efficient by using AR to superimpose the model on the finished prototype. AR is the optimal tool for training, operational instruction, and maintenance. AR helps marketing and sales test the product prototype with a broader audience, allowing users to experience how it fits into their environment. AR solutions can utilise IoT feedback from products in the field and customer feedback to suggest improvements for related new product development.

Manufacturing has always been cautious in adopting new technology due to the high costs involved. With AR, organisations seek to overcome hurdles around an ageing workforce, scarcity of talent, and training challenges due to process and machinery complexity. Manufacturing assembly line workers can use AR wearables that overlay production instructions, increasing efficiency and safety manifold as workers

do not need to look away to read and understand instructions. Quality inspection is a priority AR use case as error-prone, time-consuming processes can be replaced with real-time data and images. The CAD design can be imposed on the actual product, which helps highlight any inconsistency or fault.

Expanding, and increasingly sophisticated product lines increase the training load on employees. AR technologies provide optimal learning environments with 3-D representations of products and machinery in multiple configurations and by highlighting subsystem interaction. The in-depth visualisation helps employees understand product functioning better leading to improved business outcomes. AR can use inputs from factory sensors, control systems, and other monitoring systems to present real-time environmental parameters and diagnostic information about machinery and processes. Timely contextual alerts about parameters, settings, and defects help workers understand issues beforehand and initiate proactive action to prevent downtime. AR solutions extend beyond increasing productivity and quality through information and image visualisation.

They are the interface for workers to operate connected machines. Cobots most effectively represent human and machine collaboration. AR solutions provide an intuitive, seamless connection mechanism to program and command cobots and other industrial robots. Conventionally, reprogramming a robot had to be taken up at a separate location. With AR, virtual interactive dashboards facilitate programming like motion or kinetic machine control on the shop floor. AR solutions can communicate with IoT-enabled machinery to pause the execution of a task or suggest altering the programming parameters based on feedback. For example, suppose instructions to weld within a precise measurement range have been given, and the IoT feedback indicates that the welding machine settings are incorrect. In that case, the solution will display the fault details to the task worker.

Digital twins with real-time data in manufacturing provide a platform for the predictive analysis of processes and products. Combining AR and digital twin accelerates the [digital transformation of manufacturing](#). Implementing AR and VR technologies in the digital twin lets users

see the testing and manipulation of the equipment virtually in 3D. AR can overlay the digital twin on machinery, aiding the visualisation of the working and the understanding of the data flow.

AR benefits extend to critical support functions of manufacturing like logistics. Logistics workers can hugely benefit from real-time access to information of interest within the most convenient view space, allowing them to use their hands to perform their tasks instead of accessing information. Warehouse workers with AR devices like glasses can efficiently compare goods received to the delivery note, be routed to the delivery point or the storage area, and be instructed on storing goods. AR improves productivity in shipping area tasks like packaging and loading through packaging and loading instructions based on the items.

Augmented reality can bring in end-to-end transformation in organisations across sectors like education, logistics, product service, marketing, and retail. As many more organisations and brands adopt AR technology to transform and grow, the AR-VR industry is expected to surpass USD 125 billion by 2024.

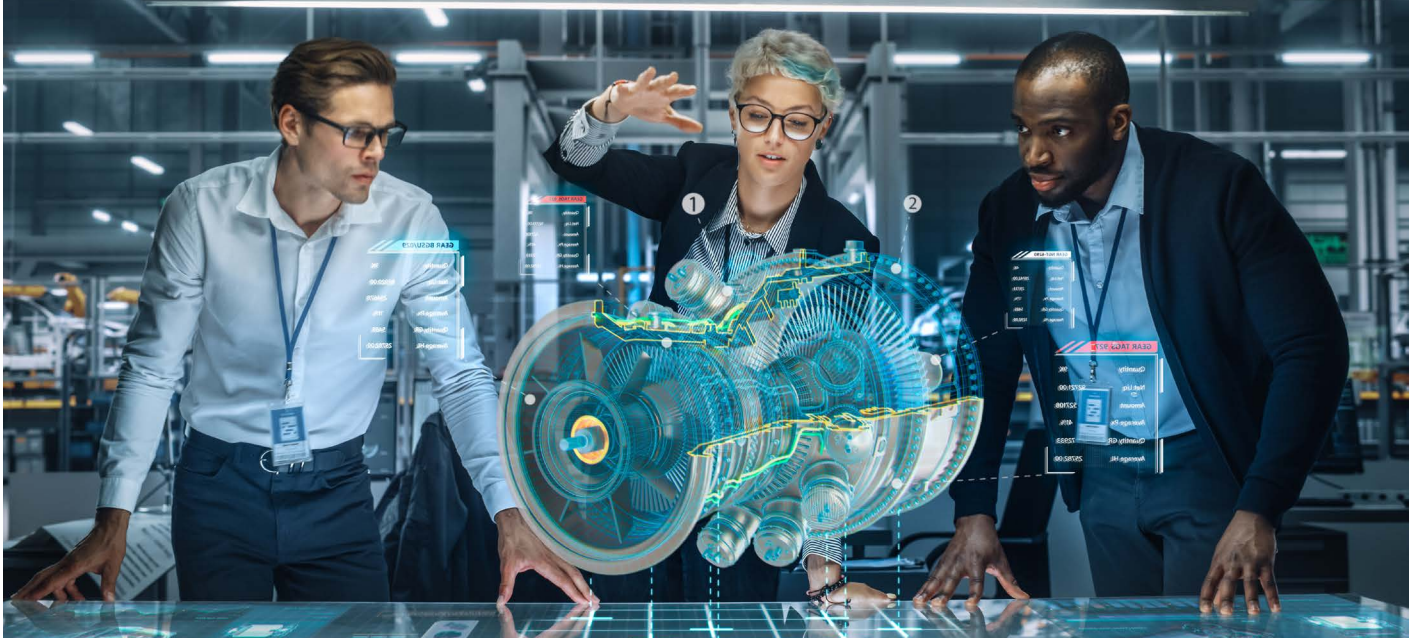


How can Infosys BPM help?

AR solutions are the interfaces that optimally connect humans and machines to enhance innovation, productivity, and quality. The **Infosys BPM Manufacturing**

Industry Services team has well-proven expertise in digital technologies to help your organisation be industry 4.0 ready. Our team of proficient domain experts and

leading-edge technology experts deliver more than end-to-end manufacturing business solutions. We deliver catalysts for transformation and growth.



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